



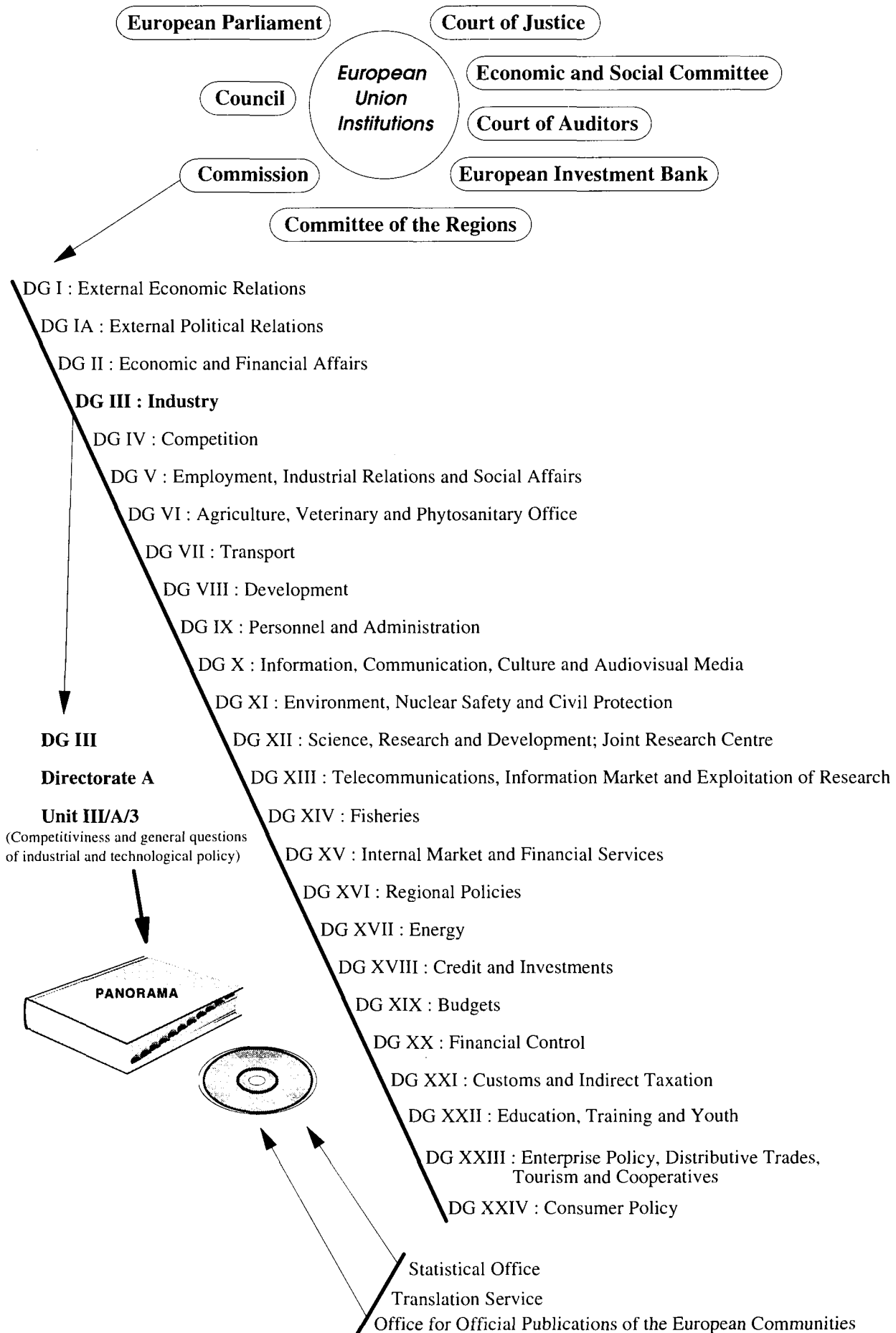
# PANORAMA of EU INDUSTRY 95/96



**European  
Commission**

*An extensive  
review  
of the situation  
and  
outlook  
of the  
manufacturing and  
service industries  
in the  
European  
Union*

# Principal European Union Institutions





Erratum: Tables on page 160, 162, 170 are to be replaced as follows

Table 1: Ranking of the 50 most dynamic CMAs according to Birch

Rank	Birch	Name	CMA	Country	Employment (beginning)	Employment (end)
1	12 766	CO-OPERATIVE WHOLESALE SOCIETY LTD	1	UK	20 000	28 850
2	8 798	KERRY CO-OPERATIVE CREAMERIES LTD	1	IR	2 615	6 279
3	7 447	NATIONWIDE BUILDING SOCIETY	2	UK	6 453	10 873
4	7 260	DEBEKA KRANKENVERSICHERUNGSVEREIN a.G.	2	DE	4 786	8 755
5	6 390	RABOBANK NEDERLAND	1	NL	30 833	36 258
6	5 690	WATERFORD CO-OPERATIVE SOCIETY LTD	1	IR	1 166	3 224
7	5 148	R+V LEBENSVERSICHERUNG a.G.	2	DE	8 066	11 635
8	4 501	CEBECO - HANDELSRAAD	1	NL	3 024	5 499
9	4 447	UNITED/NORWEST CO-OPERATIVES LTD - Southern/Northern/Central	1	UK	5 918	8 881
10	4 068	NORWICH UNION LIFE INSURANCE SOCIETY	2	UK	5 265	7 957
11	3 600	LONDON LIGHTHOUSE	3	UK	6	150
12	3 589	SCOTTISH WIDOW'S FUND AND LIFE ASSURANCE SOCIETY	2	UK	2 529	4 532
13	3 335	COOP ITALIANA DI RISTORAZIONE	1	IT	421	1 414
14	2 840	EROSKI, S. COOP.	1	ES	1 683	3 184
15	2 739	GOTHAR VERSICHERUNGSBANK V.V.a.G.	2	DE	2 872	4 587
16	2 667	STANDARD LIFE ASSURANCE COMPANY	2	UK	5 808	7 795
17	2 362	FEDERATION NATIONALE LEO LAGRANGE	3	FR	447	1 275
18	2 304	DATENVERARBEITUNGSORGANISATION DES STEUR BERATENDEN BERUFES IN BRD	1	DE	2 814	4 316
19	2 253	APOFRUIT	1	IT	206	792
20	2 215	KONSUMGENOSSENSCHAFT DORTMUND-KASSEL e.G.	1	DE	10 030	11 897
21	2 072	COOP SCHLESWIGHOLSTEIN E.G.	1	DE	5 447	7 048
22	2 044	CHELTHENHAM & GLOUCESTER BUILDING SOCIETY	2	UK	1 417	2 552
23	2 041	SHAW TRUST LTD	3	UK	1 010	2 027
24	2 039	ASS. NAZ. FAMIGLIE FANCIULLI ADULTI SUBNORMALI	3	IT	1 300	2 403
25	1 968	SERIST SERVIZI TOR VERGATA	1	IT	31	263
26	1 904	THE BRISTOL & WEST BUILDING SOCIETY	2	UK	2 020	3 216
27	1 800	GRUPO EMPRESARIAL COOPERATIVO VALENCIANO	1	ES	1 214	2 205
28	1 766	APOTHEKERS COOPERATIE OPG U.A.	1	NL	1 381	2 398
29	1 763	ACORNS CHILDREN'S HOSPICE	3	UK	4	86
30	1 610	GRULA - GRUPO LISBOETA DE ABASTECIMENTO DE PRODUTOS ALIMENTARES CRL	1	PT	185	646
31	1 572	BRADFORD & BINGLEY BUILDING SOCIETY	2	UK	2 476	3 567
32	1 445	ASEPEYO MUTUA PATR DE ACCID DE TRAB.151	2	ES	1 071	1 890
33	1 326	HUK-COBURG	2	DE	4 172	5 230
34	1 201	VESTJYSKE SLAGTERIER	1	DK	4 783	5 777
35	1 152	COOP ESTENSE	1	IT	1 323	2 062
36	1 122	C.A.M.S.T.	1	IT	1 604	2 365
37	1 100	ASSOCIATION DES PARALYSES DE FRANCE	3	FR	5 336	6 272
38	1 043	CONFEDERATION NATIONALE DU CREDIT MUTUEL	1	FR	21 139	22 135
39	1 012	MAC INTYRE CARE	3	UK	248	640
40	933	ROYAL NATIONAL INSTITUTE FOR THE BLIND	3	UK	2 100	2 800
41	921	VERENIGDE COÖPERATIEVE MELKINDUSTRIE COBERCO B.A.	1	NL	3 337	4 089
42	860	SCOTTISH AMICABLE LIFE ASSURANCE SOCIETY	2	UK	1 737	2 368
43	857	MD - FOODS AMBA	1	DK	4 939	5 684
44	835	GOLDEN VALLEY FOOD PRODUCTS Ltd.	1	IR	511	957
45	833	CO OP ULM KONSUMGENOSSENSCHAFT EG	1	DE	1 024	1 568
46	797	HAFTPFLICHT VERBAND DER DEUTSCHEN INDUSTRIE V.a.G.	2	DE	2 253	2 877
47	791	MANUTENCOOP	1	IT	747	1 228
48	770	COOPERATIVA DI LAVORO "LA GASCINA" sociedad coop a resp limitada	1	IT	400	790
49	763	DEUTSCHE APOTHEKER UND ARZT BANK	1	DE	1 364	1 909
50	759	IMPERIAL CANCER RESEARCH FUND	3	UK	1 209	1 737

Source: SOFICATRA study

Table 2: Ranking of the largest CMAs according to employment

Rank	Employment	Name	CMA	Country
1	80 000	ASSISTANCE PUBLIQUE DE PARIS	3	FR
2	38 800	JOHN LEWIS PARTNERSHIP PLC	3	UK
3	36 258	RABOBANK NEDERLAND	1	NL
4	28 850	CO-OPERATIVE WHOLESALE SOCIETY Ltd.	1	UK
5	24 598	HALIFAX BUILDING SOCIETY	2	UK
6	22 135	CONFEDERATION NATIONALE DU CREDIT MUTUEL	1	FR
7	14 080	CAISSE CENTRALE DES MUTUELLES AGRICOLES	2	FR
8	13 000	ASSISTANCE PUBLIQUE - HOPITAUX DE MARSEILLE	3	FR
9	13 000	MAX PLANK GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFTEN E.V.	3	DE
10	12 500	CO - OPERATIVE INSURANCE SOCIETY	1	UK
11	12 326	CO - OPERATIVE RETAIL SERVICES LTD	1	UK
12	11 897	KONSUMGENOSSENSCHAFT DORTMUND - KASSEL e. G.	1	DE
13	11 635	R+V LEBENSVERSICHERUNG a.G.	2	DE
14	11 360	GROUPAMA	2	FR
15	11 000	ASSOCIATION POUR LA FORMATION PROFESSIONNELLE DES ADULTES	3	FR
16	10 873	NATIONWIDE BUILDING SOCIETY	2	UK
17	10 806	ALLIANCE & LEICESTER BUILDING SOCIETY	2	UK
18	10 331	FELLESFORENINGEN FOR DANMARKS BRUGSFORENIN	1	DK
19	10 229	REMPLOY Ltd.	3	UK
20	10 160	CROIX ROUGE FRANCAISE	3	FR



**Table 2: Ranking of the largest CMAs according to employment (continued)**

Rank	Employment	Name	CMA	Country
21	10 000	KONSUMGENOSSENSCHAFT HALLE E.G.	1	DE
22	10 000	CENTRE HOSPITALIER UNIVERSITAIRE DE BORDEAUX	3	FR
23	8 881	UNITED/NORWEST CO-OPERATIVES LTD - Southern/Northern/Central	1	UK
24	8 755	DEBEKA KRANKENVERSICHERUNGSVEREIN a.G.	2	DE
25	8 376	MÖLLER-STIFTUNG HOLDING & CO. KG	3	DE
26	8 369	SODIAAL	1	FR
27	8 125	MUTUELLE GENERALE DE L'EDUCATION NATIONALE	2	FR
28	7 999	WOOLWICH BUILDING SOCIETY	2	UK
29	7 957	NORWICH UNION LIFE INSURANCE SOCIETY	2	UK
30	7 930	FAGOR OFICINAS CENTRALES, S.C.L.	1	ES
31	7 795	STANDARD LIFE ASSURANCE COMPANY	2	UK
32	7 453	BANCA POPOLARE DI NOVARA SCARL	1	IT
33	7 432	ARBEITER-SAMARITER-BUND DEUTSCHLAND E.V.	3	DE
34	7 393	CENTRE HOSPITALIER REGIONAL DE MONTPELLIER	3	FR
35	7 117	EDEKA OFFENBURG EG.	1	DE
36	7 048	COOP SCHLESWIG HOLSTEIN E.G.	1	DE
37	6 772	SIEMAG WEISS STIFTUNG & CO. KG	3	DE
38	6 700	FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	3	DE
39	6 500	CHRISTLICHES JUGENDDORF-WERK DEUTSCHLANDS E.V.	3	DE
40	6 500	FRIESLAND (FRICO DOMO)	1	NL
41	6 317	LEEDS PERMANENT BUILDING SOCIETY	1	UK
42	6 293	MARIE CURIE MEMORIAL FOUNDATION	3	UK
43	6 279	KERRY CO-OPERATIVE CREAMERIES LTD	1	IR
44	6 272	ASSOCIATION DES PARALYSES DE FRANCE	3	FR
45	6 019	SLAGTERISELSKABET DANISH CROWN AMBA	1	DK
46	6 000	HOSPITAL UNIVERSITARIO SAN CARLOS	3	ES
47	6 000	CENTRE HOSPITALIER REGIONAL	3	FR
48	6 000	HOSPITAL '12 DE OCTUBRE' INSALUD	3	ES
49	6 000	HOSPITAL GENERAL GREGORIO MARAÑON	3	ES
50	5 777	VESTJYSKE SLAGTERIER	1	DK

Source: SOFICATRA study

**Table 3: Ranking of the largest CMA groups according to employment**

Rank	Employment	Name	CMA	Country
1	73 750	GROUPE - CAISSE NATIONALE DU CREDIT AGRICOLE	1	FR
2	57 160	GRUPPE ARBEITERWOHLFAHRT	3	DE
3	40 200	GROUP CO-OPERATIVE WHOLESALE SOCIETY LTD	1	UK
4	25 802	CHAMBRE SYNDICALE DES BANQUES POPULAIRES - GROUPE	1	FR
5	25 322	GROUPE - MONDRAGON CORPORACION COOPERATIVA	1	ES
6	17 996	NORWICH UNION INSURANCE GROUP	2	UK
7	14 065	GROUPE NATIONWIDE BUILDING SOCIETY	2	UK
8	13 905	GROUPE FDB	1	DK
9	12 500	GROUP - IRISH DAIRY BOARD CO-OPERATIVE	1	IR
10	12 350	GROUPE GROUPAMA	2	FR
11	9 767	GROUP BRITISH UNITED PROVIDENT ASSOCIATION	2	UK
12	8 972	GRUPPE DEBEKA	2	DE
13	8 078	GROUPE SISTEMA MAPFRE	2	ES
14	6 989	GRUPPE SIGNAL VERSICHERUNGEN a.G.	2	DE
15	6 938	GRUPO EROSKI	1	ES
16	6 700	GROUPE ARCO	1	BE
17	6 679	GROUPE CAISSE FEDERALE DU CREDIT MUTUEL CENTRE EST EUROPE	1	FR
18	6 400	GRUPPE GOTHÄR KONZERN	2	DE
19	6 100	GRUPPE IDUNA	2	DE
20	5 814	GROUPE GMF	2	FR
21	5 364	GRUPPE HUK COBURG VERSICHERUNG	2	DE
22	5 361	GRUPPE WÜRTTEMBERGISCHE VERSICHERUNG	2	DE
23	5 000	GROUPE LES MUTUELLES DU MANS ASSURANCES	2	FR
24	4 532	GROUP SCOTTISH WIDOWS FUND AND LIFE ASSURANCE	2	UK
25	4 437	GRUPPE COOPERATIE SUIKER	1	NL
26	4 228	GROUP AVONMORE CREAMERIES LTD	1	IR
27	4 061	GRUPPE HDI	2	DE
28	4 025	GRUPPE ALTE LEIPZIGER aG	2	DE
29	4 000	GRUPPE DEUTSCHES JUGENDHERBERGSWERK GESAMTVERBAND	3	DE
30	3 823	GROUPE COMPAGNIE LAITIERE EUROPEENNE	1	BE
31	3 746	GROUPE CANA	1	FR
32	3 504	AVERO CENTRAAL BEHEER GROEP	1	NL
33	3 165	GROUPE COOP ALSACE	1	FR
34	3 151	GROUPE UNICOPA	1	FR
35	3 000	GROUPE A.N.P.F.	1	FR
36	2 873	GROUPE LIMAGRAIN	1	FR
37	2 806	GROUPE CAIXA CENTRAL DE CREDITO AGRICOLA MUTUO	1	PT
38	2 800	GROUPE - CENTRALE COOPERATIVE AGRICOLE BRETONNE	1	FR
39	2 557	GRUPPE DEVK KONZERN	2	DE
40	2 528	GRUPPO COOP TOSCANA LAZIO	1	IT
41	2 368	GROUP SCOTTISH AMICABLE LIFE ASSURANCE SOCIETY	2	UK
42	2 300	GROUPE INTERSPORT LA HUTTE	1	FR
43	2 200	GROUPE - MOUVEMENT PACT ARIM POUR L'AMELIORATION DE L'HABITAT	3	FR
44	2 079	GRUPPO COOP ESTENSE	1	IT
45	2 048	GROUPE INTERPOLIS	2	NL
46	2 022	GRUPPE LVM KONZERN	2	DE
47	1 973	GRUPPE VEREINIGTE HAFTPFLICHTVERSICHERUNG	2	DE
48	1 901	GRUPPO C.M.C	1	IT
49	1 794	GROUP DAT-SCHAUB	1	DK
50	1 792	GROUPE CAMIF	1	FR

Source: SOFICATRA study









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EUROPEAN COMMISSION

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All professional associations/organisations known to the Commission which represent industry at the European level were asked to contribute material on their sector. At the end of each monograph, addresses and telephone and fax numbers of the respective professional association concerned are indicated.

The many consultants and associations that contributed to this edition of Panorama are listed in the introduction section of the publication.

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# Introduction





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## Message from Jacques **SANTER**

**President of the European  
Commission**

This new edition of the Panorama of EU Industry coincides with a moment in history when the Union is embarking on a decisive phase of its development. This gives me great satisfaction for two reasons. Firstly, I remain convinced that one of the main tasks of the European

Commission is to promote the dissemination of regular and high quality information aimed at people in all professional or private circles. Secondly, I am pleased because this Commission publication is an important reference work for all those who, in their various ways, are concerned with our industry's evolution and performance, since industry has a crucial role to play in attaining the objectives we have set ourselves.

Our objectives are both ambitious and hard to achieve. They will have to enable us to respond to the demands of subsidiarity, openness and efficient decision-making in the Community, to underscore the democratic nature of the institutions and to work with our fellow citizens in a climate of confidence. Next, they will have to prepare the way for us to tackle the major challenges awaiting us at the dawn of the 21st century, notably laying the foundations for future expansions, strengthening solidarity at all levels, implementing the use of a single currency and, above all, significantly reducing unemployment and social exclusion.

The swift implementation of an industrial competitiveness policy, such as that adopted by the Council following the recent Communications from the Commission, constitutes a major springboard in this context for attaining most of the defined objectives, especially for creating jobs. Whether the expectations of success in this respect will be fulfilled will depend not only on the spirit of enterprise evinced by operators in the field but also on the determination of the public authorities to reshape the policies which influence industry. Now that the economic prospects are more favourable, we have the means to speed up the efforts required to adopt the necessary measures to strengthen our industry's potential. This is an opportunity which we must seize to enable us to create more favourable conditions for development and, as a result, to stimulate growth which corresponds more closely to the needs of our societies.

The Commission, for its part, is determined to take the initiatives required in the industrial sphere while stepping up its dialogue with the parties concerned.

It seems to me, therefore, that the regular publication of this work, which is the outcome of close cooperation between the Commission and industry, is an extremely positive element in line with the desired aims of cooperation.

I trust that all those for whom a better knowledge of the industrial world constitutes an indispensable element for their activities and reflections will be able to find in this work the information and inspiration needed to spur on their actions.





## **Preface by Martin Bangemann**

**Member of the Commission**

Economic operators are nowadays confronted with intensified competition resulting from the simultaneous globalization of trade and operators, the progressive opening up of markets and the acceleration of technological developments.

In such a context, the emergence of an information society raises a number of challenges to which both the economy and industry are required to respond more or less urgently, according to the areas and sectors of activity. Whether we call it the "super highway", the "I-way", or the "Infobahn", the information society is progressively putting tools which are increasingly more advanced at the disposal of small, medium-sized or large enterprises producing goods or services, thus enabling them to deal with ever increasing flows of information while they simultaneously expand and grapple with the various challenges confronting them.

The transition from an industrial society to an information society is speeding up due to the progressive convergence of telecommunications, computer, consumer electronics and multimedia technologies. Several technologies have now reached a stage where their applications are having a profound effect on our lifestyle. The various ways in which we now create, process, access and transfer information are fundamentally changing relations in our society. As a result, a new society will come into being. It will be a society in which new services and new applications will have a great impact on human activities and on the economy and organizational structures.

These changes, with their far reaching effects on the economic and operational environment, require companies to have a continuous capacity to adapt to rapid and constant developments affecting the means and methods of production, while simultaneously taking on board advances in science and technology. They also go hand-in-hand with the need for operators to give due weight to the importance of intangible investments (such as research and training) so as to quickly develop competitive advantages resulting from the implementation of strategies to differentiate products and processes, which are key factors for competitiveness and for the survival of firms in the long run.

It is in this environment that the approach to an industrial competitiveness policy adopted by the European Union comes into its own. It is focused more than ever on promoting the importance of intangible investments in the development and growth of industry in order to permit an increase in the value added of goods and services. The modernization of the European industrial fabric must also result from increasing cooperation among all the actors concerned.



With this in mind, the Commission recently set up a number of research and industry task forces whose purpose is to contribute to developing the technologies needed for the "clean car", "multimedia educational software", the "next-generation aeroplane", "viral diseases and vaccines", "trains of the future" and "intermodal transport systems". The particular brief of the task forces is to align research activities more closely to the socioeconomic and society related concerns of our fellow citizens. To take one example, research carried out in the field of multimedia educational software should enable individuals and firms to have easier access to the progress put at their disposal by information and communications technologies. These initiatives will also make it possible to increase the effectiveness of Community action and as a result enable the successes of European research to trickle down to its citizens, consumers and taxpayers. Great store is set by the consultation of all the parties concerned, whether they be industrialists, users, small, medium-sized or large enterprises.

Finally, the aim is to encourage industrial operators to make the most of this irreversible trend in our societies to improve trade considerably with our economic partners throughout the world, while at the same time ensuring that the fruits of these efforts are discernible in the sphere of enterprise and innovation as well as in the labour market.



## **Preface by Yves-Thibault de Silguy**

**Member of the European Commission**

Closer European union has brought many benefits to European industry, stemming from being part of a large prosperous market. However, fluctuating exchange rates within the EU still hinder the functioning of the Single Market. The exciting prospect is for a move to Economic and Monetary Union, as foreseen by the Treaty of the European Union. A single currency in a single market will be the strong foundation needed for the success of

European businesses in the twenty first century. The Commission's Green Paper, of May 1995, on the practical arrangements for the introduction of the single currency is an important step in this direction.

Even when the Economic and Monetary Union is achieved, European industry will continue to face a constant challenge from global competitors. It is necessary to stimulate competitiveness so that satisfactory economic growth and high employment levels can be attained. The question is how to establish the right framework and economic environment to promote this. It is vital for policy makers to have up-to-date and relevant information in order to be able to assess the effect of past and future actions. One of the virtues of the present publication is that it is a systematic and detailed source of analyses and statistics on a large number of industries. It achieves this by drawing on the best information sources available for each industry. European enterprise statistics are going through a period of rapid change as a result of various actions taken at European Union level to update and harmonize classifications and methods. We can look forward to greater availability of detailed official statistics of the EU in the coming years. Nevertheless, the Panorama publication shows that it is possible to find usable figures today on many industries if time is taken to gather data from professional associations and other non-official sources.

This new edition of Panorama of EU Industry is the result of extensive collaboration between specialists in many fields. As such, it constitutes an important reference work for those wanting to find out more about European industry.





## Introduction by Stefano Micossi

**Director-General for Industry of the  
European Commission**

The recent upturn in economic activity should not divert attention from the fundamental questions that will determine Europe's long-run economic performance. Though the Union's economic basis is strong, rigidities and distortions still remain that prevent Europe from fully exploiting its potential for growth and employment creation.

It is vital that European Society be open to change and innovation rather than lapsing into complacency. Policy-makers can assist by creating a favourable environment for innovation and growth, through market-based policies that encourage investment in human capital and knowledge, promote the exchange of information and remove obstacles to change.

The Commission has been diligent in responding to this challenge. Its strategy for industry is market-based and horizontal in approach, focusing on providing coordination and support while leaving to the private sector the responsibility for identifying technological and market trends.

In this context the Panorama of EU Industry, with its up-to-the-minute and detailed statistics, has become established as an indispensable tool, providing companies and organisations with an overview of the current situation and trends for the future in the various industrial sectors.

The collection and analysis of this data requires the cooperation and commitment of an extensive network of associations, who contributed statistical data and reports on specific industrial sectors, and gave their valuable comments on the final drafts. Without their hard work the Panorama of EU Industry would not exist in its present form.

As in earlier editions, the opening section of this year's Panorama comprises analyses of topical issues affecting European industry, including: strategic alliances, the typical forms of transnational investment made by EU firms outside the EU, changing patterns of employment in industry, SMEs and employment, media services, and the export finance instruments available to the EU's capital goods industry, among others. The results of these analyses, many of which are distilled from studies carried out on behalf of the European Commission, provide important insights on how the relevant public and private sector organisations might refine their operations and procedures.

This year, we have also substantially modified the introductory chapter in order to better focus on the competitiveness issues facing EU manufacturing industry. Next year's edition will be expanded to include statistical data and reports on industry in the new Member States.

I feel confident that this publication will prove to be a vital tool for analysts and policy-makers, and indeed anyone who needs accurate, up-to-date and detailed information on European industry.



# Time frames and statistics

*Panorama 1995 provides a comprehensive picture of industry and services within the European Union. It is intended for all those requiring an update on the present situation and probable future developments in manufacturing and service industries in the EU.*

*Panorama opens with a "special features" section, which takes a global approach to a number of horizontal subjects of topical interest. The main part of the book - the industry reviews - provides a macroeconomic survey of EU industry and services, tracing the major developments in production, employment, trade and structural change and includes, in most cases, detailed statistical data and forecasts.*

## Time frame

The industry reviews and forecasts were written during the third and fourth quarters of 1994. Time series run from 1984 to 1993. Gaps in the data were filled by estimates wherever information was available, and these estimates are footnoted in the tables.

For the main indicators table, 1994 estimates have also been added. Forecasts, if available, were provided up to 1997 for many of the monographs. In such cases the data for 1985-1987 has been omitted from the table.

## Industry classification system

The selection and ordering of industries and services included in Panorama is based on the NACE coding system. This system classifies economic activity in terms of the nature of goods and services produced or by the nature of the production process employed. It is arranged on the decimal system and is subdivided into divisions (1-digit codes), classes (2-digit codes), groups (3-digit codes), sub-groups (4-digit codes) and items (5-digit codes), Panorama is primarily focused on the 3-digit level.

More detailed information on the NACE codes is contained in the General Industrial Classification of Economic Activities within the European Community published by Eurostat (1985 reprint of the 1970 edition). This publication is available from the usual outlets for Commission publications.

Although most chapters are headed by the appropriate NACE code, some do not have a NACE code indicated as the sector represents too small a fraction of the total NACE group. This is particularly common in the service sectors.

Revisions to the NACE classification have been incorporated in a Council Regulation (OJ L293, 24th October 1990) and have already started to be used for data collection in some of the Member States. One of the objectives of this revision is a further breakdown of some service and industrial categories.

Even when a NACE code appears beneath the sector title this should be viewed with caution. In some cases the NACE classification does not exactly coincide with the industrial sector under discussion. Each chapter includes a preliminary section explaining the sectoral coverage of the chapter in question, and indicating the extent to which this deviated from the NACE classification. There are cases where an overlap occurs between sectors and therefore data cannot be cumulated.

## Statistical data

The three main sources of data are Eurostat, DEBA (Data for European Business Analysis, which contributed estimates for recent years) and the professional trade associations. Data sources are indicated for each statistical table.

For manufacturing industries most chapters include a summary table containing the main indicators for the industry. These cover apparent consumption (defined as production + extra-EU imports - extra-EU exports), production, extra-EU exports, net exports (the trade balance of the European Union with the rest of the world) and employment.

Data in the tables are current ECU unless otherwise stated. Indices (reference year: 1990=100) have been calculated for production and trade data providing easier reference for trend changes.

Every effort has been made to include data for all EUR-12 Member States. Figures are on a pre-unification basis, and exclude East Germany unless otherwise stated. At the time the statistics for the publication were compiled, industry data by NACE for the three new Member States was not available. Where data are not available for the EUR-12, country coverage is clearly indicated in the footnotes appearing below each table. The statistical data in Panorama should be regarded with some caution, particularly for the more recent years where data have often been estimated. Production figures for the USA derived from the Federal Administration have also been included, as have Japanese data from MITI. To compare the Panorama of EU Industry with the US Industrial Outlook, Eurostat can provide you with a table correlating NACE to the US SIC.

## Production and employment

Data for production and employment come from annual enquiries conducted by Member States relating to **all enterprises with 20 or more employees**. The exceptions to this are the United States, Spain and Portugal (until 1989) where the coverage is for firms of all sizes, and Japan where establishments employing 4 or more persons are covered by the enquiry. Figures are generally available at the 3-digit level. The production data exclude VAT, and the employment data relate to persons employed excluding home workers. The definitions are standardised, and so the figures are comparable across industries and countries.

Estimates are not supplied to Eurostat by Member States for the firms not covered by the enquiries, and the figures under-report actual employment and production. Where this is significant, either industry association sources are used or note is made in the commentary. Derived statistics which are calculated from both production and trade statistics will also be affected. Apparent consumption will be understated, and import penetration ratios and export rates will be overstated.

Gaps in Eurostat's data for production and employment sent by the Member States have where possible been filled using estimation techniques by DEBA. Germany, France, the Netherlands, the United Kingdom, Denmark and Greece provided data up to 1992. Italy, Spain and Portugal up to 1991; Belgium and Ireland up to 1990 and Luxembourg up to 1988. EU totals contain estimates for missing countries. Estimates are derived from short-term indicators such as indices of production, producer prices and employment. Data for 1994 are

based on monthly indicators for the majority of the year, but also take into account independent sectoral forecasts. DEBA's estimates are only made for the NACE 2-digit and 3-digit level. Gaps in industry association figures at the 4 or 5-digit level have normally not been filled due to the scarcity of statistics at this level.

#### **Exchange rate conversion and deflators**

All data are reported in ECU, and national currencies have been converted at the average exchange rate prevailing for the year in question. The exchange rates used for the conversions are stated in the 'Annex' section at the end of the 'Highlights' chapter. With the large fluctuations seen in currency markets from the end of 1992, the reader should consider such effects on ECU values (especially at an individual country level).

Producer price indices have been used to deflate production data. In the cases where the corresponding NACE 3-digit index has not been available, the NACE 2-digit index has been used. For Portugal, where such indicators are not available, the corresponding retail price indices have been taken.

#### **Trade data**

The trade data are reported in terms of EU trade flows with the rest of the world. In most cases, these data are based on Eurostat figures. Exports valuations are generally fob (free on board, i.e. excluding freight and insurance costs) whereas import data are c.i.f. (i.e. inclusive of carriage, insurance and freight). Import statistics may generally be regarded as slightly more accurate than export statistics due to greater ease of data collection in the former case. All trade figures are in current ECU. For comparative purposes, the ratio of exports to imports (X/M) has been calculated for each set of trade data.



# Abbreviations

<b>A</b>	Austria	<b>DPP</b>	Direct Product Profitability
<b>ABS</b>	Anti-lock Braking System	<b>DRAM</b>	Dynamic Random-Access Memory
<b>AAGR</b>	Annual Average Growth Rate	<b>DTP</b>	Desk-Top Publishing
<b>AC</b>	Alternate Current	<b>E</b>	Spain
<b>ACP</b>	African, Caribbean and Pacific countries	<b>EAF</b>	Electric Arc Furnace
<b>ASEAN</b>	Association of South East Asian Nations	<b>EBRD</b>	European Bank for Reconstruction and Development
<b>ASICS</b>	Application Specific Integrated Circuits	<b>EC</b>	European Community (now European Union)
<b>ATC</b>	Air Traffic Control	<b>ECSC</b>	European Coal and Steel Community
<b>ATM</b>	Automatic Teller Machine	<b>ECU</b>	European Currency Unit
<b>B</b>	Belgium	<b>EDI</b>	Electronic Data Interchange
<b>Benelux</b>	Belgium, Netherlands and Luxembourg	<b>EDM</b>	Electrical Discharge Manufacturing
<b>BLEU</b>	Belgo-Luxembourg Economic Union	<b>EDP</b>	Electronic Data Processing
<b>CAD</b>	Computer Aided Design	<b>EEA</b>	European Economic Area
<b>CAM</b>	Computer Aided Manufacturing	<b>EEIG</b>	European Economic Interest Groupings
<b>CAP</b>	Common Agricultural Policy	<b>EFT</b>	Electronic Funds Transfer
<b>CD</b>	Compact Disc	<b>EFTA</b>	European Free Trade Association
<b>CD-I</b>	Compact Disc-Interactive	<b>EFT-POS</b>	Electronic Funds Transfer at the Point Of Sale
<b>CD-ROM</b>	Compact Disc - Read Only Memory	<b>EIB</b>	European Investment Bank
<b>CEC</b>	Commission of the European Communities	<b>EOS</b>	Economies Of Scale
<b>CEN</b>	Comité Européen des Normes (European Committee for Standardisation)	<b>EOTA</b>	European Organisation for Technical Approvals
<b>CENELEC</b>	Comité Européen des Normes Electroniques (European Electronics Standard Committee)	<b>EPA</b>	Environmental Protection Agency
<b>CFC</b>	Chlorofluorocarbons	<b>EPOS</b>	Electronic Point Of Sale System
<b>CGT</b>	Compensated Gross Tonnes	<b>ETSI</b>	European Telecommunications Standard Institute
<b>CGRT</b>	Compensated Gross Registered Tonnes	<b>EU</b>	European Union
<b>CH</b>	Switzerland	<b>Eurostat</b>	Statistical Office of the European Communities
<b>CHP</b>	Combined Heat and Power	<b>F</b>	France
<b>cif</b>	cost, insurance and freight	<b>FAO</b>	Food and Agriculture Organisation
<b>CIM</b>	Computer Integrated Manufacturing	<b>FDI</b>	Foreign Direct Investment
<b>CIS</b>	Commonwealth of Independent States (former USSR)	<b>FGD</b>	Flue Gas Desulphurisation
<b>CMEA</b>	Council of Mutual Economic Assistance	<b>FMS</b>	Flexible Manufacturing System
<b>CMO</b>	Common Market Organisation	<b>fob</b>	free on board
<b>CNC</b>	Computerised Numeric Control	<b>FTE</b>	Full-Time Equivalent
<b>COCOM</b>	Coordinating Committee for Multilateral Security Controls	<b>GATS</b>	General Agreement on Tariffs and Services
<b>CRS</b>	Computer Reservation System	<b>GATT</b>	General Agreement on Tariffs and Trade
<b>D</b>	Federal Republic of Germany	<b>GDP</b>	Gross Domestic Product
<b>DAT</b>	Digital Audio Tape	<b>GNP</b>	Gross National Product
<b>DC</b>	Direct Current	<b>GR</b>	Greece
<b>DCC</b>	Digital Compact Cassette	<b>GSM</b>	Global System for Mobile
<b>DG</b>	Directorate-General	<b>GSP</b>	Generalised System of Preferences
<b>DIY</b>	Do-It-Yourself	<b>GVW</b>	Gross Vehicle Weight
<b>DK</b>	Denmark	<b>GW</b>	Gigawatt
		<b>h</b>	hour
		<b>HCFC</b>	Hydrochlorofluorocarbons



<b>HDPE</b>	High-Density Polyethylene	<b>OJ</b>	Official Journal of the European Communities
<b>HDTV</b>	High Definition Television	<b>OPEC</b>	Organisation of Petroleum Exporting Countries
<b>HFC</b>	Hydrofluorocarbons	<b>OPT</b>	Outward Processing Trade
<b>I</b>	Italy	<b>osb</b>	oriented strand board
<b>IAEA</b>	International Atomic Energy Agency	<b>OTC</b>	over the counter
<b>IC</b>	Integrated Circuits	<b>P</b>	Portugal
<b>ICA</b>	International Coffee Agreement	<b>PBX</b>	Private Branch Exchange
<b>ICO</b>	International Coffee Organisation	<b>PC</b>	Personal Computer
<b>IDN</b>	Integrated Digital Network	<b>PCI</b>	Pulverised Coal Injection
<b>IEA</b>	International Energy Agency	<b>PPS</b>	Production Planning System
<b>IGCC</b>	Integrated Gasification Combined Cycle	<b>PPP</b>	Purchasing Power Parity
<b>IMF</b>	International Monetary Fund	<b>PR</b>	Public Relations
<b>IRL</b>	Ireland	<b>PVC</b>	Polyvinyl Chloride
<b>ISDN</b>	Integrated System Digital Network	<b>PWR</b>	Pressurised Water Reactor
<b>ISO</b>	International Standards Organisation	<b>QWPDR</b>	Quality Wines Produced in Determined Regions
<b>IT</b>	Information Technology	<b>RAM</b>	Random Access Memory
<b>JPN</b>	Japan	<b>R&amp;D</b>	Research and Development
<b>kW</b>	Kilowatt	<b>R,D&amp;D</b>	Research, Development and Demonstration
<b>L</b>	Luxembourg	<b>S</b>	Sweden
<b>LAN</b>	Local Area Network	<b>SCMS</b>	Serial Copy Management System
<b>LCD</b>	Liquid Crystal Display	<b>SF</b>	Finland
<b>LDC's</b>	Less Developed Countries	<b>SHG</b>	Special High Grade
<b>LDPE</b>	Low-Density Polyethylene	<b>SICAV</b>	deposit certificate
<b>LME</b>	London Metals Exchange	<b>SITC</b>	Standard International Trade Classification
<b>LP</b>	Long Playing	<b>SMEs</b>	Small and Medium-sized Enterprises
<b>LNG</b>	Liquefied Natural Gas	<b>SWU</b>	Separative Work Units
<b>LPG</b>	Liquefied Petroleum Gas	<b>TEN</b>	Trans-European Network
<b>LWR</b>	Light Water Reactor	<b>TEU</b>	Twenty-foot Equivalent Unit
<b>M&amp;A</b>	Mergers and Acquisitions	<b>TGV</b>	Train à Grande Vitesse (High Speed Train)
<b>MD</b>	Mini Disk	<b>TJ</b>	Terajoule
<b>mdf</b>	medium-density fibreboard	<b>toe</b>	tonne of oil equivalent
<b>MFA</b>	Multi-Fibre Arrangement	<b>TPA</b>	Third Party Access
<b>MNCs</b>	Multinational Corporations	<b>TQM</b>	Total Quality Management
<b>MSW</b>	Municipal Solid Waste	<b>tU</b>	tonne of uranium
<b>MW</b>	Megawatt	<b>TV</b>	Television
<b>N</b>	Norway	<b>TW</b>	Terawatt
<b>N/A</b>	Not Available	<b>UHT</b>	Ultra-High Temperature
<b>NACE</b>	General industrial classification of economic activities within the European Community	<b>UK</b>	United Kingdom
<b>NAFTA</b>	North American Free Trade Agreement	<b>UN</b>	United Nations
<b>NATO</b>	North Atlantic Treaty Organisation	<b>USA</b>	United States of America
<b>NBP</b>	Net Banking Products	<b>USD</b>	US Dollar
<b>NCM</b>	Numerically-Controlled Machinery	<b>USSR</b>	Union of Socialist Soviet Republics
<b>NHS</b>	National Health System	<b>VAT</b>	Value-Added Tax
<b>NICs</b>	Newly Industrialised Countries	<b>VCR</b>	Video Cassette Recorder
<b>NL</b>	The Netherlands	<b>WHO</b>	World Health Organisation
<b>NVOCC's</b>	Non-Vessel-Owning Common Carriers	<b>X/M</b>	Exports/Imports ratio
<b>OE</b>	Original Equipment		
<b>OECD</b>	Organisation for Economic Cooperation and Development		
<b>OEM</b>	Original Equipment Manufacturer		

# CONTRIBUTORS

*The following list provides the names of the trade associations and consultants that contributed to this edition of Panorama. Associations are listed in alphabetical order according to their acronym, together with an indication of the chapter of pertinence. The full address details of the trade associations can be found at the end of their respective monograph. Independent consultants are listed with their full address.*

## Associations

<b>ACE</b>	Association des Compagnies Aériennes de la CE Chapter 22	<b>AITC</b>	Association Internationale des Traducteurs de Conférence Chapter 24
<b>ACE</b>	Architects' Council of Europe Chapter 24	<b>APAG</b>	The European Oleochemicals & Allied Products Group Chapter 6
<b>ACEA</b>	European Automobile Manufacturers Association Chapter 11	<b>APME</b>	Association of Plastics Manufacturers in Europe Chapter 6
<b>ACEM</b>	Association des Constructeurs Européens de Motocycles Chapter 11	<b>APPE</b>	Association of Petrochemicals Producers in Europe Chapter 6
<b>ACI EUROPE</b>	Airports Council International / European Region Chapter 22	<b>AVEC</b>	Association of Poultry Processors and Poultry Import and Export Trade in the EU Chapter 13
<b>AEA</b>	Association of European Airlines Chapter 22	<b>BIBM</b>	International Bureau for Precast Concrete Chapter 5
<b>AEC-CEMBUREAU</b>	European Cement Association Chapter 5	<b>BLIC</b>	Liaison Office of the Rubber Industry of the EC Chapter 17
<b>AECMA</b>	European Association of Aerospace Industries Chapter 11	<b>CAEF</b>	Committee of European Foundry Associations Chapter 7
<b>AEEBC</b>	Association of European Building Surveyors Chapter 24	<b>CAFIM</b>	Confédération des Associations des Facteurs d'Instruments de Musique de la CE Chapter 18
<b>AESGP</b>	European Proprietary Medicines Manufacturers' Association Chapter 6	<b>CAOBISCO</b>	Association des Industries de la Chocolaterie Biscuiterie Biscotterie et Confiserie de la CEE Chapter 13
<b>AFCASOLE</b>	Association of Soluble Coffee Manufacturers of the EC Chapter 13	<b>CAPIEL</b>	Comité de Coordination des Associations de Constructeurs d'Appareillage Industriel Electrique du Marché Commun Chapter 9
<b>AIBI</b>	Association Internationale de la Boulangerie Industrielle Chapter 13	<b>CBMC</b>	Confederation of Common Market Brewers Chapter 13
<b>AIIC</b>	Association Internationale des Interprètes de Conférence Chapter 24	<b>CCBE</b>	Council of the Bars and Law Societies of the European Community Chapter 24
<b>AIPCEE</b>	EU Fish Processors Association Chapter 13	<b>CEA</b>	Comité Européen des Assurances Chapter 23
<b>AIS</b>	International Association of the Soap and Detergent Industry Chapter 6	<b>CEC</b>	European Confederation of the Footwear Industry Chapter 14
		<b>CECED</b>	European Committee of Manufacturers of Electric Domestic Equipment Chapter 9
		<b>CECIMO</b>	Comité Européen de Coopération des Industries de la Machine-Outil Chapter 8
		<b>CECIP</b>	European Committee of Weighing Instrument Manufacturers Chapter 12

<b>CECM</b>	European Convention for Constructional Steelwork Chapter 7	<b>CIBJO</b>	International Confederation of Jewelry Silverware Diamonds Pearls and Stones Chapter 18
<b>CECT</b>	Comité Européen de la Chaudronnerie et de la Tuyauterie Chapter 7	<b>CIELFFA</b>	Comité International d'Etude du Laminage à Froid du Feuillard d'Acier Chapter 3
<b>CEEC</b>	European Committee of Construction Economists Chapter 24	<b>CIETT</b>	International Confederation of Temporary Work Businesses Chapter 24
<b>CEFIC</b>	European Chemical Industry Council Chapter 6	<b>CIPF</b>	Comité International du Profilage à Froid Chapter 3
<b>CEFS</b>	Comité Européen des Fabricants de Sucre Chapter 13	<b>CIRFS</b>	International Rayon and Synthetic Fibres Committee Chapter 6
<b>CEHP</b>	Comité Européen de l'Hospitalisation Privée Chapter 26	<b>CITPA</b>	International Confederation of Paper and Board Converters in the EC Chapter 16
<b>Cei-Bois</b>	European Confederation of Woodworking Industries Chapter 15	<b>CLEPA</b>	Liaison Committee of the Automotive Components and Equipment Industry Chapter 11
<b>CELCAA</b>	Comité Européen de Liaison des Commerces Agro-Alimentaires Chapter 20	<b>CLGEE</b>	Comité de Liaison des Géomètres-Experts Européens Chapter 24
<b>CEMA</b>	European Committee of Agricultural Machinery Manufacturers Chapter 8	<b>CLITRAVI</b>	Liaison Centre of the Meat Processing Industry in the EC Chapter 13
<b>CEMATEX</b>	European Committee of Textile Machinery Manufacturers Chapter 8	<b>CoESS</b>	Confédération Européenne des Services de Sécurité Chapter 24
<b>CEO</b>	European Tool Committee Chapter 7	<b>COLIPA</b>	The European Cosmetic Toiletry and Perfumery Association Chapter 6
<b>CEPCEO</b>	Association of the Coal Producers of the European Community Chapter 1	<b>COMITE VINS</b>	Comité de la Communauté Economique Européenne des Industries et de Commerce des Vins Chapter 13
<b>CEPE</b>	European Confederation of Paint Printing Ink and Artists' Colours Manufacturers' Association Chapter 6	<b>COMITEXIL</b>	Coordination Committee for the Textile Industries of the EU Chapter 14
<b>CEPI</b>	Confederation of European Paper Industries Chapter 16	<b>COPAMA</b>	Confederation of Packaging Machinery Association Chapter 8
<b>CEPS</b>	Confédération Européenne des Producteurs de Spiriteux Chapter 13	<b>COTANCE</b>	Confederation of National Associations of Tanners and Dressers of the EC Chapter 14
<b>CER</b>	Community of European Railways Chapter 22	<b>COTREL</b>	Comité des Associations de Constructeurs de Transformateurs du Marché Commun Chapter 9
<b>CERAME-UNIE</b>	Liaison Office of the European Ceramic Industry Chapter 5	<b>CPHE</b>	European Watch and Clock Permanent Committee Chapter 12
<b>CERP</b>	European Public Relations Confederation Chapter 24	<b>CPIV</b>	Permanent Committee of the Glass Industries in the European Union Chapter 5
<b>CESA</b>	Committee of EC Shipbuilders' Associations Chapter 11	<b>CPIV</b>	Comité Permanent International du Vinaigre Chapter 13
<b>CET</b>	Comité Européen de la Trefilerie Chapter 3	<b>EAAA</b>	European Association of Advertising Agencies Chapter 24
<b>CET/ETC</b>	European Tea Committee Chapter 13		
<b>CIAA</b>	Confederation of the Food and Drink Industries of the EEC Chapter 13		

<b>EACEM</b>	European Association of Consumer Electronics Manufacturers Chapter 10	<b>EIIA</b>	European Information Industry Association Chapter 25
<b>EAT</b>	European Advertising Tripartite Chapter 24	<b>EISA</b>	European Independent Steelworks Association Chapter 3
<b>EAZA</b>	European Association of Zoos and Aquaria Chapter 21	<b>ELC</b>	European Lighting Council Chapter 9
<b>EBA</b>	European Bright Bar Association Chapter 3	<b>ELCA</b>	European Landscape Contractors Association Chapter 24
<b>EBMA</b>	European Bicycle Manufacturers Association Chapter 11	<b>EMECA</b>	European Major Exhibition Centres Association Chapter 24
<b>ECATRA</b>	European Car and Truck Rental Association Chapter 24	<b>EMF</b>	European Mortgage Federation Chapter 23
<b>ECLA</b>	European Clothing Association Chapter 14	<b>EMOTA</b>	European Mail Order Traders Association Chapter 24
<b>ECPA</b>	European Crop Protection Association Chapter 6	<b>ENPA</b>	European Newspaper Publishers' Association Chapter 16
<b>ECSA</b>	European Community Shipowners' Association Chapter 22	<b>EPBA</b>	European Portable Battery Association Chapter 9
<b>ECTAA</b>	Group of National Travel Agents' and Tour Operators' Associations within the EU Chapter 21	<b>EPI</b>	European Photographic Chemical Industry Chapter 6
<b>ECTEL</b>	The European Telecommunications and Professional Electronics Industry Chapter 10	<b>EPTA</b>	European Power Tools Association Chapter 9
<b>EDA</b>	European Dairy Association Chapter 13	<b>ERA</b>	European Regional Airlines Association Chapter 22
<b>EECA</b>	European Electronic Component Manufacturers Association Chapter 10	<b>ERMCO</b>	European Ready Mixed Concrete Organization Chapter 5
<b>EEO</b>	The European Express Organisation Chapter 22	<b>ESBNA</b>	European Secretariat of National Bioindustry Associations Chapter 6
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<b>EIGA</b>	European Industrial Gases Association Chapter 6	<b>EUMABOIS</b>	Comité Européen des Constructeurs de Machines à Bois Chapter 8
		<b>EuPC</b>	European Plastics Converters Chapter 17

<b>EUREAU</b>	European Union of National Associations of Water Suppliers Chapter 1	<b>Europlant</b>	European Committee of Plantmakers Chapter 19
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# Special Features





## Highlights on industrial competitiveness: the trade performance of the EU manufacturing industry

This article analyses the trade performance of EU manufacturing and trends in relative competitiveness by sector.

Between 1982 and 1994, the EU's trade balance for goods and services has continuously been in surplus, with the surplus shrinking between 1986 and 1989 then growing rapidly after this, reaching as much as 3.6% of GDP in 1994.

The trend in the manufactured goods balance has failed to match the positive development on the balance for goods and services, however. The surplus on the manufactured goods balance shrank more or less continuously between 1985 and 1991, only recovering partly between 1992 and 1994. To some extent, the improvement in the manufactured goods balance between 1992 and 1994 reflects the cyclical downturn in Europe, with domestic demand growing slower than in the rest of the world. The development of relative unit labour costs and exchange rates also goes some way in explaining the past trends in the EU's market share both on domestic and on export markets. Still the past trends in aggregate demand and relative costs fall short of providing a comprehensive explanation of past developments in trade.

The sectoral analysis undertaken in this article shows that the EU's export structure is less specialised than that of either the US and Japan, and that the sectors in which the EU does have a comparative specialisation (measured by that sector's share of total manufactured exports) are not necessarily good performers. Two examples are textiles and clothing, and jewellery, both of which are also high import sectors. The geographical specialisation of EU trade is also less favourable than that of its direct competitors, the US and Japan, although progress has recently been posted on this front.

The analysis also points to wide disparities in changes in cost competitiveness and market shares at the sectoral level. As to cost competitiveness, a small majority of the sectors has actually recorded an improvement in relative unit labour cost competitiveness over the period 1987-94, thanks essentially to faster productivity growth in Europe than in the US and Japan. Among those sectors which reported declining labour cost competitiveness were, however, a number of high technology, fast growth sectors, among which electronics and electrical goods, and automotive. Taking into account the past trends in intermediate input costs (excluding capital costs), it appears that the EU's total unit cost competitiveness has improved in a number of areas, among which pharmaceuticals, basic chemicals and the leather goods sector, along with ferrous metals, office & EDP and aerospace equipment.

Looking at the trends in market shares, one finds that there are a number of sectors in which EU companies increased their share of export markets over the period 1987-94. However, their coverage of the domestic market has generally deteriorated, so that the overall trade performance still looks poor over the period considered. Although a few sectors have managed to lift their market shares in spite of adverse cost developments, the EU has lost market shares in most of the electrical/electronics sectors as well as in two of its largest export sectors, namely mechanical engineering and automotive equipment. To some extent this poor record reflects the fact that improvements in cost competitiveness have only taken place in recent years and have not yet fully translated into improvements in market shares.

Two other important factors influencing a country or sector's relative performance are R&D and innovation. A comparison

**Table 1: EU macroeconomic trends**  
(% annual change)

	1987-1990 (2)	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
GDP at constant market prices	14.2	1.5	0.9	-0.6	2.6	3.0	2.8
Total number of employed	7.3	0.0	-0.9	-1.6	-0.5	1.0	1.2
Deflator of private consumption (3)	39.1	8.1	9.0	10.6	11.1	10.6	10.1
Gross fixed capital formation in current prices	51.7	3.5	0.4	-4.6	3.6	8.4	8.4
Gross fixed capital formation at 1990 prices in equipment	34.6	-0.8	-3.8	-10.6	2.0	9.2	7.3
Real unit labour costs	-3.4	-0.1	-0.1	-1.0	-2.5	-1.2	-0.9

(1) Excluding former East Germany.

(2) Average growth rate over the period.

(3) In national currency.

Source: Commission Services



**Table 2A: Sectoral breakdown of EU exports, 1994**

	Share in total exports (%)	Share in total imports (%)	Export specialization (1)	Adjusted cover ratio (2)
Mineral oil refining	1.9	2.2	1.40	0.87
Ferrous metals (prod.,prel.proc.)	3.1	1.5	1.12	2.06
Non-ferrous metals (prod.,prel.proc.)	1.6	5.3	0.57	0.30
Non-metallic mineral products	2.0	1.1	1.46	1.83
Basic chemicals	5.5	4.9	1.03	1.13
Pharmaceuticals	2.8	1.6	1.70	1.73
Specialty chemicals	4.7	2.8	1.22	1.69
Manufacture of metal articles	3.3	2.5	1.36	1.34
Mechanical engineering	16.0	7.5	1.14	2.13
Office and edp-machinery	2.8	6.7	0.60	0.42
Electrical equip. for industry	4.8	4.4	0.89	1.08
Telecom equip. & oth. prof. electro.	3.2	3.0	0.85	1.07
Consumer electronics	2.6	6.1	0.52	0.42
Household appliances	0.9	0.7	1.51	1.25
Motor vehicles and parts	8.7	6.0	0.70	1.46
Aerospace equip.	4.3	4.1	1.19	1.07
Other means of transport	1.4	1.1	0.76	1.30
Instrument engineering	2.3	3.2	0.73	0.73
Food,drink,tobacco	6.5	5.3	1.13	1.22
Textile	3.9	5.4	1.46	0.72
Leather and leather goods	0.9	1.0	1.97	0.81
Footwear and clothing	2.7	6.0	1.89	0.44
Timber and wooden furniture	1.4	3.7	0.73	0.38
Pulp, paper & paperboard	1.5	4.1	0.47	0.36
Printing and publish.	0.9	0.5	1.42	1.97
Proc. of rubber and plastics	2.7	2.3	1.11	1.15
Manufacture of jewelry	3.2	4.2	1.58	0.77
Other manufacturing	4.4	2.8	1.26	1.59
Total manufacturing	100	100	1.00	1.00

(1) share of sector in total EU manufacturing exports divided by the same share calculated for the OECD

(2) sectoral cover ratio (i.e. exports divided by imports) adjusted for the overall cover ratio of the manufacturing industry

Source: Eurostat, DEBA, DFI

of the EU's performance on these two counts with its main world competitors indicates that the European technological system appears to suffer from an over-emphasis on fundamental research at the expense of commercial innovations, and from a lack of clear technological edge at the sectoral level. Although the EU has a relatively strong position in terms of new registered patents in the aerospace and other transport equipment sectors, as well as in pharmaceuticals and general engineering, its share of new patents has been falling steadily in all sectors except aerospace with a particularly fast decline in the electronics sector, a sector in which R&D is most intense at world level and which increasingly drives innovation throughout the whole of industry.

## INTRODUCTION

This article analyses the trade performance of EU manufacturing at a sectoral level. In recent years most of the research carried out to evaluate the competitiveness of the EU economy has focused on macroeconomic factors. It is, however, increasingly evident that production costs, exchange rates and demand conditions can not solely explain a country's trade competitiveness, and that sectoral and structural factors constitute fundamental parameters of a country's trade performance. An additional, somewhat different, justification for a sectoral approach to competitiveness is the fact that industrial sectors show large disparities in their response to changes in the macroeconomic environment. Consequently, a sectoral approach is required to avoid improperly extrapolating and applying conclusions from a macroeconomic analysis to the sectoral level.

Given its structural character, the analysis presented in this article is essentially of a long-term nature. However, a pre-

liminary study of the recent past and of the influence of the business cycle is needed to understand the structural issues. An introductory section is therefore devoted to the macroeconomic picture of competitiveness, and to bridging the gap between the structural analysis and recent short-term developments. The structural analysis is developed in four sections. The first examines the trade structure of the EU, i.e. the nature of its sectoral and geographical specialisation. The two following sections investigate long-term developments in cost competitiveness and trade performance. Again, the objective is to highlight disparities in the response of industrial sectors to changing macroeconomic conditions, rather than to comment on recent developments. The last section of the structural analysis is devoted to a comparative evaluation of EU performance in research and development. The choice to include this topic is motivated by two observations. First, research and development seems to be one of the most important factors of non-price competitiveness. Second, the EU posts a poor industrial performance in several high-tech sectors, so that it is relevant to question the performance of its R&D system.

## THE MACROECONOMIC OUTLOOK

A country or region's current account reflects its balance of overall economic relations with the rest of the world. When a country's citizens spend more in foreign countries than they earn, the current account will turn negative. This deficit is then financed by borrowing foreign capital, selling foreign assets, or selling central bank reserves. On the other hand, a country achieving a surplus on its current account accumulates foreign assets.

Figure 1 depicts the evolution of the trade balance for goods and services of the EU, the US, and Japan between 1982 and



**Table 2B: Sectoral breakdown of US exports, 1994**

	Share in total exports (%)	Share in total imports (%)	Export specialization (1)	Adjusted cover ratio (2)
Mineral oil refining	1.3	2.3	1.00	0.58
Ferrous metals (prod.,prel.proc.)	0.9	2.7	0.30	0.32
Non-ferrous metals (prod.,prel.proc.)	2.7	2.9	0.97	0.95
Non-metallic mineral products	0.8	1.2	0.61	0.68
Basic chemicals	6.2	3.5	1.17	1.80
Pharmaceuticals	1.1	0.4	0.65	2.67
Specialty chemicals	4.1	1.8	1.05	2.33
Manufacture of metal articles	2.1	2.2	0.85	0.96
Mechanical engineering	13.7	8.2	0.97	1.67
Office and edp-machinery	6.4	7.5	1.38	0.85
Electrical equip. for industry	5.5	5.0	1.04	1.10
Telecom equip. & oth. prof. electro.	4.5	2.8	1.19	1.61
Consumer electronics	6.1	7.8	1.24	0.78
Household appliances	0.5	0.7	0.87	0.72
Motor vehicles and parts	10.9	16.9	0.87	0.64
Aerospace equip.	7.7	1.2	2.12	6.21
Other means of transport	0.5	0.8	0.30	0.72
Instrument engineering	2.7	2.7	0.85	0.99
Food,drink,tobacco	7.7	4.1	1.35	1.87
Textile	1.6	3.6	0.61	0.45
Leather and leather goods	0.3	0.8	0.62	0.33
Footwear and clothing	0.8	6.2	0.59	0.13
Timber and wooden furniture	1.4	2.6	0.75	0.55
Pulp, paper & paperboard	2.4	2.0	0.77	1.17
Printing and publish.	0.9	0.4	1.33	2.37
Proc. of rubber and plastics	2.4	2.2	0.99	1.07
Manufacture of jewelry	1.3	4.0	0.62	0.31
Other manufacturing	3.5	3.3	0.99	1.04
Total manufacturing	100	100	1	1

(1) share of sector in total US manufacturing exports divided by the same share calculated for the OECD

(2) sectoral cover ratio (i.e. exports divided by imports) adjusted for the overall cover ratio of the manufacturing industry

1994. Over the entire period under consideration, the EU's balance for goods and services has been positive. The surplus has fluctuated with lows in 1982 and 1989, and highs in 1986 and 1994. Since 1989, the EU's trade surplus has risen continuously, with the rate of growth accelerating after 1992. In 1994, the surplus on the EU's trade balance equalled a remarkable 3.6% of GDP, even higher than the 2.1% figure achieved by Japan.

Japan's trade balance also posted a surplus over the entire period 1982-1994, in most years greater (relative to GDP) than that of the EU. The US, in contrast, ran a continuous deficit which peaked at 3.3% of GDP in 1986 and 1987. Between 1987 and 1991, the US deficit was substantially reduced (to 0.5% of GDP), but since then it has been widening again, reaching close to 2% of US GDP in 1994. Notice that the evolution of the US trade balance almost mirrors those of the EU and Japan: in the years that the trade balance deteriorates in the US, it improves in the EU and Japan, and vice versa.

The balance of goods and services can be broken down into three components: the balance of services, the balance of primary commodities (energy products agricultural products, and other raw materials) and the balance of manufactured goods. The EU has traditionally been running a surplus in services which tends to be relatively stable as a share of GDP though it has slightly weakened since the early 1990s, reaching 1.1% in 1994. The balance of primary commodities, which was largely negative in the early 1980s, has improved almost continuously since that period turning into a surplus in the early 1990s and reaching 2.5% of GDP in 1994. The improvement in the balance of primary commodities explains much of the

observed rebound of the European balance in goods and services after 1989. On the other hand, the balance of manufactured goods has evolved comparatively poorly since the mid-1980s. As is apparent from Figure 2, the manufacturing balance exhibits a very different behaviour than the overall balance for goods and services. Although the manufacturing balance has remained positive over the 1982-94 period, the surplus shrank continuously between 1982 and 1991, coming down to 0.1% of GDP. By 1993, the surplus had increased to 1.3% of GDP, but the recovery was both later and slower than that of the overall trade balance. The sharp improvement of the EU's overall trade balance in the last few years therefore hides the absence of a significant improvement in the manufacturing sector.

Japan's manufacturing surplus is much higher than its overall trade surplus, as the country relies heavily on exports of manufactured goods to pay for the imports of nearly all its raw materials and energy requirements and for a trade deficit in services. In the peak years, 1984 and 1985, the manufacturing surplus exceeded 9% of GDP. As in the EU, the surplus declined continuously between 1985 and 1991, followed by a weak recovery thereafter. Nevertheless, in 1994, Japan's manufacturing trade surplus still accounted for 5.6% of GDP. The US registered a deficit in the trade of manufactured goods over the entire period 1982-1994. In this case, the evolution of the manufacturing and overall trade balances were very similar.

The remainder of this section will be devoted to an analysis of some macro-economic determinants of manufacturing trade performance. In succession, the influence of demand and of cost competitiveness will be explored.

Table 2C: Sectoral breakdown of Japanese exports, 1994

	Share in total exports (%)	Share in total imports (%)	Export specialization (1)	Adjusted cover ratio (2)
Mineral oil refining	0.5	3.5	0.38	0.15
Ferrous metals (prod.,prel.proc.)	4.1	1.8	1.46	2.31
Non-ferrous metals (prod.,prel.proc.)	0.9	6.0	0.31	0.15
Non-metallic mineral products	1.3	1.1	0.92	1.13
Basic chemicals	4.0	5.0	0.75	0.80
Pharmaceuticals	0.3	1.7	0.17	0.16
Specialty chemicals	3.6	2.5	0.93	1.45
Manufacture of metal articles	1.4	1.3	0.60	1.10
Mechanical engineering	15.0	4.9	1.06	3.04
Office and edp-machinery	7.9	4.3	1.72	1.86
Electrical equip. for industry	7.8	3.3	1.45	2.35
Telecom equip. & oth. prof. electro.	4.9	2.5	1.29	1.94
Consumer electronics	10.2	6.4	2.09	1.61
Household appliances	0.4	0.4	0.61	0.94
Motor vehicles and parts	18.9	4.3	1.51	4.37
Aerospace equip.	0.2	2.1	0.06	0.11
Other means of transport	4.6	0.5	2.51	9.58
Instrument engineering	5.4	3.0	1.72	1.79
Food,drink,tobacco	0.7	16.8	0.13	0.04
Textile	1.7	6.1	0.63	0.27
Leather and leather goods	0.1	1.3	0.21	0.07
Footwear and clothing	0.2	6.1	0.12	0.03
Timber and wooden furniture	0.1	6.2	0.07	0.02
Pulp, paper & paperboard	0.6	1.8	0.20	0.33
Printing and publish.	0.1	0.3	0.21	0.41
Proc. of rubber and plastics	2.2	1.6	0.91	1.41
Manufacture of jewelry	0.9	3.4	0.45	0.27
Other manufacturing	1.9	1.7	0.53	1.08
Total manufacturing	100	100	1	1

(1) share of sector in total Japanese manufacturing exports divided by the same share calculated for the OECD

(2) sectoral cover ratio (i.e. exports divided by imports) adjusted for the overall cover ratio of the manufacturing industry

To some extent, changes in the trade balance can be related to lags in the business cycle. Indeed, if an economy experiences an early recovery compared to the rest of the world, faster growing domestic demand will tend to fuel imports and to depress its trade balance. To examine the causality between EU domestic demand and the trade balance, both variables are plotted in Figure 3.

The measure used for domestic demand is defined as real EU domestic demand relative to that in the industrialised countries. The measure is defined in such way that it will decrease if domestic demand in the EU, adjusted for EU inflation, grows faster than the weighted average of domestic demand in the industrialised countries, also adjusted for inflation. Similarly, the measure for domestic demand in Figure 3 will rise if real demand in the EU grows *more slowly* than real demand in the rest of the industrialised world. Such a *relative decline* of domestic demand in the EU is indeed expected to yield an improvement of the trade balance.

Figure 3 shows that slow demand in the EU in the early eighties (1982-1985) and the early nineties (1992-1994) can explain the sharply increasing trade balance surpluses in those periods. However, in the intervening period, the evolution of the trade balance appears unrelated to developments in domestic demand.

Another explanatory factor of manufacturing trade performance which deserves investigation is cost competitiveness. Figure 4 presents the various factors determining unit labour cost, i.e. the labour cost per unit of real production. While for an individual firm or sector, intermediate materials and components purchased from other firms or sectors often represent a major part of production costs, for the economy as

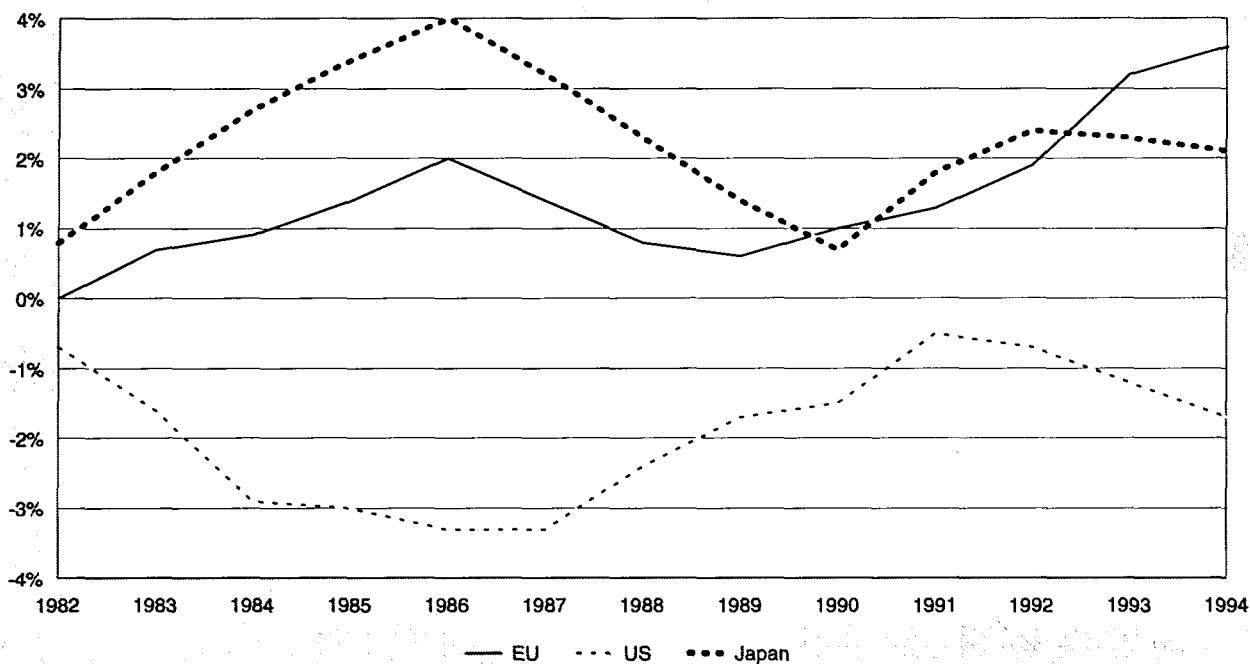
a whole, labour is by far the most important cost component (intermediate input costs will, in contrast, be very relevant in the sectoral analysis below). All indicators shown in Figure 4 refer to the manufacturing sector, and are presented as indexes with base year 1990 (1990=100).

Changes in unit labour cost can be separated into two components: changes in wage rates and changes in real labour productivity. For each of these three variables, a competitiveness indicator has been calculated which compares changes in the variable considered in the EU to a weighted sum of changes in the same variable in the US and in Japan. In the case of nominal variables (unit labour costs and wage rates) the weighted sum is based on current exchange rates while in the case of the real variable (labour productivity) it is based on constant 1990 exchange rates. The competitiveness indicators have been plotted in Figure 4. Note that the indicators have been calculated in such a way that an increase corresponds to an improvement in the competitiveness of the EU. It is immediately apparent that, in terms of productivity, the EU position has remained fairly constant over the period considered. The European manufacturing industry has achieved productivity gains which on average have been similar to those observed in the US and Japan between 1982 and 1993. The Union has even managed to improve its relative position in terms of productivity in 1994. It is therefore unsurprising that the fluctuations in the indicator of wage rate competitiveness (which compares changes in wages and salaries per employee) is fairly similar to fluctuations in unit labour cost competitiveness except in 1994.

Figure 4 shows that between 1984 and 1990, the unit labour cost competitiveness of the EU compared to US and Japan deteriorated by about 30%. The indicator remained static in



Figure 1: Trade balance (1) - goods and services - EU (2), US, Japan



(1) as a share of GDP  
 (2) EU does not include former Eastern Germany  
 Source: Commission Services, AMECO

the following two years, and has improved by about 15% since then.

The most important determinant of the evolution of labour cost competitiveness, i.e. the deterioration in 1984-1990 and the improvement after 1992, has been the exchange rate. Figure 4 therefore also displays the effective exchange rate of the ECU. The effective exchange rate summarises the various bilateral exchange rates into a single number reflecting the average value of a currency. It is calculated as the weighted average exchange rate of a country's currency against the currencies of its trading partners, where the values of mutual trade are used as the weights. Here, the effective exchange rate of the ECU has been obtained as the appropriately weighted average of the dollar/ECU and yen/ECU exchange rates.

Examining Figure 4, it is clear that the unit labour cost (or wage rate) indicator and the effective exchange rate have mirrored each other year after year. Between 1984 and 1990 the effective exchange rate of the ECU appreciated by about a third (mainly a result of the depreciation of the dollar). This appreciation accounted for most of the deterioration of labour cost competitiveness over the same period. The value of the ECU remained fairly stable over the next two years, and decreased by about a fifth between 1992 and 1994 (due to stabilisation of the dollar and appreciation of the yen), contributing to a restoration of EU labour cost competitiveness.

The definition of the market share indicator is straightforward. The indicator is based on the share of EU exports in Triad exports, and is expressed as an index with base year 1990. The indicator of the domestic market share is more complicated. It has been calculated as the rate of coverage of EU domestic sales of manufactured goods by EU production, divided by the same ratio for the entire Triad. A decline of this indicator means that the EU supplies relatively less of its home market than the US and Japan, and thus loses domestic market share.

Figures 5 and 6 show that both export and domestic market shares are loosely related to cost competitiveness (the cost indicator has been lagged by one period for a better visual fit). The deterioration of cost competitiveness in the second half of the eighties has been associated with a loss of both export and domestic market share.

However, the fit is loose. In particular, cost competitiveness can not explain the very different development of export and domestic market shares in the early nineties. While the modest restoration of cost competitiveness in 1993 and 1994 seems to have triggered a sizeable recapture of export markets, performance on the domestic market remained weak.

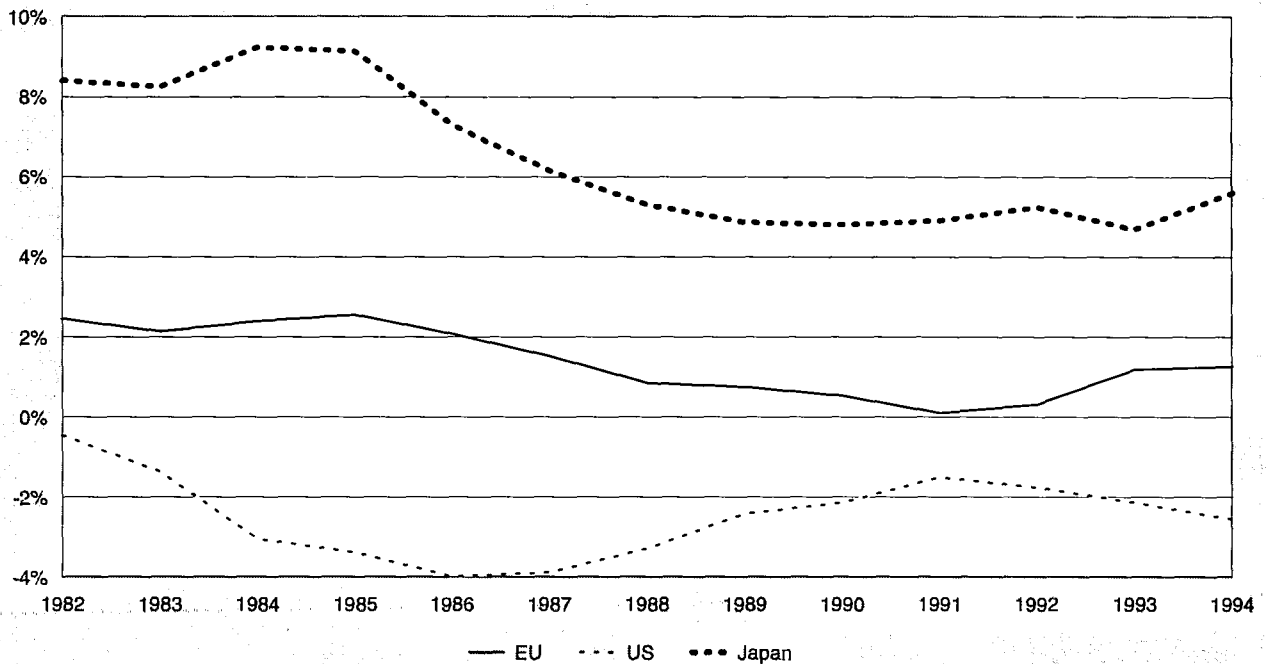
To summarise, aggregate demand and cost variables can roughly account for recent developments in manufacturing trade performance, and are clearly important determinants of competitiveness. However, they fall short of providing a comprehensive explanation, suggesting that there are many other factors at play. To identify and investigate these other factors, a disaggregated, sectoral approach is indicated. This forms the subject of the following sections of the article.

### TRADE STRUCTURE

As mentioned above, simple macroeconomic factors such as the business cycle, costs developments, or exchange rate fluctuations cannot fully explain observed trade performances. It is now increasingly apparent that a country's sectoral structure plays a key role in determining its overall competitiveness and trade performance. This section will shed some light on the structure of EU trade and the nature of its sectoral and geographical specialisation.

Based on the observation that countries do not determine their exports on a random basis but specialise in those sectors or products for which they have a comparative advantage (such as proprietary knowledge, the use of a specific natural resource, particular human skills etc.), the strengths and weaknesses of a country can be inferred from a simple analysis of its trade patterns. Note that, although much of the discussion below will be based on 1994 data, the analysis is essentially

Figure 2: Trade balance (1) - manufacturing - EU (2), US, Japan



(1) as a share of GDP  
 (2) EU does not include former Eastern Germany  
 Source: Eurostat

of a medium- to long-term nature as the structural indicators used tend to be very stable over relatively long periods of time.

When analysing the structure of EU exports, two characteristics become rapidly apparent: first, compared to the rest of the Triad, the EU is less specialised, and second, its specialisation is marked by a number of weaknesses, in particular in relation to the sectoral and geographical specialisations. Each of these two aspects will be investigated in turn.

An examination of the contributions of the various NACE 3 sectors (a more detailed level of disaggregation than in the tables presented in this article) to the total exports of manufactured goods of a given country/region, shows that the sectors which account individually for more than 3% of total exports, represent less than 30% of total EU manufacturing exports. The comparable figures are 51% for the US and 62% for Japan. Exports are therefore more uniformly spread across sectors in the case of the EU than in the case of the US or Japan. In other words, the EU is less specialised in terms of the structure of its exports than the US or Japan. The indicator is obviously sensitive to the sectoral classification used and the threshold adopted but it is fairly robust as to the country ranking it implies. Indeed, the same ranking, with Japan the most and the EU the least specialised in the Triad, can be obtained using a wide range of thresholds, and also with other indicators such as the standard deviation of export shares. However, to the extent that specialisation is linked to the size of the country considered (a small country will tend to specialise in a more limited number of sectors) these results are difficult to interpret and it is impossible to conclude whether the EU is or not sufficiently specialised.

Rather than absolute specialisation, it is thus considerably more revealing to investigate the relative sectoral and geographical specialisation of trade in order to determine the nature of the comparative advantage of the EU.

Table 2 provides a snapshot of the sectoral structure of EU trade. Mechanical engineering is the largest exporting sector accounting

for 16% of total EU exports. It is followed by automotive equipment (8.7%) and food, drink and tobacco (6.5%). Other large exporting sectors include chemicals, particularly specialty chemicals and pharmaceuticals, and electrical engineering, particularly industrial electrical equipment.

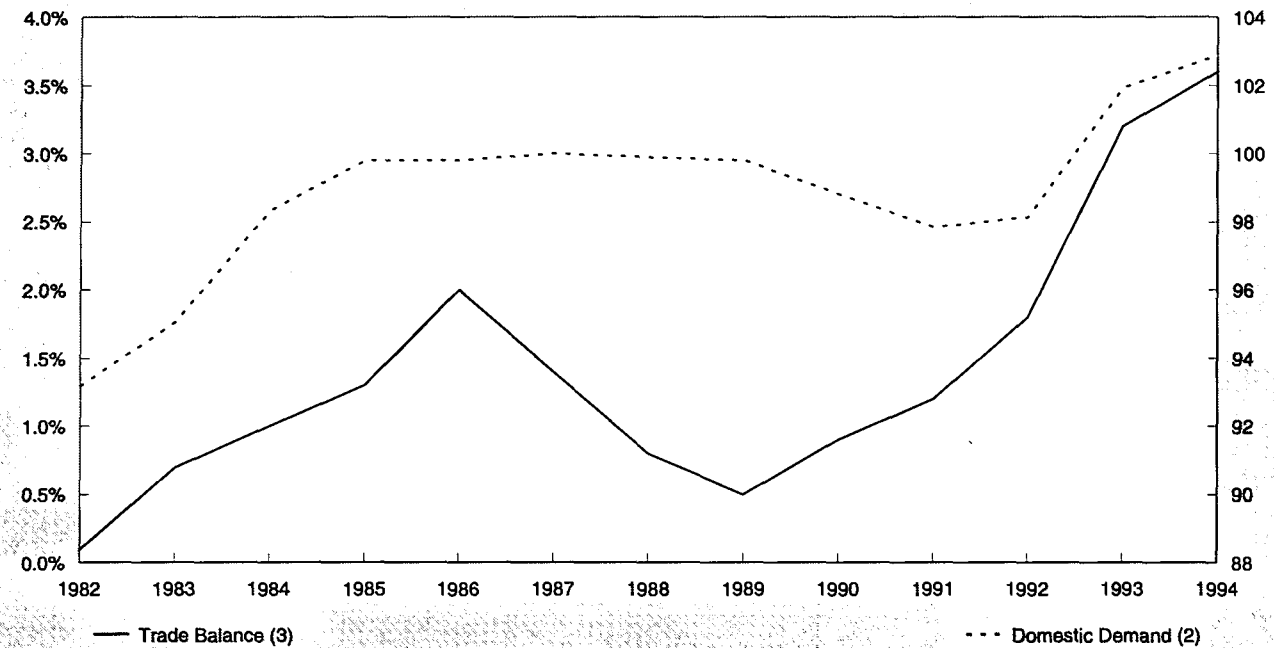
The third column of Table 2 provides a more meaningful way to assess the nature of the EU's specialisation by comparing it to the average OECD export pattern. For a given sector, the indicator of export specialisation is calculated as that sector's share of the total manufacturing exports of the EU, divided by the same share evaluated for total OECD exports. A value of one therefore indicates that the weight of the corresponding sector in total exports is the same as the OECD average, in other words that the country considered shows no specialisation compared to the OECD average. Table 3 gives a snapshot of the relative specialisation patterns of the EU, the US, and Japan. Based on the indicator described above, the table lists those sectors which post either a strong or a moderate specialisation pattern.

A number of observations can be drawn from the table.

- The specialisation of the US is much closer to the OECD average than that of the EU or Japan. Only aerospace appears in the strong specialisation group. The country also appears relatively strong in electronics-related industries
- Japan has developed a strong comparative advantage in the electronics- and transport-related sectors.
- The EU has a large number of 'specialised' sectors but these appear little related except in the case of the textile cluster and, to a lesser extent, chemicals.
- Contrary to the US and Japan, the EU has little or no specialisation in electrical- and electronics-related sectors (computers, precision instruments, consumer electronics sectors etc.). More generally, pharmaceuticals appears as the only high-tech sector in the EU which benefits from a strong or moderate specialisation ratio.



Figure 3: EU (1) trade balance in goods and services and domestic demand



(1) EU 15  
 (2) Real domestic demand relative to industrial countries (inverted scale)  
 (3) Left scale  
 Source: Commission Services, AMECO

- Several sectors (such as food, drink and tobacco, and aerospace) which are traditionally considered as EU strengths, actually have a specialisation indicator only slightly higher than the OECD average and are not even included in the moderate specialisation category.

One of the weaknesses of the EU trade performance becomes more obvious when examining the weights of the sectors with a strong specialisation. In short, in the EU most of the sectors posting a strong or moderate specialisation account for less than 3% of manufacturing exports. The largest specialised sectors are the specialty chemicals and the textile sectors, whose individual shares of total exports are less than 5%. By contrast, many 'strong' sectors in Japan represent more than 8% of the country's total manufacturing exports. The only 'strong' sector in the US, namely aerospace, accounts for close to 8% of American exports. Overall, most of the sectors which account for the largest share of total EU exports either post a 'normal' specialisation (as in the case of mechanical engineering) or a weak specialisation (as for automotive equipment) compared to the US and Japan.

Another feature of the specialisation of European trade is that it does not necessarily entail performance, if performance is measured by the trade balance. Figure 9 shows the average cover ratio (i.e. exports divided by imports) for the specialisation categories defined above. To avoid differences linked to the business cycle or to exchange rates, the cover ratios have been adjusted for the average cover ratio for all manufacturing sectors in the region considered. In the EU, the cover ratio of strong sectors averages 0.8 (which corresponds to an adjusted deficit, meaning that the trade balance performance of the sectors of strong export specialisation is worse than that of manufacturing as a whole) against 6.2 in the US (though admittedly the group only covers one sector) and 2.6 in Japan. Overall, the average trade ratio for strong and moderate sectors hardly exceeds 1.0 in the EU against 1.4 in the US and 2.5 in Japan. Note that, in the EU, the specialised sectors which register a poor trade balance are either sectors

which generate large flows of imports of primary materials (oil refining and jewellery) or textile sectors (textile, leather, clothing, footwear etc.). EU exports are specialised in textile and clothing products but the trade balance of this sector has deteriorated markedly over the 1980s under the pressure of competition by low wage countries and increasing outward processing of European production. Besides, it is worth stressing that the sectoral picture provided here has to be considered as an average which can, in some cases, hide wide intra-sectoral performances. In the case of the textile sectors, for instance, an average bleak performance can conceal a much better performance in higher value added sub-sectors.

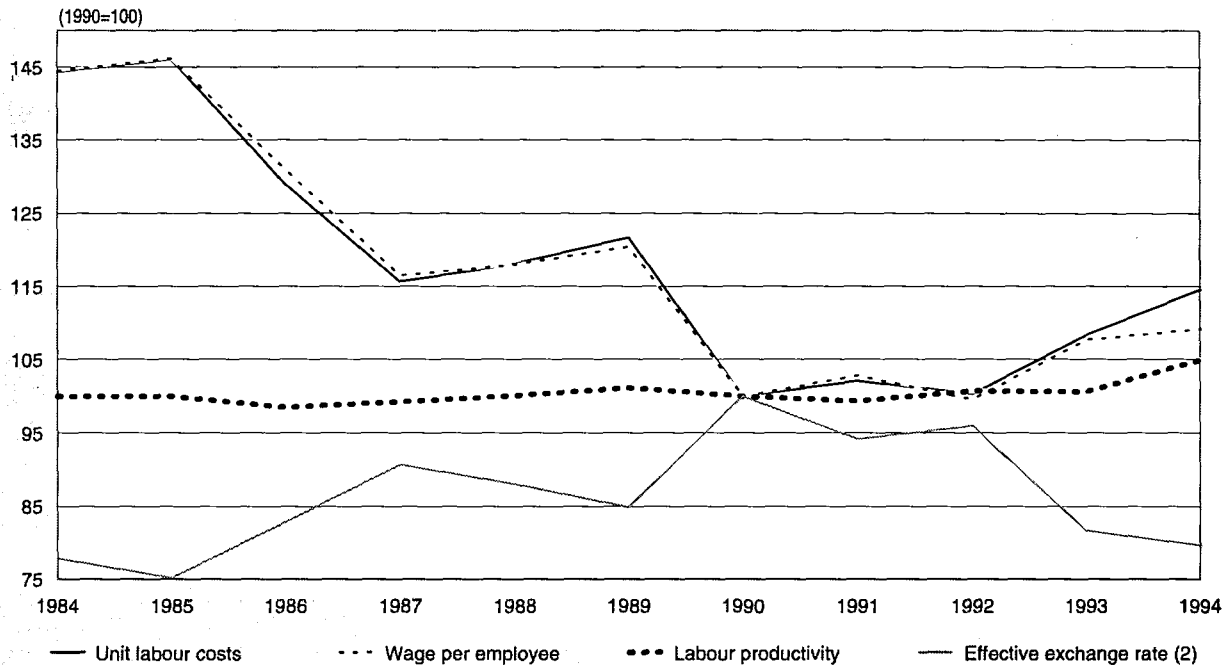
A systematic analysis of cover ratios adjusted for the overall trade surplus or deficit points to other features of EU industry structure.

The weighted average of the adjusted cover ratios must be equal to one. Schematically, these ratios can therefore point to two types of patterns:

- a relatively uniform distribution of ratios around one indicating that most of the sectors tend to post similar trade performances
- or large fluctuations in the distribution indicating that some perform well in terms of trade and that their large (adjusted) trade surpluses are compensated by large (adjusted) trade deficits in other sectors.

The first situation is a good description of European trade whereas the second corresponds to Japanese trade. The US is located somewhere between the EU and Japan although it is certainly closer to the EU than to Japan. Table 2 presents the adjusted cover ratios for EU manufacturing sectors. Note that the highest ratio (mechanical engineering) hardly exceeds 2.0. In the meantime, Japan totals five sectors with a ratio exceeding 2.0, and the US has four such sectors. In the EU, most of the above-average cover ratios correspond to specialised sectors. The only notable exceptions are mechanical engineering, automotive equipment and ferrous metals. The

**Figure 4: Indicators of EU cost competitiveness (1) - manufacturing industry**



(1) Each indicator measures the improvement/deterioration of the corresponding cost item in the EU relative to the US and Japan. Positive growth indicates an improvement in EU competitiveness  
 (2) Weighted sum of the exchange rates of the US and Japan - an increase indicates an appreciation of the ECU  
 Source: Eurostat, DEBA, DRI

problem of mechanical engineering which posts an export specialisation ratio slightly above the OECD average (but insufficiently high to be incorporated in the moderate specialisation category defined above) highlights one of the limits of this type of approach. Given the size of the sector in total exports (16% in the case of the EU), a high export specialisation ratio is difficult to imagine unless the country considered devotes a very high share of its resources to the sector. In fact, the EU is more specialised than both the US and Japan and it is clear that a high cover ratio indicates a comparative advantage in that case. The case of automotive equipment is quite different as the combination of a high cover ratio and of a weak export specialisation indicates that the EU exhibits both lower relative exports and lower relative imports compared to the OECD average. In other words, the EU is less integrated in world trade in this sector than the OECD average, something which is certainly linked to the trade restrictions practised in various Member States over the period considered. These restrictions have somewhat sheltered domestic producers from world competition and have fostered foreign direct investment. In this case, thus, the existence of a high cover ratio does not reflect the existence of a comparative advantage in that sector.

The analysis has so far focused on the sectoral specialisation of European trade but another important dimension is its geographic specialisation. It is of little benefit to a country to specialise in fast growing and high value added sectors if it only sells to stagnating export markets where the high sectoral potential can not be exploited.

The comparison of cover ratios and exports specialisation indices has already pointed to the danger of measuring comparative advantage on the basis of a single criteria.

Table 4 presents a geographic breakdown of exports of the EU, Japan, and the US. Unsurprisingly, each region dominates nearby export markets: the EU in EFTA, the Mediterranean Basin and Eastern Europe; the US in Canada and Latin Amer-

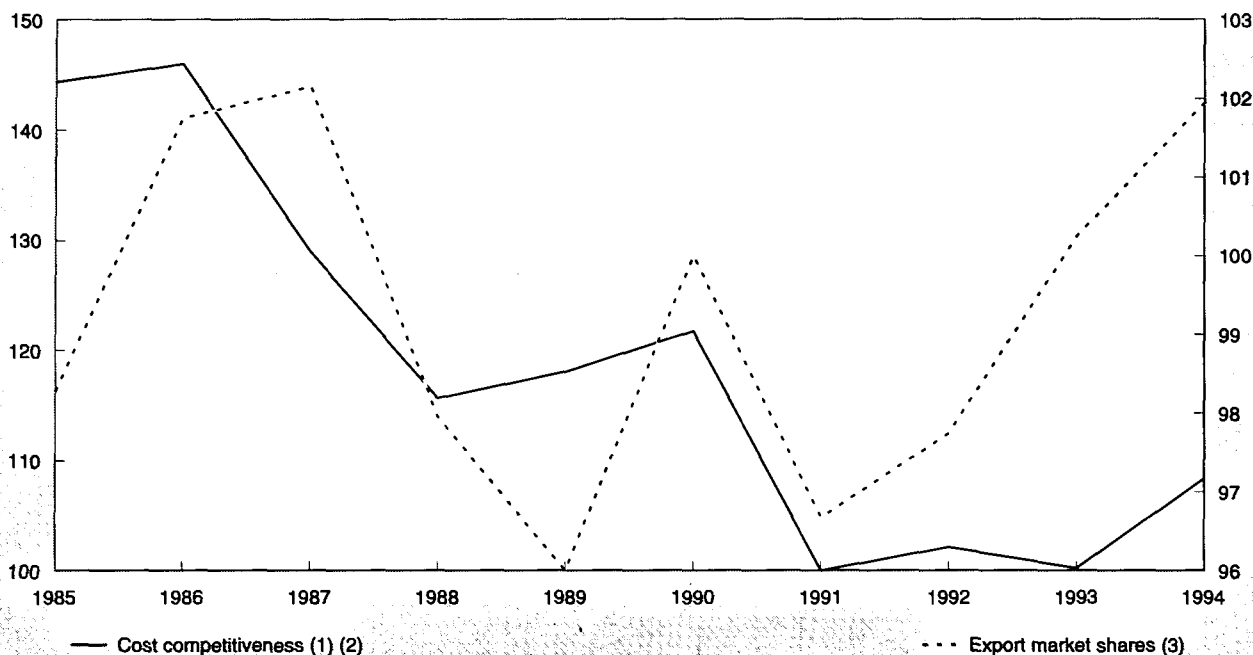
ica; and Japan in the NICs. Both Japan and Europe also have very strong export relations with the US.

Like its sectoral specialisation, the geographic structure of the EU's exports exhibits significant weakness compared to the other Triad members. In particular, the EU is less specialised in fast growth destinations and more dominant in slow growth destinations. When measuring export market growth by the increase of OECD exports between 1987 and 1993, the four fastest growing destinations were the NICs, China, Central and Eastern Europe, and Latin America. OECD exports to each of these regions rose by more than 100% over the 1987-1993 period. In 1993 these four areas of fast growth accounted for 23% of the EU's exports, against 35% of US and 42% of Japanese exports.

The four slowest growing destinations were the rest of the world (OPEC, Africa, ...), EFTA, Other Asia, and the EU itself, with OECD exports to these regions increasing by less than 30% between 1987 and 1993. The EU sold 40% of its exports in these four areas of slow growth, compared to 22% for Japan and 27% for the US.

A positive element is that the EU is improving its geographic specialisation. Between 1987 and 1993 it increased its share of Triad exports to the NICs, the fastest growing export destination, from 14% to 24%. This was largely at the expense of Japan, which saw its share fall from 59% to 50%. Furthermore, the EU maintained a very high market share (93% of Triad exports in 1993) in Central and Eastern Europe, and marginally increased its share in China. On the other hand, it lost market share in Latin America. Between 1987 and 1994, its share of Triad exports to Latin America fell from 30% to 24%, largely to the benefit of the US. Already a very strongly growing export market, Latin America is expected to become much more important in the future as economic reform programmes are laying the foundations for a rapid economic development not far behind the performance of the Asian NICs.

Figure 5: EU cost competitiveness and market shares (export market) - manufacturing industry



(1) Indicator of unit labour cost competitiveness lagged by one year  
 (2) left scale  
 (3) Indicator of the share of EU exports in OECD exports  
 Source: Eurostat, DEBA, DRI

### COST COMPETITIVENESS

Table 5a summarises changes in the cost competitiveness of the EU over the 1987-94 period, and Tables 5b and 5c present similar information for the US and Japan respectively. The choice of such a relatively long period is motivated by the focus on long-term sectoral trends in competitiveness and not on recent developments. Each indicator in the table compares changes in EU costs to changes in the costs of Europe's main competitors. Due to data availability at the sectoral level, these competitors have been restricted to the US and Japan.

Total production costs can be broken down into a number of individual items such as labour costs and intermediate input costs. A specific indicator has been calculated for each of these items in order to be able to determine which particular factor is responsible for an increase or decrease in a sector's competitiveness. For instance, a relevant question is whether an observed deterioration in unit labour costs in the EU compared to the US and Japan is attributable to insufficient productivity gains or to fast-growing wage rates. As can be easily seen from the table, different indicators can exhibit quite different trends over the 1987-94 period. Furthermore, a deterioration in labour cost competitiveness is not systematically associated with a deterioration in total costs.

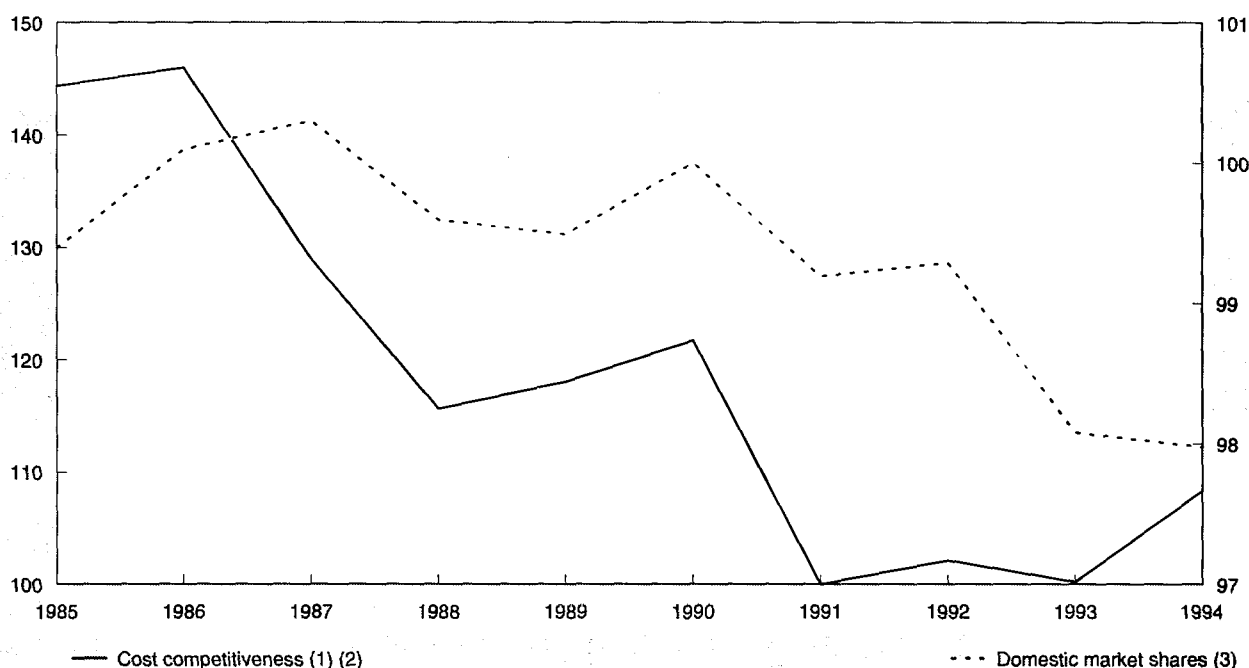
Starting with the analysis of labour costs, a small majority of sectors have experienced an improvement in labour cost competitiveness over the period considered (note that for all indicators, an *increase* indicates an *improvement* in the competitiveness of the EU). Many of these sectors report relatively large gains, particularly basic chemicals, leather and leather goods, footwear and clothing. Sectors which report a loss in competitiveness essentially include all electronics and electrical goods sectors (except computers), all transport sectors (except aerospace), food, drink and tobacco, and wooden products. Except for some electrical goods sectors, losses remain limited but they affect most of the larger exporting sectors and are therefore not without consequences for the average competitiveness of the manufacturing industry.

Breaking down unit labour costs into a wage rate and a productivity effect, only very few sectors in the EU have seen an improvement in wage rates competitiveness compared to the US and Japan. These are metal products, aerospace equipment, leather products, and textiles and clothing. In practice the list is probably even smaller as the indicator might not be very meaningful in the case of leather and textiles, two sectors for which the US and Japan are not major competitors.

In contrast, only very few sectors have suffered from lower productivity gains than their major trade competitors. Poor performers are mainly found in a group for which the competitiveness of the EU is known to be particularly problematic, namely electronics-related sectors such as office and EDP, consumer electronics, and instrument engineering. Sectors which have registered a particularly good performance on the productivity front include the primary metals sectors (both ferrous and non-ferrous), the three chemical sectors (though specialty chemicals remain somewhat behind), the textile cluster (particularly textiles and leather goods) and the wood cluster (wood products, pulp and paper, and printing and publishing). In most cases, the stronger productivity gains in Europe thus made it possible to offset the relatively faster growth of nominal labour costs, hence resulting in an improvement in unit labour cost competitiveness.

Only very few sectors have suffered a loss in competitiveness in terms of intermediate input costs per unit of output. To some extent, this positive result might result from the impact of changes in exchange rates on intra-EU trade. Sectors which report a loss in intermediate input cost competitiveness include automotive equipment, food, drink and tobacco, and footwear and clothing. Though it is difficult to draw further conclusions without more detailed analysis of relative input cost structures and price developments by country/region, one may wonder whether the European automotive manufacturers do not lag their US and Japanese counterparts in terms of rationalising their links with their suppliers.

**Figure 6: EU cost competitiveness and market shares (domestic market) - manufacturing industry**



(1) Indicator of unit labour cost competitiveness lagged by one year  
 (2) left scale  
 (3) Indicator of the coverage of EU demand by EU production compared to a similar ratio calculated for the Triad  
 Source: Eurostat, DEBA, DRI

The total unit cost indicator presented in column five of Table 5a is defined as the weighted average of unit labour costs and purchases of intermediate inputs per unit of real output. Total cost competitiveness therefore covers all cost components except capital costs and takes into account the weight of each component for each sector considered. Table 5a indicates that the European manufacturing industry has generally managed to improve its cost competitiveness over the period 1987-1994, though these gains remain marginal. Sectors such as automotive equipment, other means of transport and, to a lesser extent, food and drink, household appliances, and non-metallic minerals have all lost ground compared to their competitors. However, these losses remain generally relatively small. More dispersion can be observed in the case of the sectors which improved their cost competitiveness compared to the US and Japan. The pharmaceuticals, basic chemicals, and leather goods sectors are revealed as the clear winners followed by ferrous metals, office and EDP, and aerospace equipment. Note that, although these winners have generally improved their position both in terms of labour costs and in terms of intermediate input costs, the latter item seems to play a particularly important role in overall cost performance. This, again, highlights the danger of over-emphasising labour cost issues in a sectoral analysis.

Before turning to the next section, which is dedicated to the analysis of the trade performance by sector, it is necessary to emphasise that the relatively good cost performance observed over the 1987-94 period owes much to a marked improvement in costs and exchange rate conditions between 1992 and 1994. Given that trade adjusts only slowly to changes in costs, the EU trade performance over 1987-94 will look somewhat pale compared to its cost performance.

**MARKET SHARES**

Table 6 provides a number of indicators of trade performance, again for the 1987-94 period. The indicator of export market share compares EU exports to average OECD exports. The indicator of domestic market share is calculated as the coverage

of European consumption by European production (in practice, production minus exports divided by domestic sales) divided by a similar ratio calculated for the Triad. The trade balance indicator is simply defined to be the trade balance as a share of production.

The indicators only rarely point in the same direction. The overall performance appears poor, however, particularly when measured by the coverage of the domestic market. The EU manufacturing industry lost overall domestic market share, and this loss was widespread. Only very few sectors have managed to improve their domestic market share compared to the other members of the Triad. On the other hand, performance is considerably less uniform in the case of export market share. More than half of the sectors have raised their share of total OECD exports over the period considered, while the others saw their share shrink.

Based on these two indicators, the food and drink and the mineral oil refining industries seem the unquestionable winners. The sectors have managed to raise their share of OECD trade and to maintain their coverage of the European market in spite of adverse cost developments. They indeed belong both to the group of sectors which in 1994 were still hampered by inferior cost competitiveness when compared to 1987. Note however, that the apparent good performance of the food sector is, to some extent, explained by problems with trade data and that the actual performance of the EU food industry might be somewhat weaker.

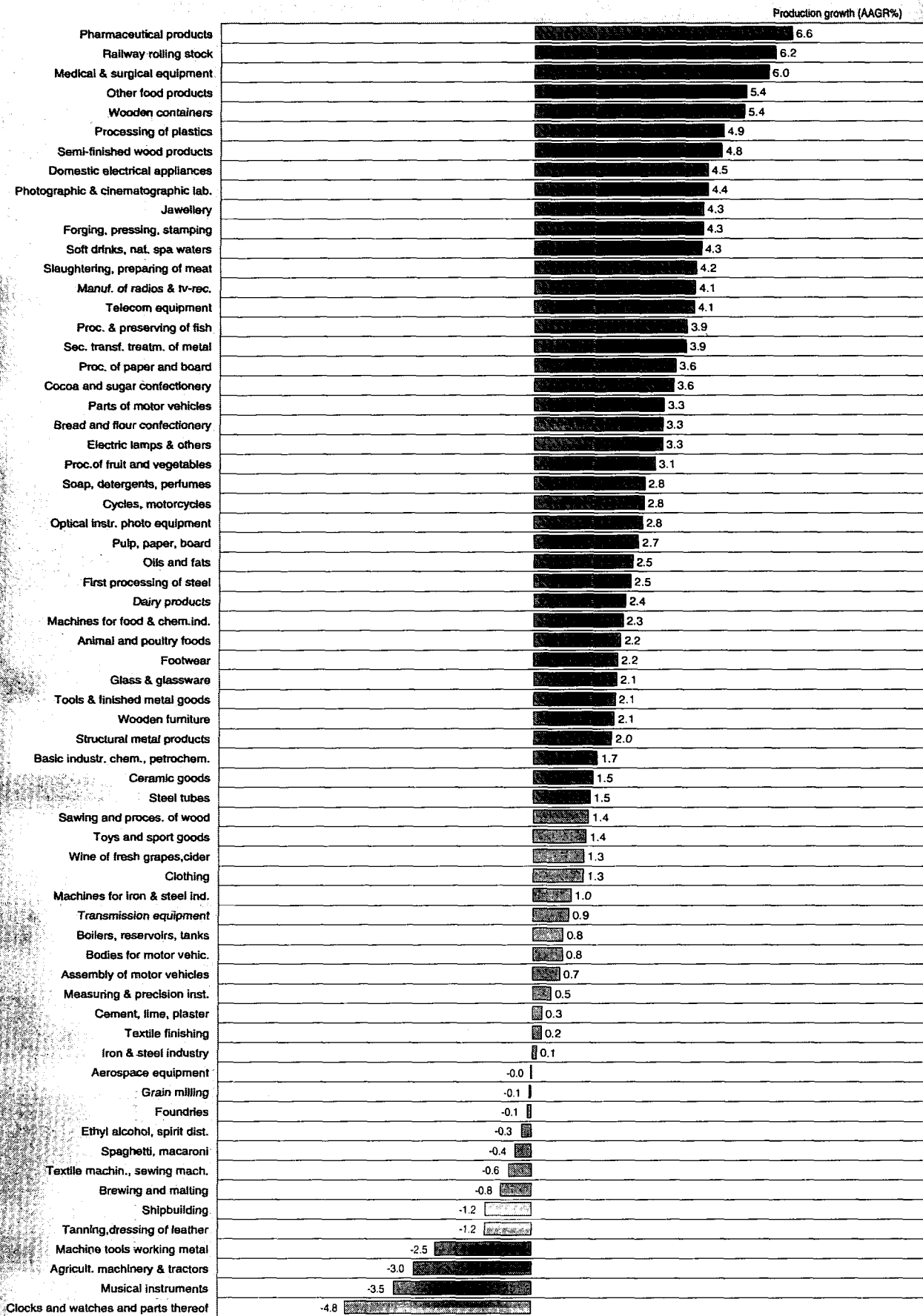
A number of sectors have managed to limit losses on the domestic market, while significantly improving their export position and thus raising their trade surplus. These are usually sectors commonly regarded as relatively strong in the EU, such as aerospace equipment, pulp and paper, and households appliances.

By contrast, the chemical cluster, which is usually also regarded as relatively strong in the EU, appears in an intermediary position with a performance less bright than that of the





Figure 7: Industrial output growth by sector, 1987-1994 (%)

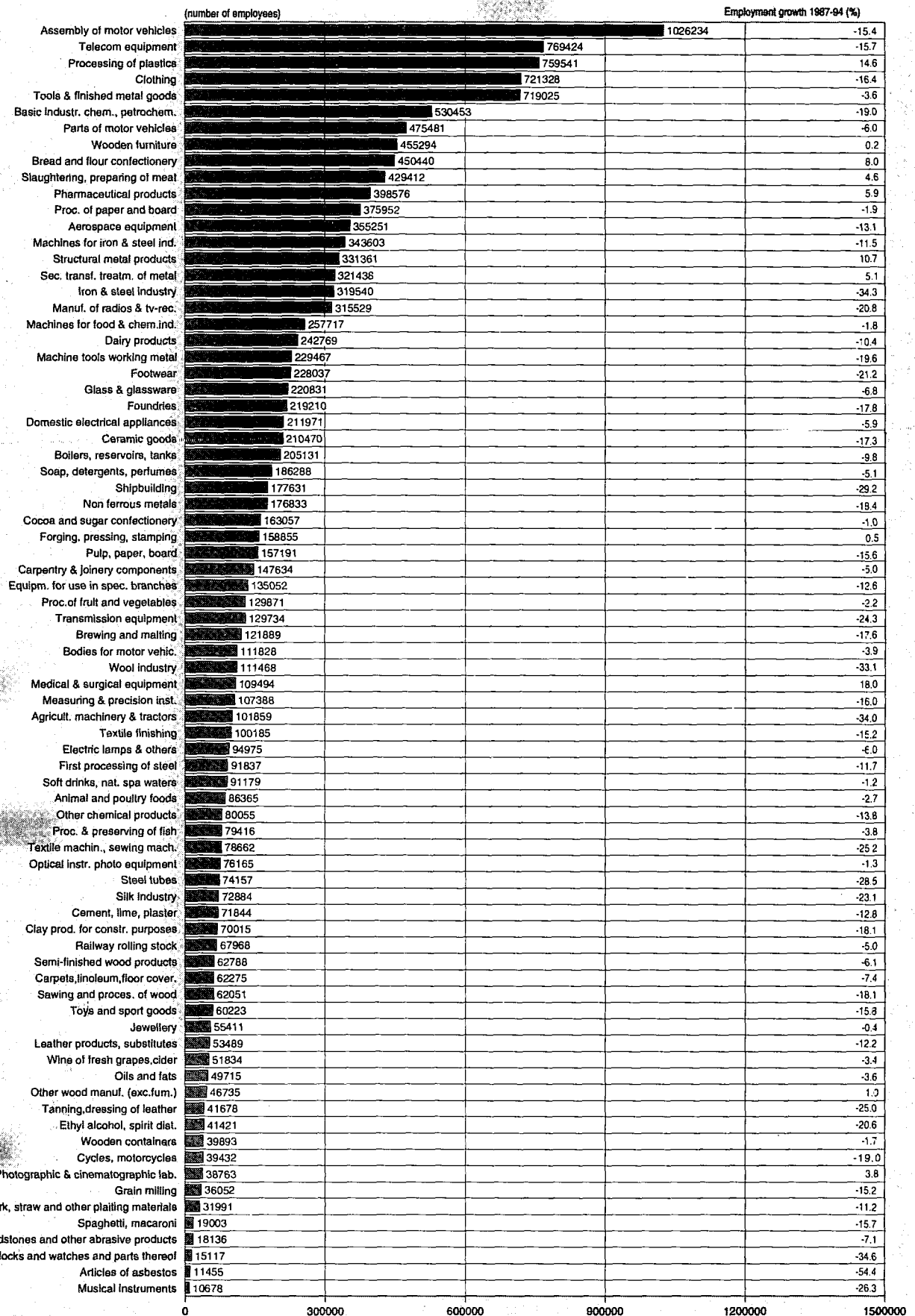


(1) Estimated; calculated using production in constant prices (1990=100).

Source: DEBA



Figure 8: Employment in EU industrial sectors, 1994 (1)



(1) Estimated.  
Source: DEBA



**Table 3: Sectors of export specialisation, EU, US and Japan, 1994**

EU	United States	Japan
	Sectors with a strong specialisation (1)	
Pharmaceuticals	Aerospace equip.	Office and edp-machinery
Household appliances	Consumer electronics	
Leather and leather goods	Motor vehicles and parts	
Footwear and clothing	Other means of transport	
Manufacture of jewelry	Instrument engineering	
	Sectors with a moderate specialisation (2)	
Mineral oil refining	Office and edp-machinery	Ferrous metals (prod.,prel.proc.)
Non-metallic mineral products	Consumer electronics	Electrical equip. for industry
Specialty chemicals	Food,drink,tobacco	Telecom equip. & oth. prof. electro.
Manufacture of metal articles	Printing and publish.	
Textile		
Printing and publish.		

(1) Export specialisation ratio higher than 1.5 (see column 3 of table 2)

(2) Export specialisation ratio higher than 1.2 (see column 3 of table 2)

Source: Eurostat, DEBA, DRI

sectors above but still slightly better than the manufacturing average. Indeed, the chemical sectors have reported limited gains in market shares on the export market but also improvements in the trade balance and limited losses on the domestic market. Sectors which report a poor trade performance compared to the manufacturing average include textile products, footwear and clothing, rubber and plastics, motor vehicles and the electronic/electrical cluster. Excluding household appliances, the performance of the electronic/electrical cluster looks particularly bleak. All sectors in this cluster have experienced an increase in their trade deficit. Office and EDP and consumer electronics report good performances on the export market, but these are more than offset by a poor record on the domestic market. Electrical and telecom equipment have both lost ground on their domestic and export markets, most likely as a result of a deterioration of their cost competitiveness. Note that if the trade performance in electrical engineering is not particularly bright, the performance of the EU in mechanical engineering is also worrying. Indeed, the mechanical engineering sector has lost shares both on the domestic and the export markets though this counter-

performance is somewhat offset by an improvement in the trade balance.

It is somewhat difficult to assess the impact of worsening cost conditions on trade, both in terms of the magnitude of this impact and because of the lag between changing costs and trade performance. The average improvement in cost competitiveness between 1987 and 1994 is largely a result of improving cost and exchange rate conditions between 1992 and 1994. It is likely that for most sectors this improvement has not yet been entirely passed through. Table 6 therefore also includes a column providing the growth in cost competitiveness lagged by one year. For most of the sectors the lagged indicator indeed shows no or a much smaller improvement of cost competitiveness. Only ferrous metals, basic chemicals, pharmaceuticals, and leather goods have enjoyed an early improvement in terms of cost. Note that all of these sectors, except ferrous metals, also achieved an unambiguously favourable trade performance.

To summarise this discussion in terms of performance, good trade performers can be classified into two groups:

**Table 4: Geographic breakdown of exports, EU, US and Japan - 1993**

	Share of region in world imports	EU	Japan	US			
EFTA	6.5	21.4	2.0	2.9	167 186	167 186	6.5
Medit. Basin	7.4	9.3	1.3	2.7	95 724	191 448	7.4
Latin America	5.0	4.8	4.3	17.2	128 333	128 333	5.0
NICs	17.3	9.9	32.2	15.2	448 512	448 512	17.3
Former Soviet Union	1.1	3.0	0.5	0.7	28 053	28 053	1.1
Central and Eastern Europe	2.1	6.0	0.2	0.4	53 114	53 114	2.1
China	3.4	2.3	4.9	2.1	88 728	88 728	3.4
Other Asia	1.4	2.2	1.2	1.0	37 407	37 407	1.4
Australia & New Zealand	1.9	1.7	2.4	2.3	48 092	48 092	1.9
Japan	7.9	4.5	0.0	9.4	205 525	205 525	7.9
US & Canada	24.8	18.7	32.3	22.7(1)	642 085	642 085	24.8
EU	18.8	0.0	13.8	19.1	484 866	484 866	18.8
Rest of the world	2.4	16.1	4.8	4.2	158 041	62 317	2.4
	100.0	100.0	100.0	100.0	2 585 666	2 585 666	100.0

(1) Share of Canadian exports in total US exports

Source: Eurostat



**Table 5: Indicators of cost competitiveness (1), EU  
Growth over 1987-94**

	Share in total manuf. production	Labour productivity	Wage rates costs	Unit labour costs	Intermediate costs	Total
Mineral oil refining	5.2	12.5	-0.7	12.5	-22.6	-22.1
Ferrous metals (prod.,prel.proc.)	3.1	29.0	-15.0	9.5	13.3	14.1
Non-ferrous metals (prod., prel.proc.)	1.3	15.7	-6.1	8.7	0.7	2.1
Non-metallic mineral products	3.7	9.5	-10.0	-1.4	-1.4	-0.7
Basic chemicals	4.3	27.2	-8.1	16.5	15.7	16.5
Pharmaceuticals	2.8	23.0	-10.0	11.0	30.7	23.8
Specialty chemicals	4.4	10.2	-9.4	0.0	1.4	1.4
Manufacture of metal articles	6.3	2.8	5.0	8.0	5.0	7.2
Mechanical engineering	7.9	2.8	-7.5	-4.8	1.4	0.7
Office and edp-machinery	1.9	-3.4	7.2	3.6	15.7	14.1
Electrical equip. for industry	3.2	-2.1	-8.8	-11.3	2.8	0.0
Telecom equip. & oth. prof. electro.	3.2	4.3	-6.1	-2.1	0.0	2.1
Consumer electronics	1.6	-1.4	-2.8	-4.1	2.8	2.1
Household appliances	0.9	7.2	-16.8	-11.3	2.1	-0.7
Motor vehicles and parts	10.3	2.8	-8.1	-5.5	-3.4	-2.8
Aerospace equip.	1.5	2.1	6.5	8.7	9.5	9.5
Other means of transport	1.0	9.5	-14.4	-6.1	-8.8	-6.1
Instrument engineering	0.9	-1.4	-4.1	-5.5	3.6	1.4
Food,drink,tobacco	17.2	11.0	-13.2	-3.4	-0.7	-1.4
Textile	3.1	19.7	-8.1	10.2	2.8	5.0
Leather and leather goods	0.4	20.5	2.1	23.0	23.8	24.7
Footwear and clothing	2.3	15.7	10.2	26.4	-2.1	3.6
Timber and wooden furniture	2.8	15.7	-17.4	-4.1	11.8	7.2
Pulp, paper & paperboard	2.8	16.5	-13.8	0.7	7.2	5.7
Printing and publish.	3.3	11.8	-10.7	0.0	1.4	0.7
Proc. of rubber and plastics	4.0	11.0	-11.3	-0.7	5.7	4.3
Manufacture of jewelry	0.5	30.7	-6.8	22.2	3.6	8.0
Total manufacturing	100	5.7	-6.1	-0.7	5.0	3.6

(1) Each indicator measures the improvement/deterioration of the corresponding cost item in the EU relative to the US and Japan. Positive growth indicates an improvement in EU competitiveness  
Source: Eurostat, DEBA, DRI

- those sectors which have improved their trade performance over the period considered in spite of adverse cost developments (food, drink and tobacco, mineral oil refining and household appliances)
- those sectors which have managed to improve their cost competitiveness (basic chemicals, specialty chemicals, pulp and paper, and aerospace).

Note that the second group includes sectors for which cost competitiveness is not the key explanatory factor of changes in market share observed in past years (specialty chemicals and, to a lesser extent, aerospace), and that most of the good performers do not belong to the specialised sectors defined in the section devoted to the analysis of the trade structure.

As to poor trade performers, three comments can be made:

- The EU has continued to lose ground in the electrical/electronics sector. It has also suffered from adverse cost developments in the two sectors of the cluster for which it is generally considered as more competitive, namely electrical and telecom equipment.
- The EU has also lost market shares in the textile and clothing sectors though it has registered a good performance for leather products. Remember that the EU exhibits a relative specialisation in these sectors.
- Two of Europe's largest exporting sectors post worrying signs of weakness. Both mechanical engineering and auto-

otive equipment have lost market share and seem to have suffered from poor cost developments.

## RESEARCH & DEVELOPMENT

Research and development is obviously a key factor of competitiveness and growth, but the links between technology and economic performance are complex and difficult to measure. The technological system, which covers both scientific and industrial research, is largely an open system insofar as scientific discoveries and innovations tend to be diffused across borders through the publication of scientific papers and through the technologies embedded in exported products. In this context, the relationship between technology and competitiveness may appear somewhat elusive, but there is now a broad consensus around the view that countries tend to develop a limited number of areas of technological leadership which underpin their competitiveness in related industrial sectors, and which benefit from the cross-fertilisation between first grade research organisations, high-performing companies, and dedicated training centres.

Technological specialisation of course confers a much less stable and enduring advantage than the more traditional forms of specialisation resulting from factor endowments in labour or capital. Commercial innovations can be replicated more or less rapidly by competitors and a technological cluster will only confer a lasting competitive advantage if it manages to constantly renew its leadership. Note that although much of the recent economic research has emphasised the role of

**Table 6: Indicators of trade performance, EU  
Growth over 1987-94**

	Total cost indicator (1)	Trade balance (2)	Share of OECD exports	Domestic market share (3)
Mineral oil refining	-18.1	7.0	17.3	-1.1
Ferrous metals (prod.,prel.proc.)	6.9	0.2	-4.8	-0.2
Non-ferrous metals (prod.,prel.proc.)	-3.4	-15.1	-8.1	-9.8
Non-metallic mineral products	-14.7	-0.7	8.7	-1.9
Basic chemicals	5.4	1.4	0.7	-3.0
Pharmaceuticals	7.0	0.5	0.0	-2.9
Specialty chemicals	-14.4	2.2	0.7	-1.9
Manufacture of metal articles	-11.4	-1.4	5.7	-2.3
Mechanical engineering	-14.4	4.0	-8.8	-3.0
Office and dp-machinery	-3.1	-9.0	12.5	-6.0
Electrical equip. for industry	-11.8	-0.8	-14.4	-6.2
Telecom equip. & oth. prof. electro.	-14.4	-0.7	-11.3	-2.1
Consumer electronics	-11.4	-9.1	26.4	-16.3
Household appliances	-15.0	2.5	24.7	-3.2
Motor vehicles and parts	-18.8	-3.3	-9.4	-3.1
Aerospace equip.	-16.0	8.7	80.5	-24.8
Other means of transport	-13.4	1.6	-1.4	-4.0
Instrument engineering	-8.9	-3.9	-18.6	-6.5
Food,drink,tobacco industry	-11.7	1.1	18.9	0.1
Textile industry	-7.9	-3.8	0.7	-5.0
Leather and leather goods	6.3	0.7	41.7	-17.8
Footwear and clothing ind.	-11.2	-14.2	-7.5	-1.3
Timber and wooden furniture	-9.4	-2.9	-16.8	2.1
Pulp, paper & paperboard	-5.6	1.9	18.9	-0.9
Printing and publish.	-14.2	0.0	-2.8	-0.6
Proc. of rubber and plastics	-9.7	-1.8	-17.4	0.3
Manufacture of jewelry	-2.7	-40.4	-5.5	
Total manufacturing	-9.4	-0.1	0.0	-2.3

(1) One year lagged

(2) Difference between 1987 and 1994, as a percentage of production in 1994

(3) Measured by the coverage of the European market by European production divided by the same ratio calculated for the Triad

Source: Eurostat, DEBA, DRI

innovation in non-price competitiveness, the impact of technology on price competitiveness must not be overlooked. Innovation allows both the marketing of higher quality products for which price competition will play a limited role, and the improvement of production processes thereby raising productivity and curtailing costs.

In recent years, considerable effort has been geared towards the construction of databases of technology and R&D statistics for the EU and its main competitors, both for the technological system as a whole and at a sectoral level (see for instance *The European Report on Science and Technology Indicators - European Commission 1994* on which much of the discussion thereafter is based).

There are a number of ways to evaluate R&D activity. Dedicated statistical publications generally distinguish two types of technological indicators: those based on input measures, i.e. the amount of resources allocated to the research activity, and those based on output measures, i.e. the outcome of the R&D process. In most cases, input indicators are evaluated either in terms of R&D spending or in terms of human capital stock (the number of scientists or researchers employed). Output indicators can be measured either in terms of scientific output, generally proxied by the number of scientific publications, or in terms of technological output, generally proxied by the number of patents. Each of these measures suffers from specific statistical shortcomings and none of them is perfectly correlated with the actual technological performance of an economy or sector. Besides, these measures do not cover all the actual innovation effort as many innovations, particularly in terms of labour organisation, are captured neither on the input side nor on the output side. Nonetheless, the simultaneous analysis

of all these measures gives a reasonably clear picture of the strengths and weaknesses of the European technological system.

Overall, this picture is somewhat dreary, both at the level of the technological system as a whole and in terms of sectoral specialisation. To summarise the arguments developed hereafter, the European technological system suffers from an over-emphasis on fundamental research at the expense of commercial innovations, and from a lack of clear technological edge at the sectoral level.

Starting with the analysis of the technological system as a whole, Table 7 provides data on the resources allocated to R&D in the EU, the US, and Japan. Measured as a share of GDP, the EU suffers from the lowest R&D spending in the Triad. Other indicators of technological input such as the size of the existing pools of research scientists and engineers involved in R&D (commercial and non-commercial) point to a similar lag.

Another weakness of the EU technological system is a comparatively low contribution of business enterprises to total R&D. Both in terms of R&D performed and in terms of R&D financed, EU companies appear to be less involved in R&D than their American or Japanese counterparts. This is confirmed by data on the share of business research scientists or engineers in the labour force. Note that while company contributions to R&D do not necessarily have an influence on the quality of the research carried out in a country, they can be considered as an indicator of the commercial efficiency of this research. Therefore, the EU seems to suffer from a double handicap: a lower level of research spending combined with a less commercially oriented research effort. The latter

**Table 7: Structure of R&D spending in the EU, US and Japan, 1991**

	EU	US	Japan
Total R&D spending in GDP	2.0	2.6	2.9
Share of total R&D performed by business	62.6	71.6	66.0
Share of total R&D financed by business	53.2	59.0	68.2
RSEs (1) per 1000 labourforce	4.4	7.6	9.7
Business RSEs per 1000 labourforce	2.2	6.1	5.6

(1) Research Scientists and Engineers  
 Source: European Commission DG XII

conclusion is confirmed by measures of technological output such as the number of scientific publications or the number of patents. While the EU by and large continues to hold its rank in terms of scientific publications or Nobel prizes, its position in terms of commercial innovations seems to have deteriorated. Table 8 highlights the clear decline in the EU's share of the total number of patents granted in the US or in the total number of patent applications in the EU.

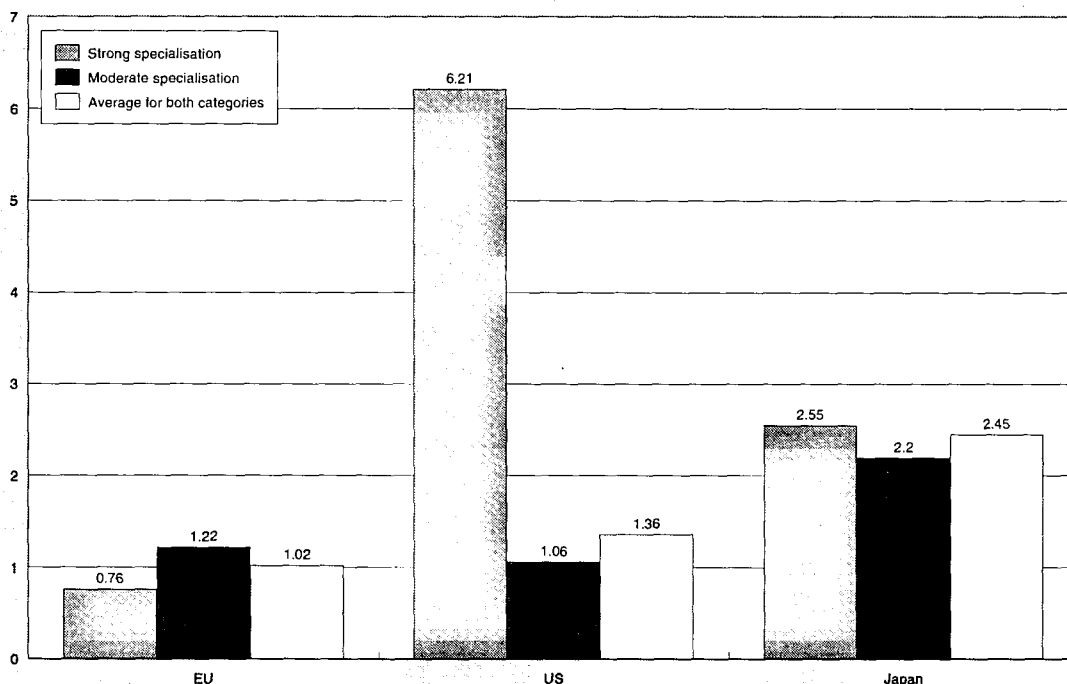
Two additional factors contribute to a somewhat dismal diagnosis of Europe's technological competitiveness. First a substantial share of European research is devoted to military ends. Given the general trend towards declining defence budgets and the increasing difficulty in developing civilian applications from military research (in particular because military research aims at technical prowess which are of limited use for civilian applications) a high share of defence R&D can be considered as a competitive handicap for European companies. Arguably, the US economy suffers from a similar handicap but such is not the case of Japan, which remains little involved in the defence industry. The second handicap of the European technology system, and this time compared both to the US and to Japan, is a costly duplication of research centres and activities which owes much to the national basis on which tech-

nology has developed. European integration should, however, progressively alleviate this problem.

Turning to the sectoral aspects of technological competitiveness, the EU's major weakness is that it has only few sectors with a strong research specialisation pattern and a clear technological edge. Table 9 presents the information of Table 8 detailed by sector. Between 1984 and 1993, the EU loses patent share in all sectors except aerospace and transport equipment. Both these sectors are, however, very minor in terms of the number of patents granted or applied for. Furthermore, the performance in aerospace owes much to the heavily subsidised defence-related sector. The losses are limited in chemicals, pharmaceuticals and engineering. The most worrying observation is the rapid further deterioration of the EU's already weak position in the electronics sectors (including information technologies). It is exactly those sectors that research and development activity is most intense at world level, while their products have a large impact on the productivity in many other industries.

There are no signs of a significant improvement in the position of the weak sectors. In contrast, after more careful consideration, the position of several stronger sectors where the EU is holding ground, or even leading, looks less than prominent.

**Figure 9: Cover ratio of specialized sectors(1), EU, US and Japan - 1994**

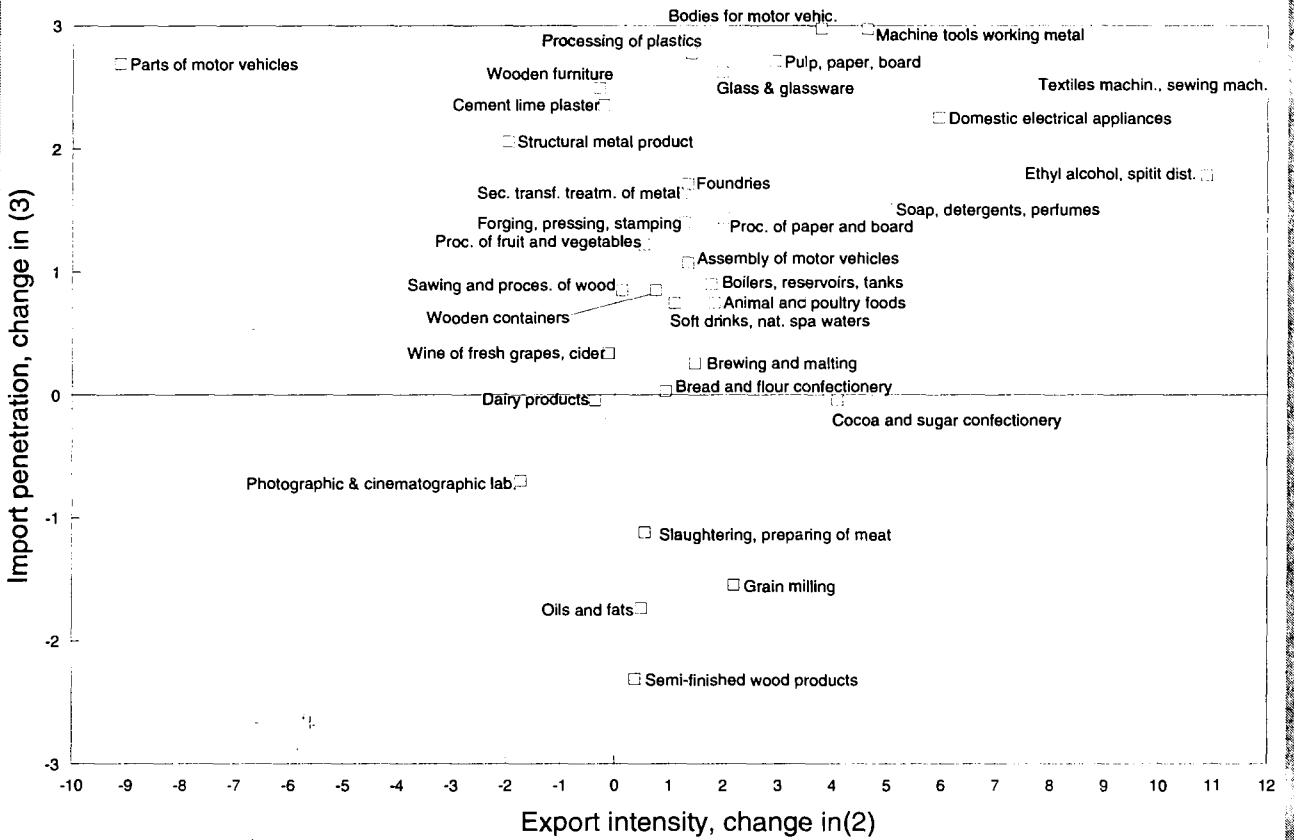
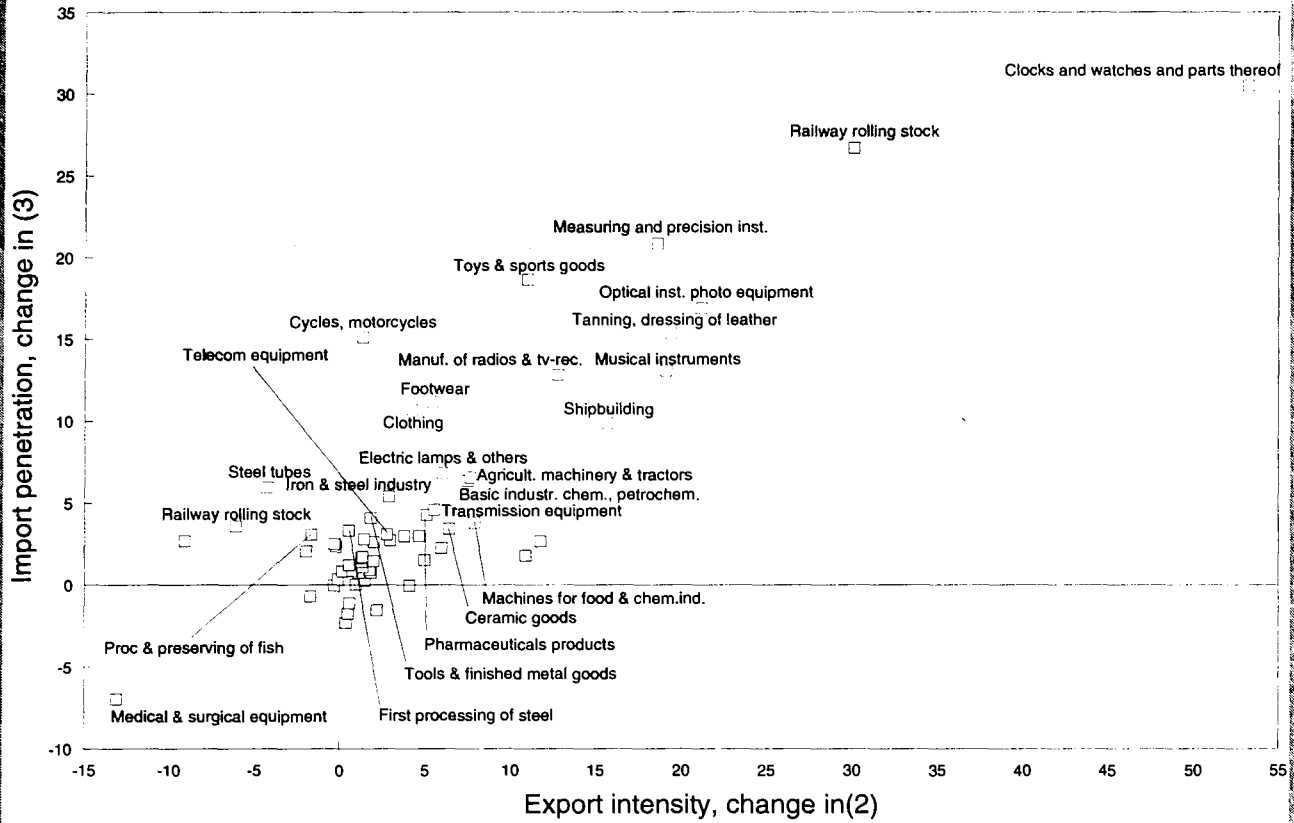


(1) Based on the export specialisation ratio as provided in Table 2 column3  
 Source: Eurostat, DEBA, DRI





Figure 10: Change in export intensity / Import penetration by sector 1987-94 for some selected sectors (1) (%)



(1) Estimated.

(2) Calculated as extra-EU exports / production.

(3) Calculated as extra-EU imports / apparent consumption.

Source: DEBA



**Table 8: Share of total patents, 1984-93**

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Share of patents granted in the US										
EU	21.6	21.9	22.4	22.4	22.1	21.3	20.6	19.6	18.3	16.7
US	51.2	49.3	47.5	46.0	45.5	45.6	45.4	46.1	47.0	50.1
Japan	18.8	20.1	21.2	22.7	23.5	24.2	24.8	25.0	25.7	24.2
Share of patent applications in Europe										
EU	46.5	45.9	45.3	46.5	46.9	46.0	43.7	41.9	41.8	42.6
US	28.7	27.4	27.5	27.1	25.3	25.0	25.8	26.6	27.0	28.4
Japan	13.7	15.5	15.9	15.4	17.2	19.0	20.7	21.9	21.6	19.1

Source: European Commission DG XII

EU leadership is not exclusive but shared with other members of the Triad, and it looks threatened in the medium term.

In electrical engineering, for instance, Japan has undertaken a major technological effort since the early 1980s which now translates into a much higher R&D intensity and also a much higher R&D spending level than in the EU. Even in mechanical engineering, the EU's largest exporting sector, R&D intensity is estimated at about 1.5%, against 1.3% for the US which is presently its major competitor, but 2.6% for Japan, which is the third largest world player in the sector. In the chemical sector, the US and the EU are the two traditional leaders, both in terms of patents granted and in terms of absolute level of spending but, there too, Japan has undertaken a considerable effort since the early 1980s which now results in a much higher R&D intensity than for the two other members of the Triad. That this effort is bearing fruit is evidenced by a marked increase in the share of Japan in the number of engineering and chemicals patents in Europe and in the US, as is apparent from Table 9.

In the aerospace sector, the problem is somewhat different to the extent that the EU appears to be squeezed between the US, which remains the unquestionable leader in the sector, and Japan which has somewhat reduced its admittedly considerable lag in recent years. The US has a much higher R&D intensity than the EU and Japan and, given the size of its industry, this leadership turns into an overwhelming domina-

tion in terms of the absolute level of R&D spending. Japan still remains a second order player in the field of aerospace, with a nearly negligible share of patents granted in the US or in Europe, and an absolute level of R&D spending which looks insignificant compared to that of the US or the EU. However, Japan's potential long term role in civilian aerospace should not be neglected. Japan's R&D intensity has surged since the late 1980s and is now close to that of the EU. Moreover, the American, and to a lesser extent European, domination in absolute R&D spending owes much to government subsidies particularly in terms of defence research. When considering the research intensity restricted to business-financed R&D, Japan ranks first and the EU only third.

In conclusion to this analysis of high-tech sectors, the EU suffers from a lack of clear technological domination and its traditional areas of strength look increasingly challenged. In addition, the European position appears particularly weak in the fast growing area of information technologies and electronics. Another worrying point is that Europe's relative weakness in high-tech sectors is not offset by a marked technological advantage in traditional or low- to medium-tech sectors.

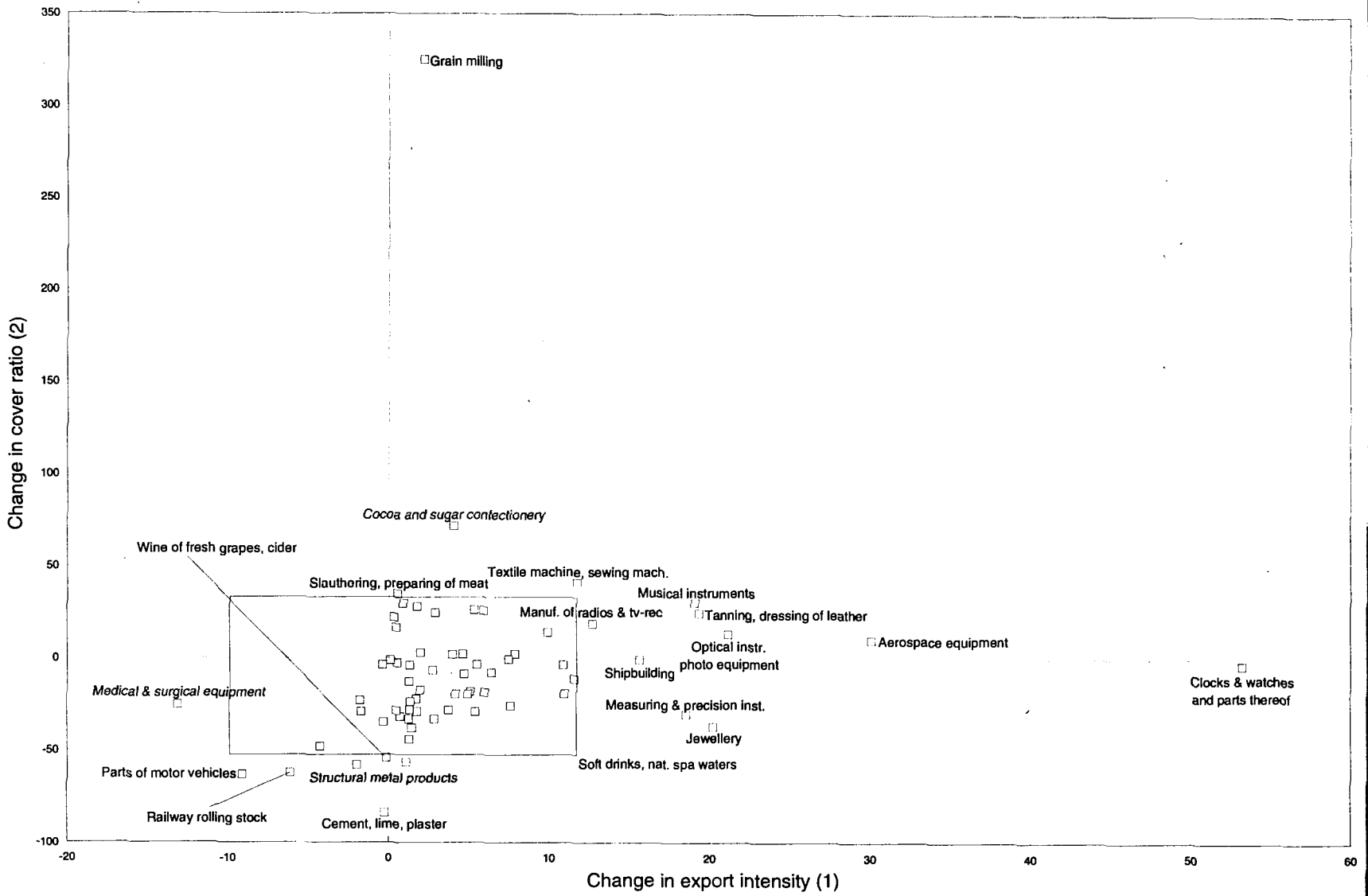
**Table 9: Share of total patents by sector, 1993 and change 1984-1993**

	1993	EU Change 1984-1993	1993	US Change 1984-1993	1993	Japan Change 1984-1993
Share of patents granted in the US						
Aerospace	29.2	0.5	62.5	-1.1	3.9	1.5
Chemicals	21.1	-1.4	53.0	-4.3	19.5	5.9
Pharmaceuticals	22.9	-3.1	54.9	2.8	14.8	1.0
Engineering	19.0	-3.9	50.5	-0.8	20.2	3.2
Electronics	10.9	-6.8	49.2	-3.3	33.4	7.8
Transport equipment	24.6	-3.9	37.2	1.1	30.4	1.8
Other	17.8	-4.5	50.2	-1.2	18.9	4.2
Total	16.7	-4.9	50.1	-1.1	24.2	5.4
Share of patent applications in Europe						
Aerospace	60.8	8.3	29.0	-12.3	3.6	2.0
Chemicals	41.4	-0.7	32.7	-4.5	19.4	7.1
Pharmaceuticals	38.8	-3.2	36.6	3.6	15.5	-0.7
Engineering	50.3	-0.6	22.6	-3.0	15.2	4.2
Electronics	30.8	-8.3	34.6	1.3	27.0	7.1
Transport equipment	59.7	5.4	17.6	-4.0	14.9	2.2
Other	50.9	-1.8	21.5	-0.2	14.0	4.6
Total	42.6	-3.9	28.4	-0.3	19.1	5.4

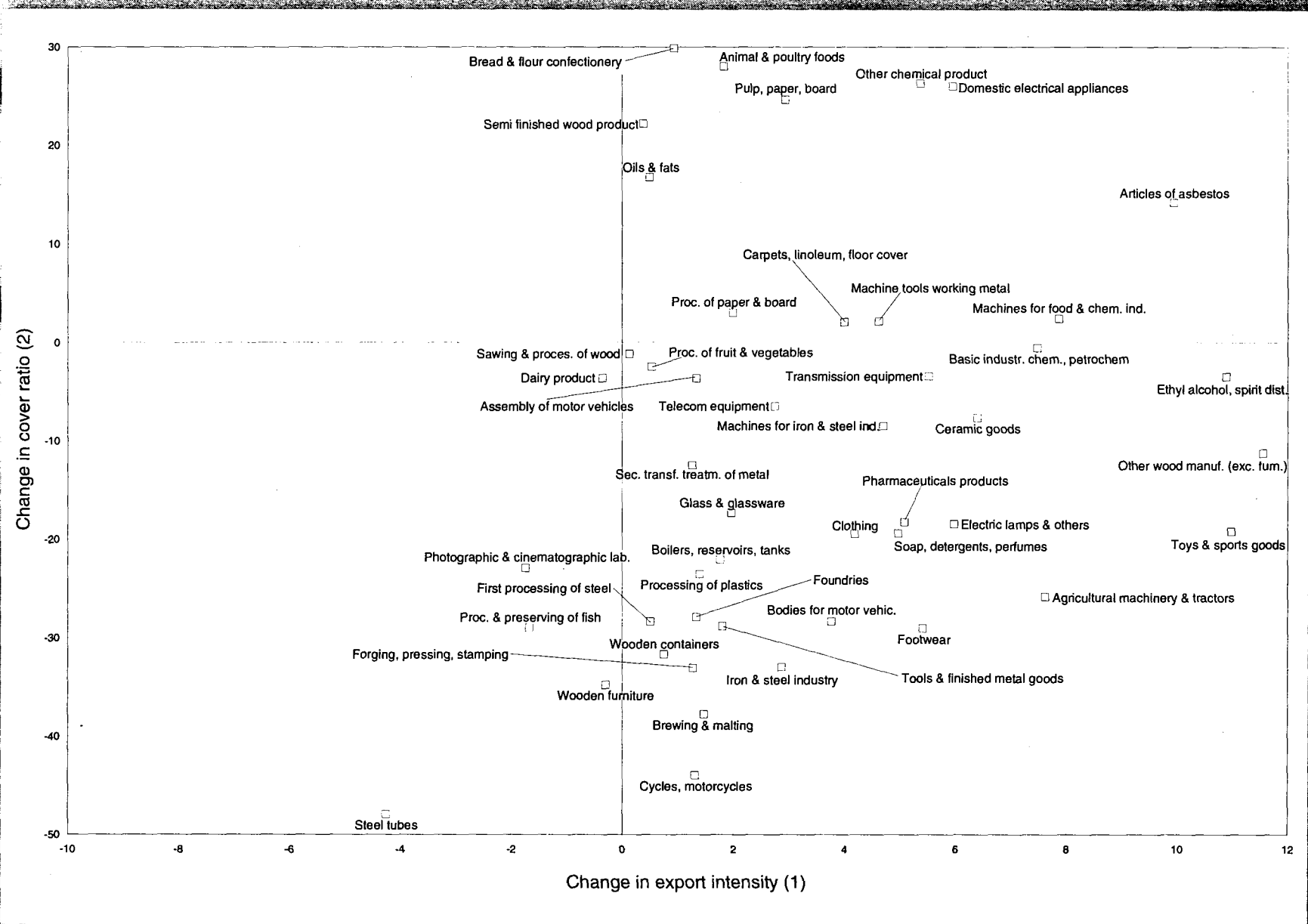
Source: European Commission DG XII



Figure 1: Performance of EU Industry In terms of exports, 1987-94 (%)



(1) Estimated, calculated as  $\frac{\text{Exports in 1994} - \text{Exports in 1987}}{\text{Exports in 1987}}$   
 (2) Calculated as  $\frac{\text{Exports in 1994} - \text{Exports in 1987}}{\text{Exports in 1987}}$   
 Source: DEBA



(1) Estimated, calculated as extra-EU exports/production in 1994 minus the same ratio in 1987.  
 (2) Calculated as extra-EU exports / extra-EU imports in 1994 minus the same ratio in 1987.  
 Source: DEBA

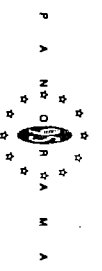
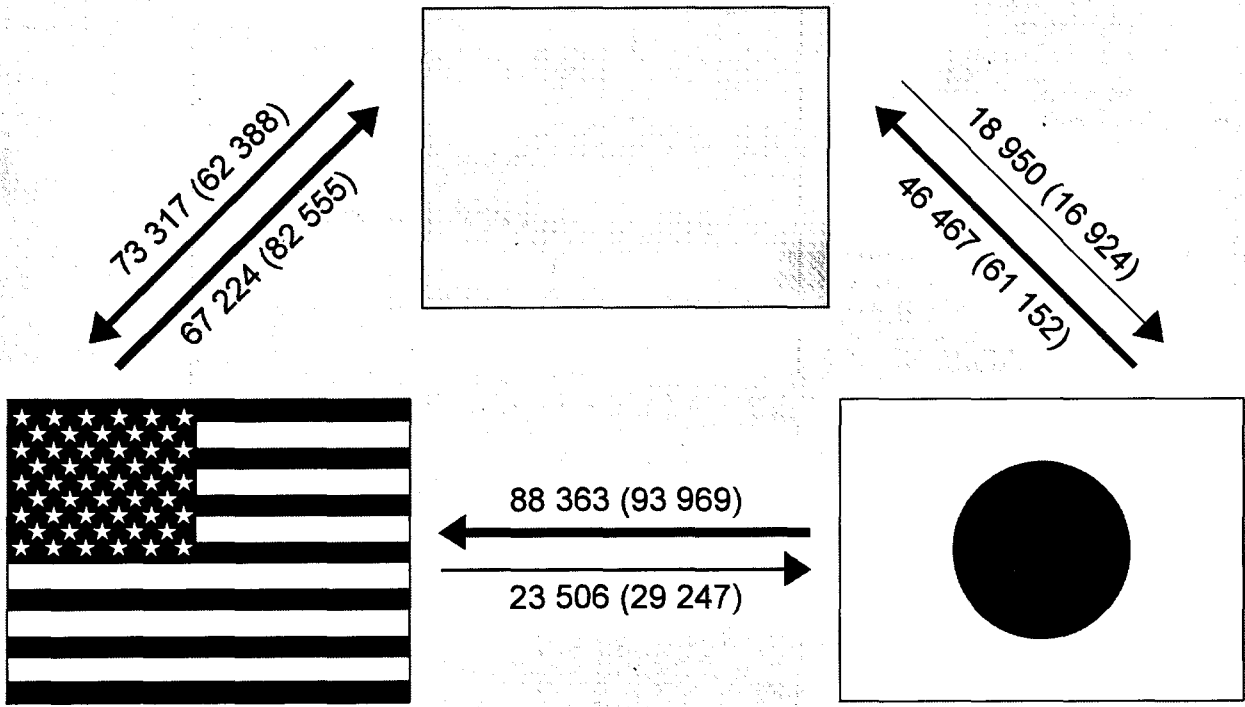
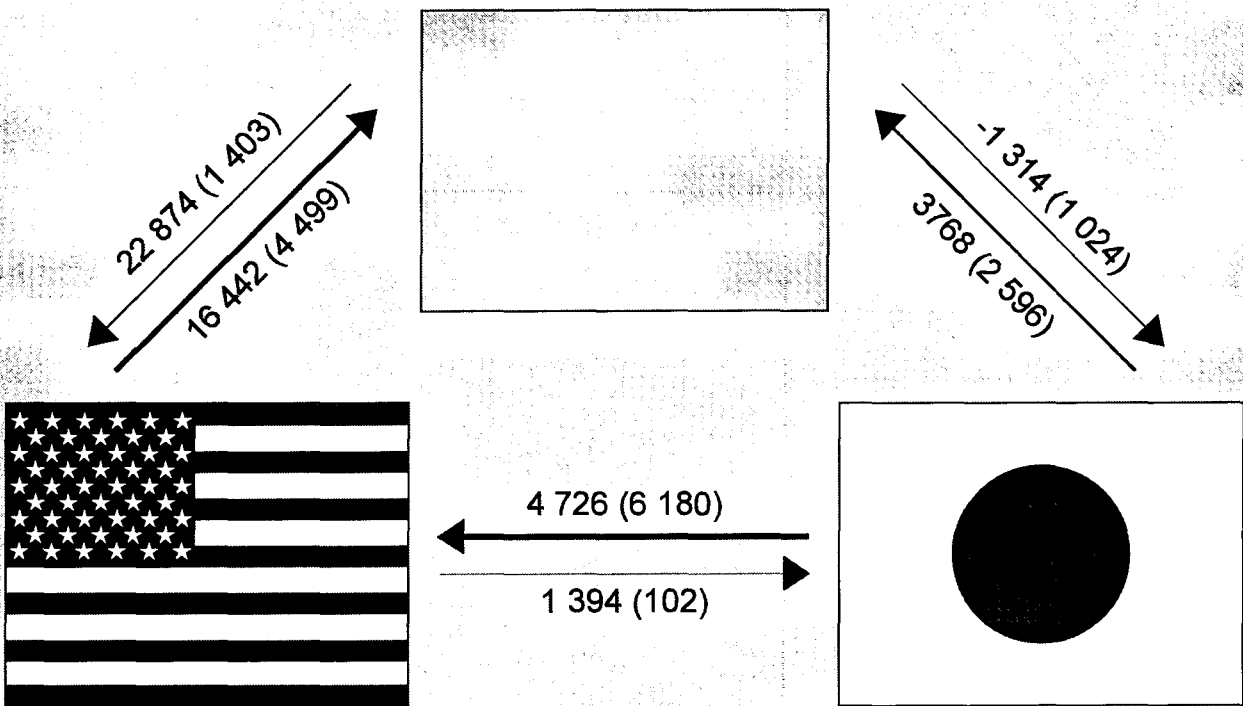


Figure 12A: Exports between the EU, USA and Japan, 1993 (1)



(1) Manufactured goods, corresponding to SITC 5+6+7+8  
 Note: the figure between brackets is the 1992 value.  
 Source: Eurostat

Figure 12B: Foreign direct investment between the EU, USA and Japan, 1993 (1)



(1) Excluding reinvestment profits.  
 Note: the figure between brackets is the 1992 value.  
 Source: Survey of Current Business and Bank of Japan

## CONCLUSION

Looking at the trade balance, the competitiveness of the EU does not seem a cause for worry. The trade balance has permanently registered a surplus in the last decade. In the last years, the surplus increased spectacularly, and in 1994 it stood at 3.6% of GDP, which is even higher than in Japan.

However, the picture looks much darker when considering only the trade in manufactured goods, thus leaving out primary commodities and services. The trade balance in manufactured goods declined almost continuously between 1982 and 1991, when it remained barely positive. Since then, the manufacturing balance has recovered, but its performance has been sluggish compared to that of the overall trade balance of goods and services. The sharp improvement of the overall trade balance after 1989 has therefore hidden the persistent problems of the manufacturing sector.

An examination of the structure of EU exports reveals several weaknesses compared with the US and Japan, both in sectoral and geographical specialisation. First, the sectors in which the EU shows some degree of specialisation have unfavourable characteristics. For instance, they only include one high-tech sector, pharmaceuticals. Besides, the trade balance of sectors in which the EU has a significant export specialisation is relatively worse than that of other manufacturing sectors. With respect to the destination profile, export performance is handicapped by the EU's weaker trade links with some of the fastest growing markets, the NICs and Latin America. The structural problems of European competitiveness are widely recognised. For instance, they are summarised in the *First Report on Enhancing European Competitiveness* of the Competitiveness Advisory Group, which was published in June 1995.

The analysis of cost competitiveness and market shares clearly illustrates the value of a disaggregated, sectoral approach. Behind the indicators of overall trade performance and cost competitiveness, a wide disparity of sectoral developments is hidden. Of the many items discussed in these sections, a few observations are especially worth remembering. Two of

the EU's largest exporting sectors, mechanical engineering and the automotive industry, register a worrying loss of competitiveness, visible in a loss of market share and unfavourable relative cost developments. For individual sectors, the evolution of the cost of intermediate inputs is as equally decisive as that of labour costs in determining overall cost performance. Many sectors achieving good results in cost competitiveness and trade do not belong to the current sectors of EU specialisation. Examples are basic chemicals, pulp and paper, and aerospace.

The last section of the article complements the cost analysis by examining another important factor in competitiveness: research and development. The main conclusion is very similar to the result of the structural trade analysis. In particular, the absence of high-tech sectors in the trade specialisation of the EU reappears in its R&D performance. The EU has only very few sectors with a strong research specialisation and a clear technological edge. The sectors in which research is concentrated are often medium-tech, while the EU is only very weakly represented in information technology and electronics. In addition, even in mechanical engineering, the largest exporting sector, a medium-tech industry where the EU is relatively strong in R&D, the EU's R&D efforts are lower than those of Japan.

Written by: DRI Europe

# Statistical annex

**Table 1: Statistical Annex**  
**GDP at constant market prices**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Belgique/België	0.8	1.4	2.0	4.9	3.5	3.2	2.3	1.9	-1.7	2.3	2.7	2.6
Danmark	4.3	3.6	0.3	1.2	0.6	1.4	1.3	0.8	1.5	4.4	3.3	2.9
BR Deutschland (2)	2.0	2.3	1.5	3.7	3.6	5.7	5.0	1.8	-1.7	2.3	2.5	2.2
Hellas	3.1	1.6	-0.5	4.4	4.0	-1.0	3.2	0.8	-0.5	1.1	1.6	1.8
España	2.6	3.2	5.6	5.2	4.7	3.7	2.2	0.7	-1.1	2.0	3.1	3.4
France	1.9	2.5	2.3	4.5	4.3	2.5	0.8	1.3	-1.5	2.7	3.1	2.9
Ireland	3.1	-0.4	5.7	4.3	7.4	8.6	2.9	5.0	4.0	6.3	6.9	5.5
Italia	2.6	2.9	3.1	4.1	2.9	2.1	1.2	0.7	-0.7	2.2	3.3	3.4
Luxembourg	2.9	4.8	2.9	5.7	6.7	3.2	3.1	1.9	2.1	3.0	3.3	2.9
Nederland	2.6	2.7	1.2	2.6	4.7	4.1	2.3	1.3	0.3	2.5	3.2	2.8
Österreich	2.5	1.2	1.7	4.1	3.8	4.2	2.9	1.8	-0.1	2.7	2.7	2.5
Portugal	2.8	4.1	5.5	5.8	5.7	4.3	2.1	1.1	-1.2	1.1	3.0	3.2
Suomi/Finland	3.4	2.4	4.1	4.9	5.7	0.0	-7.1	-3.6	-1.6	3.9	5.3	4.2
Sverige	1.9	2.3	3.1	2.3	2.4	1.4	-1.1	-1.4	-2.6	2.2	2.8	3.0
United Kingdom	3.5	4.4	4.8	5.0	2.2	0.4	-2.0	-0.5	2.0	3.8	3.1	2.8
EU (2)	2.5	2.9	2.9	4.2	3.5	2.9	1.5	0.9	-0.6	2.6	3.0	2.8
United States	3.1	2.8	3.1	3.9	2.7	1.2	-0.6	2.3	3.2	4.1	3.2	2.3
Japan	5.0	2.6	4.1	6.2	4.7	4.8	4.3	1.1	0.1	0.6	1.6	2.9

(1) Spring 1995 forecasts.  
(2) Excluding former East Germany.  
Source: Commission Services

**Table 2: Statistical Annex**  
**Deflator of private consumption (1)**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (2)	1996 (2)
Belgique/België	5.9	0.7	1.9	1.6	3.6	3.7	2.5	2.1	2.6	2.4	1.9	2.4
Danmark	4.3	2.9	4.6	4.0	4.3	2.7	2.4	1.8	1.0	1.7	2.3	2.7
BR Deutschland (3)	2.0	-0.1	0.7	1.8	2.1	2.8	4.0	3.8	3.1	2.6	2.0	2.4
Hellas	18.3	22.1	15.7	14.2	14.4	19.2	18.8	15.1	13.6	10.9	9.6	8.8
España	7.1	9.4	5.7	5.0	6.6	6.5	6.4	6.4	5.6	5.1	4.9	4.5
France	5.8	2.7	3.1	2.6	3.4	2.8	3.2	2.4	2.2	1.8	1.9	2.1
Ireland	5.0	4.6	2.3	2.9	3.2	1.4	2.5	2.8	1.6	3.0	2.9	2.7
Italia	9.0	6.2	5.3	5.7	6.5	5.9	6.9	5.2	5.1	4.7	5.2	4.5
Luxembourg	4.3	1.3	1.7	2.7	3.6	3.6	2.9	2.8	3.6	2.2	2.3	2.5
Nederland	2.2	0.3	0.2	0.5	1.2	2.2	3.2	3.0	2.1	2.2	1.8	2.2
Österreich	3.3	1.9	1.0	1.4	2.7	3.1	3.4	3.9	3.5	3.3	2.8	2.9
Portugal	19.4	13.8	9.6	11.4	11.8	11.7	12.5	10.0	7.9	5.1	4.5	4.5
Suomi/Finland	5.6	3.1	3.6	4.6	5.0	6.0	5.6	4.1	3.9	1.6	1.7	3.3
Sverige	6.9	4.7	5.3	5.9	6.8	9.6	10.2	2.2	5.8	3.0	3.2	3.2
United Kingdom	5.3	4.0	4.3	5.0	5.9	5.5	7.4	4.7	3.4	2.4	3.0	3.0
EU (3)	5.8	3.9	3.6	4.0	4.8	4.8	5.6	4.4	3.8	3.2	3.2	3.2
United States	3.6	2.5	4.1	4.1	4.8	5.0	3.9	2.9	2.5	2.2	2.9	3.3
Japan	2.2	0.4	0.2	-0.1	1.8	2.6	2.5	2.1	1.0	0.9	0.7	1.0

(1) In national currency.  
(2) Spring 1995 forecasts.  
(3) Excluding former East Germany.  
Source: Commission Services



**Table 3: Statistical Annex**  
**Number of unemployed as a percentage of the civil working population**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Belgique/België	10.3	10.3	10.0	8.9	7.5	6.7	6.6	7.3	8.9	10.0	9.7	9.1
Danmark	7.1	5.4	5.4	6.1	7.3	7.7	8.4	9.2	10.5	10.3	9.0	8.5
BR Deutschland (2)	7.2	6.5	6.3	6.2	5.6	4.8	4.2	4.5	5.9	6.6	6.4	6.1
Hellas	7.0	6.6	6.7	6.8	6.7	6.4	7.0	7.9	8.6	8.9	8.8	8.7
España	21.6	21.2	20.5	19.5	17.2	16.2	16.4	18.5	22.8	24.1	23.7	22.8
France	10.2	10.3	10.4	9.9	9.4	9.0	9.5	10.4	11.8	12.6	12.2	11.7
Ireland	16.9	16.8	16.6	16.1	14.7	13.4	14.8	15.4	15.7	15.1	14.0	13.0
Italia	8.1	8.7	9.1	9.1	9.0	8.3	8.3	8.8	10.3	11.3	11.4	10.8
Luxembourg	2.9	2.6	2.5	2.0	1.8	1.7	1.7	2.1	2.6	3.5	3.6	3.5
Nederland	8.4	8.3	8.1	7.6	6.9	6.2	5.8	5.6	6.6	7.0	6.9	6.4
Österreich (3)	3.6	3.1	3.8	3.6	3.1	3.2	3.5	3.6	4.1	4.0	3.9	3.8
Portugal	8.7	8.4	6.9	5.5	4.9	4.6	4.0	4.2	5.7	7.0	6.8	6.4
Suomi/Finland	6.3	6.9	5.1	4.5	3.5	3.4	7.6	13.1	17.9	18.4	16.2	14.5
Sverige	3.0	2.8	2.3	1.9	1.6	1.8	3.3	5.8	9.5	9.8	9.2	8.6
United Kingdom	11.5	11.5	10.6	8.7	7.3	7.0	8.8	10.1	10.4	9.6	8.4	7.9
EU (2)	10.0	9.9	9.6	9.0	8.2	7.6	8.1	9.0	10.6	11.1	10.6	10.1
United States (3)	7.2	7.0	6.2	5.5	5.3	5.5	6.7	7.4	6.8	6.1	5.7	5.9
Japan (3)	2.6	2.8	2.8	2.5	2.3	2.1	2.1	2.2	2.6	3.1	3.0	2.8

(1) Spring 1995 forecasts.  
(2) Excluding former East Germany.  
(3) OECD data.  
Source: Commission Services

**Table 4: Statistical Annex**  
**Net lending or net borrowing of general government**

(% of GDP at market prices)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Belgique/België	-8.8	-9.2	-7.4	-6.6	-6.2	-5.4	-6.5	-6.7	-6.6	-5.3	-4.2	-3.9
Danmark	-2.0	3.4	2.4	0.6	-0.5	-1.5	-2.1	-2.9	-4.5	-4.0	-1.9	-1.2
Deutschland	-	-	-	-	-	-	-3.3	-2.9	-3.3	-2.5	-2.1	-2.4
BR Deutschland	-1.2	-1.3	-1.9	-2.2	0.1	-2.1	-3.4	-2.3	-2.9	-	-	-
Hellas	-14.0	-12.5	-11.7	-11.9	-14.8	-14.0	-11.6	-12.3	-13.2	-12.5	-11.3	-10.2
España	-6.9	-6.0	-3.1	-3.3	-2.8	-3.9	-4.9	-4.2	-7.5	-6.6	-6.0	-4.8
France	-2.9	-2.7	-1.9	-1.7	-1.2	-1.6	-2.2	-3.9	-6.1	-6.0	-4.9	-3.9
Ireland	-10.8	-10.7	-8.5	-4.5	-1.7	-2.2	-2.1	-2.4	-2.4	-2.3	-2.8	-2.6
Italia	-12.6	-11.6	-11.0	-10.7	-9.9	-10.9	-10.2	-9.5	-9.6	-9.0	-7.9	-8.1
Luxembourg	6.6	4.7	2.9	-	-	5.0	1.9	0.6	1.7	1.9	1.1	1.3
Nederland	-3.6	-5.1	-5.9	-4.6	-4.7	-5.1	-2.9	-3.9	-3.3	-3.1	-3.2	-2.5
Österreich	-2.5	-3.7	-4.3	-3.0	-2.8	-2.2	-2.4	-2.0	-4.1	-4.0	-4.6	-3.9
Portugal (2)	-10.1	-6.4	-6.0	-4.7	-2.7	-5.5	-6.5	-3.3	-7.0	-5.8	-5.6	-4.7
Suomi/Finland	2.9	3.4	1.0	4.1	6.3	5.4	-1.5	-5.9	-7.8	-5.6	-5.0	-1.1
Sverige	-3.8	-1.2	4.2	3.5	5.4	4.2	-1.1	-7.8	-13.4	-10.4	-9.1	-5.8
United Kingdom	-2.8	-2.8	-1.4	0.1	-0.1	-1.5	-2.6	-6.1	-7.9	-6.9	-4.8	-2.9
EU (3)	-4.5	-4.2	-3.6	-	-	-3.5	-4.4	-5.1	-6.3	-5.5	-4.5	-3.8
United States	-3.1	-3.5	-2.5	-2.0	-1.5	-2.5	-3.5	-4.5	-3.4	-2.0	-1.6	-1.6
Japan	-0.8	-0.9	0.5	1.5	2.5	2.9	3.0	1.8	-0.5	-2.0	-2.7	-2.9

(1) Spring 1995 forecasts.  
(2) Breaks in 1990/91.  
(3) Excluding former East Germany.  
Source: Commission Services



**Table 5: Statistical Annex**  
**Total number of employed**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Belgique/België	0.6	0.7	0.5	1.5	1.7	1.5	0.2	-0.3	-1.3	-0.2	1.1	1.0
Danmark	2.6	4.3	0.6	0.5	-1.9	1.1	-1.0	0.0	-0.7	-0.1	2.3	1.1
BR Deutschland (2)	0.7	1.4	0.7	0.8	1.5	2.8	1.9	0.6	-1.5	-1.2	0.4	0.6
Hellas	1.0	0.4	-0.1	1.6	0.4	1.3	-2.3	1.5	0.9	1.2	1.0	1.1
España	-1.0	2.2	4.7	3.5	4.1	2.6	0.2	-2.0	-4.2	-0.9	1.5	2.1
France	-0.3	0.2	0.3	0.8	1.2	3.0	0.1	-0.4	-1.6	0.1	1.2	1.1
Ireland	-2.5	0.6	0.7	0.1	-0.3	4.6	-0.1	0.4	0.7	2.5	2.7	2.6
Italia	0.4	0.5	-0.1	1.1	0.1	1.8	0.9	-0.7	-1.1	-1.7	0.3	0.9
Luxembourg	1.4	2.6	2.8	3.1	3.7	4.3	4.1	1.8	2.1	2.6	2.9	2.7
Nederland	1.9	1.6	1.9	9.9	2.2	3.3	2.8	2.0	-0.1	0.1	1.4	2.1
Österreich	0.0	1.5	0.5	0.3	0.9	2.1	2.1	1.8	-0.4	0.2	0.5	0.4
Portugal	-0.4	0.2	2.6	2.6	2.3	6.4	3.0	-6.3	2.2	-0.1	1.0	1.2
Suomi/Finland	1.0	-0.2	-0.3	0.3	1.7	-0.1	-5.2	-7.2	-6.3	-0.8	3.0	2.4
Sverige	1.0	-0.7	1.6	1.4	1.5	0.0	-1.8	-4.3	-5.3	-0.9	2.0	1.8
United Kingdom	1.2	0.1	2.3	3.4	3.1	1.0	-3.3	-2.2	-1.6	0.4	1.3	1.1
EU (2)	0.5	0.8	1.2	2.0	1.7	2.2	0.0	-0.9	-1.6	-0.5	1.0	1.2
United States	2.1	2.3	2.6	2.3	2.1	0.5	-0.8	0.6	1.5	3.2	2.1	1.3
Japan	0.7	0.8	1.0	1.7	1.9	2.0	1.9	1.1	0.2	0.1	0.9	1.8

(1) Spring 1995 forecasts.

(2) Excluding former East Germany.

Source: Commission Services

**Table 6: Statistical Annex**  
**Gross fixed capital formation at constant prices in the construction industry**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
EU (2)	-1.6	4.2	3.4	7.0	5.5	3.0	-0.5	-0.5	-3.6	1.1	3.1	3.4
Belgique/België	-0.5	3.9	4.5	14.6	7.9	7.1	2.5	5.3	-1.0	1.0	4.8	4.0
Danmark	8.9	18.0	1.1	-5.5	-6.1	-5.6	-11.2	-0.4	-6.8	4.7	4.1	1.6
BR Deutschland (2)	-5.9	3.1	0.0	3.1	4.4	4.9	2.7	4.3	-0.8	4.1	2.5	2.2
Hellas	3.1	-0.8	-5.0	9.2	4.2	7.3	-7.8	-5.9	-5.1	-3.1	5.5	4.2
España	1.8	8.8	9.4	11.7	15.0	10.2	4.0	-4.6	-6.6	1.2	5.5	4.9
France	-0.2	4.7	4.1	8.8	6.8	2.0	-0.1	-1.3	-3.5	1.0	2.0	2.5
Ireland	-7.1	-4.6	-6.8	-4.2	9.7	20.5	0.6	0.6	-3.4	7.4	9.0	7.5
Italia	-0.5	1.9	-0.7	2.3	3.6	3.5	1.4	-2.1	-6.2	-5.2	1.8	4.4
Luxembourg	-3.1	4.6	11.4	12.3	13.0	9.8	8.7	5.4	4.4	0.6	4.6	2.7
Nederland	0.3	5.2	2.0	9.5	2.3	0.0	0.0	1.9	-3.2	3.7	4.6	3.0
Österreich	1.4	3.5	4.8	6.3	4.6	5.8	5.4	5.4	7.2	4.0	3.4	2.8
Portugal	-6.0	8.7	9.4	10.1	3.5	5.3	10.4	0.0	-4.8	1.2	9.0	12.8
Suomi/Finland	-1.0	-2.4	1.2	9.0	14.5	-1.3	14.5	17.3	-18.1	-6.2	9.8	14.9
Sverige	-0.8	1.8	4.7	3.6	7.7	2.0	-5.2	-7.7	-19.2	-11.5	5.4	5.6
United Kingdom	-1.7	6.1	12.0	14.3	2.1	-2.8	-8.4	0.0	-0.6	2.3	2.2	3.7

(1) Spring 1995 forecasts.

(2) Excluding former East Germany.

Source: Commission Services

**Table 7: Statistical Annex**  
**Gross fixed capital formation at constant prices in equipment**

(% annual change)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
EU (2)	8.2	3.5	7.5	9.4	9.5	4.5	-0.8	-3.8	-10.6	2.0	9.2	7.3
Belgique/Belgie	2.3	5.3	7.1	16.1	17.4	13.5	-5.0	-6.2	-12.3	-1.9	10.0	7.3
Danmark	16.2	16.6	-8.9	-8.6	9.7	1.9	0.5	-13.4	2.0	2.5	7.7	6.3
BR Deutschland (2)	8.6	3.7	4.5	6.3	8.8	13.2	9.5	-4.2	-17.6	-3.1	6.9	4.3
Hellas	7.7	-12.6	-5.2	8.4	18.2	14.9	-4.9	6.8	1.3	4.1	4.6	5.8
España	8.5	12.0	23.2	17.6	11.8	2.2	-2.5	-2.7	-17.0	0.6	7.4	8.0
France	9.2	4.3	6.8	10.4	9.2	3.8	-1.2	-4.6	-5.8	1.4	10.7	10.0
Ireland	-7.4	1.5	2.5	1.0	17.2	6.0	-17.1	-4.9	3.2	7.0	9.5	8.5
Italia	2.0	2.5	11.5	11.6	4.9	4.1	-0.1	-1.9	-15.6	5.3	8.0	7.2
Luxembourg	-20.5	87.2	18.7	16.0	4.4	-6.0	11.2	-12.1	10.0	2.8	4.0	3.0
Nederland	15.5	8.8	0.4	-2.5	7.9	3.7	0.6	0.4	-1.0	0.9	9.9	5.5
Österreich	10.1	3.9	0.9	5.6	8.3	5.7	4.7	-0.9	-6.1	7.9	8.5	6.2
Portugal	-1.8	13.2	25.1	21.3	9.3	6.3	-0.1	5.4	-4.8	5.3	5.5	7.5
Suomi/Finland	8.9	3.4	11.4	11.1	15.2	-8.5	-30.2	-16.0	-19.8	22.0	32.3	22.4
Sverige	16.1	-0.1	11.6	8.4	16.2	-0.6	-11.9	-16.0	-14.7	18.1	21.9	14.3
United Kingdom	10.6	-1.1	8.1	13.4	11.4	-4.3	-10.8	-2.7	1.6	4.4	9.9	7.3

(1) Spring 1995 forecasts.  
(2) Excluding former East Germany.  
Source: Commission Services

**Table 8: Snapshots**  
**Ranking of EU manufacturing industry by production (2-digit level), 1994 (1)**

NACE	Manufacturing sector	Production (in mio ECU)	Employment (2) (number of employed)	Extra-EU exports (in mio ECU)	Extra-EU imports (in mio ECU)	Annual average growth rate (3) (% annual change)
4100	Food, drink, tobacco industry	472239.5	2330732.7	33783.1	24162.9	4.7
2601	Chemicals and man-made fibres	309657.5	1584460.6	67203.1	41034.5	3.9
2500	Chemical industry	298027.6	1539606.9	65867.7	39405.7	3.8
3500	Motor vehicles and parts	276346.0	1613547.6	45635.6	23948.8	4.5
3400	Electrical engineering	262324.2	2334034.8	58841.5	62355.0	4.4
3200	Mechanical engineering	218421.3	1981316.0	82783.6	34297.7	3.9
3100	Manufacture of metal articles	174415.2	1986593.9	17119.1	11392.2	4.3
4700	Paper, printing and publish.	170391.6	1350092.3	12214.2	20455.5	5.1
1400	Mineral oil refining	139959.4	104742.5	9770.2	12542.6	3.1
2200	Production and preliminary processing of metals	119481.1	662374.8	24431.1	32972.9	1.8
4800	Proc. of rubber and plastics	110963.8	1060345.1	13811.2	10573.3	5.4
2400	Non-metallic mineral products	101371.0	918568.7	10425.1	4840.6	4.5
4600	Timber and wooden furniture	77996.9	846418.0	7301.3	15525.7	5.7
4500	Footwear and clothing ind.	69166.4	1020098.4	14851.2	26619.7	3.3
3600	Other means of transport	68807.5	650204.2	26663.0	22000.9	3.7
3300	Office and dp-machinery	49074.7	215654.8	14222.6	28529.0	4.4

(1) Estimated.  
(2) Number of employees.  
(3) Calculated using production in constant prices (1990=100).  
Source: DEBA

**Table 9: Snapshots**  
**Exchange rates, 1970-1994 (1)**

(1 ECU = national currency)	BFR	DKR	DM	DR	PTA	FF	£IRL	LIT	HFL	ESC	£UK	USD	YEN
1970	51.11	7.667	3.741	30.67	71.36	5.678	0.4259	638.9	3.700	29.38	0.4259	1.022	368.0
1975	45.57	7.123	3.049	39.99	71.16	5.319	0.5600	809.5	3.135	31.50	0.5600	1.241	367.7
1980	40.60	7.827	2.524	59.32	99.70	5.869	0.6760	1189.2	2.760	69.55	0.5985	1.392	315.0
1981	41.29	7.923	2.514	61.62	102.68	6.040	0.6910	1263.2	2.775	68.49	0.5531	1.116	245.4
1982	44.71	8.157	2.376	65.34	107.56	6.431	0.6896	1323.8	2.614	78.01	0.5605	0.980	243.5
1983	45.44	8.132	2.271	78.09	127.50	6.771	0.7150	1349.9	2.537	98.69	0.5870	0.890	211.4
1984	45.44	8.146	2.238	88.34	126.57	6.872	0.7259	1381.4	2.523	115.68	0.5906	0.789	187.1
1985	44.91	8.019	2.226	105.74	129.16	6.795	0.7152	1448.0	2.511	130.25	0.5890	0.763	180.6
1986	43.80	7.936	2.128	137.42	137.46	6.800	0.7335	1461.9	2.401	147.09	0.6715	0.984	165.0
1987	43.04	7.884	2.072	156.22	142.19	6.928	0.7754	1494.7	2.334	162.58	0.7047	1.154	166.6
1988	43.43	7.952	2.074	167.58	137.60	7.036	0.7757	1537.3	2.335	170.06	0.6644	1.182	151.5
1989	43.38	8.049	2.070	178.84	130.41	7.024	0.7768	1510.5	2.335	173.41	0.6733	1.102	151.9
1990	42.43	7.856	2.052	201.41	129.32	6.914	0.7678	1521.9	2.312	181.11	0.7139	1.273	183.7
1991	42.22	7.909	2.051	225.22	128.47	6.973	0.7678	1533.2	2.311	178.61	0.7010	1.239	166.5
1992	41.59	7.810	2.020	246.98	132.51	6.849	0.7607	1595.3	2.275	174.70	0.7376	1.298	164.2
1993	40.47	7.594	1.936	268.57	149.12	6.634	0.8000	1841.2	2.175	188.37	0.7800	1.171	130.1
1994	39.66	7.543	1.925	288.03	158.92	6.583	0.7936	1915.1	2.158	196.90	0.7759	1.190	121.3

(1) Annual average exchange rate.  
Source: Eurostat

**Table 10: Snapshots**  
**Ranking of EU manufacturing sub-sectors by production, 1994 (1)**

NACE	Manufacturing sector	Production (2)	Employment (3)	Annual average growth rate (4)
3510	Man., assembly motor vehicles	212 013	1 026 234	4.2
2510	Basic industr. chem., petrochem.	114 657	530 453	1.3
3440	Manuf. of telecom. equipment	85 986	769 424	4.9
4830	Processing of plastics	83 538	759 541	6.7
4120	Slaughtering, prep. of meat	81 897	429 412	5.5
3280	Other machinery & equipment	81 020	704 941	5.7
2570	Pharmaceutical products	73 770	398 576	7.9
4130	Manufacture of dairy products	73 423	242 769	4.0
3160	Tools & finished metal goods	68 419	719 025	4.8
2210	Iron & steel industry	57 267	319 540	0.6
3530	Manuf. of parts of mot. vehic.	53 012	475 481	5.8
4720	Proc. of paper and board	48 141	375 952	5.5
4530	Manuf. of clothing	45 974	721 328	3.2
3450	Manuf. of radios & tv-rec.	43 693	315 529	3.7
3640	Aerospace equipment manuf.	41 164	355 251	3.2
4230	Manuf. of other food prod.	40 883	195 652	7.1
3250	Machines for iron & steel ind.	40 695	343 603	4.0
4670	Manuf. of wooden furniture	39 324	455 294	5.5
2580	Soap, detergents, perfume	38 796	186 288	5.8
2240	Production & preliminary processing of non ferrous metals	37 399	176 833	2.9
2430	Struct. concrete, cement, plaster	30 458	233 223	6.9
3240	Machines for food & chem. ind.	30 035	257 717	5.7
4710	Manuf. of pulp, paper, board	29 653	157 191	2.5
4220	Animal and poultry foods	28 874	86 365	2.4
4190	Bread and flour confectionery	28 365	450 440	6.6
3140	Structural metal products	27 418	331 361	4.5
4270	Brewing and malting	25 852	121 889	3.1
3460	Domestic type electr. appl.	25 469	211 971	5.3
4210	Cocoa and sugar confectionery	25 084	163 057	5.5
3130	Sec. transf., treatm. of metal	23 834	321 438	4.6
2470	Manufact. of glass & glassware	22 153	220 831	3.6
4110	Manufacture of oils and fats	20 011	49 715	5.7
3150	Boilers, reservoirs, tanks	19 242	205 131	3.4
3220	Machine tools working metal	19 107	229 467	0.3
4280	Soft drinks, nat. spa waters	19 041	91 179	7.8
4360	Knitting industry	19 038	248 440	0.4
4140	Proc. of fruit and vegetables	18 113	129 871	4.6
3110	Foundries	17 946	219 210	2.2
4510	Footwear	17 291	228 037	3.5
2480	Manufacture of ceramic goods	16 562	210 470	3.7
4320	Cotton industry	16 137	185 425	-1.1
3120	Forging, pressing, stamping	15 976	158 855	5.7
3610	Shipbuilding	14 570	177 631	2.3
3270	Equipm. f. use in spec. branches	14 477	135 052	2.6
2420	Cement, lime, plaster	14 367	71 844	3.0

**Table 10: Snapshots (continued)**  
**Ranking of EU manufacturing sub-sectors by production, 1994 (1)**

NACE	Manufacturing sector	Production (2)	Employment (3)	Annual average growth rate (4)
4630	Carpentry & joinery components	14 188	147 634	6.7
4240	Ethyl alcohol, spirit dist.	13 839	41 421	3.2
2230	Drawing, cold rolling and cold folding of steel	13 423	91 837	3.3
2590	Manufacture of other chemical products	12 950	80 055	4.3
3260	Transmission equipment	12 332	129 734	3.6
3210	Agricult. machinery & tractors	12 051	101 859	-0.2
2220	Manufacture of steel tubes	11 419	74 157	2.5
3520	Manuf. bodies for motor vehic.	11 304	111 828	4.0
4250	Wine of fresh grapes, cider	10 837	51 834	4.3
4310	Wool industry	10 527	111 468	-1.5
4160	Grain milling	10 182	36 052	0.0
3710	Measuring & precision inst.	9 411	107 388	3.5
4150	Proc. & preserving of fish	9 354	79 416	5.3
2450	Working of stone and of non-metallic mineral products	9 116	82 642	5.3
4620	Semi-finished wood products	9 023	62 788	5.3
3470	Manuf. electr. lamps & others	8 987	94 975	5.2
3720	Medical & surgical equipment	8 747	109 494	8.9
3230	Textile machin., sewing mach.	8 640	78 662	1.5
4370	Textile finishing	8 524	100 185	0.9
4330	Silk industry	8 375	72 884	1.6
4380	Carpets, linoleum, floor cover.	7 918	62 275	3.9
4910	Manuf. articles of jewellery	7 494	55 411	5.4
3620	Manuf. of railway rol.- stock	7 288	67 968	9.4
3730	Optical instr., photo equipment	6 824	76 165	5.5
2410	Clay prod. for constr. purposes	6 312	70 015	4.7
4410	Tanning, dressing of leather	6 185	41 678	-1.1
4940	Toys and sport goods	6 099	60 223	4.1
4610	Sawing and proces. of wood	5 690	62 051	3.5
3630	Manuf. of cycles, motor cycles	4 719	39 432	4.7
4170	Manuf. of spaghetti, macaroni	4 279	19 003	-0.5
4650	Other wood manuf. (exc. fum.)	4 259	46 735	7.8
4420	Leather products, substitutes	3 903	53 489	3.3
4950	Miscellaneous man. industries	3 548	48 262	5.6
4640	Manuf. of wooden containers	3 464	39 893	6.8
4930	Photographic & cinematographic lab.	2 766	38 763	5.2

(1) Estimated.

(2) In current prices, million ECU.

(3) Number of employees.

(4) Calculated using production in constant prices (1990=100).

Source: DEBA

**Table 11: Snapshots**  
**Ranking of EU manufacturing industry by value-added (2-digit level), 1994 (1)**

NACE	Manufacturing sector	(million ECU)
2601	Chemicals and man-made fibres	110 472
2500	Chemical industry	106 418
4100	Food, drink, tobacco industry	106 349
3400	Electrical engineering	105 948
3200	Mechanical engineering	86 139
3500	Motor vehicles and parts	80 778
3100	Manufacture of metal articles	70 681
4700	Paper; printing and publish.	64 921
4800	Proc. of rubber and plastics	43 817
2400	Non-metallic mineral products	41 913
2200	Production and preliminary processing of metals	32 366
4600	Timber and wooden furniture	27 823
3600	Other means of transport	26 119
4500	Footwear and clothing ind.	22 834
3300	Office and dp-machinery	16 835
3700	Instrument engineering	12 791
1400	Mineral oil refining	10 445
4900	Other manufacturing industries	8 591
4400	Leather and leather goods	2 993

(1) Estimates.

Source: DEBA

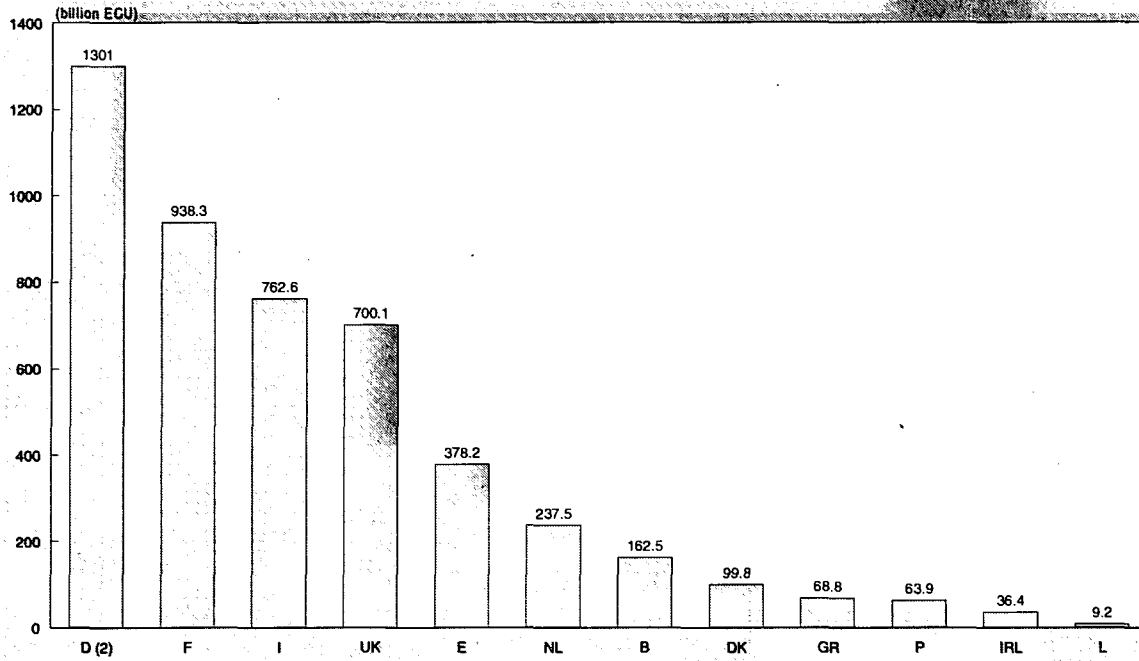
**Table 12: Snapshots**  
**Ranking of EU manufacturing industry by labour costs (2-digit level), 1994 (1)**

NACE	Manufacturing sector	(million ECU)
3400	Electrical engineering	78 763
3200	Mechanical engineering	66 185
2601	Chemicals and man-made fibres	63 026
2500	Chemical industry	61 495
4100	Food, drink, tobacco industry	59 524
3500	Motor vehicles and parts	57 885
3100	Manufacture of metal articles	55 409
4700	Paper; printing and publish.	41 573
4800	Proc. of rubber and plastics	29 522
2400	Non-metallic mineral products	25 517
2200	Production and preliminary processing of metals	23 448
3600	Other means of transport	21 126
4600	Timber and wooden furniture	19 320
4500	Footwear and clothing ind.	15 722
3300	Office and dp-machinery	10 060
3700	Instrument engineering	9 143
1400	Mineral oil refining	5 547

(1) Estimates.

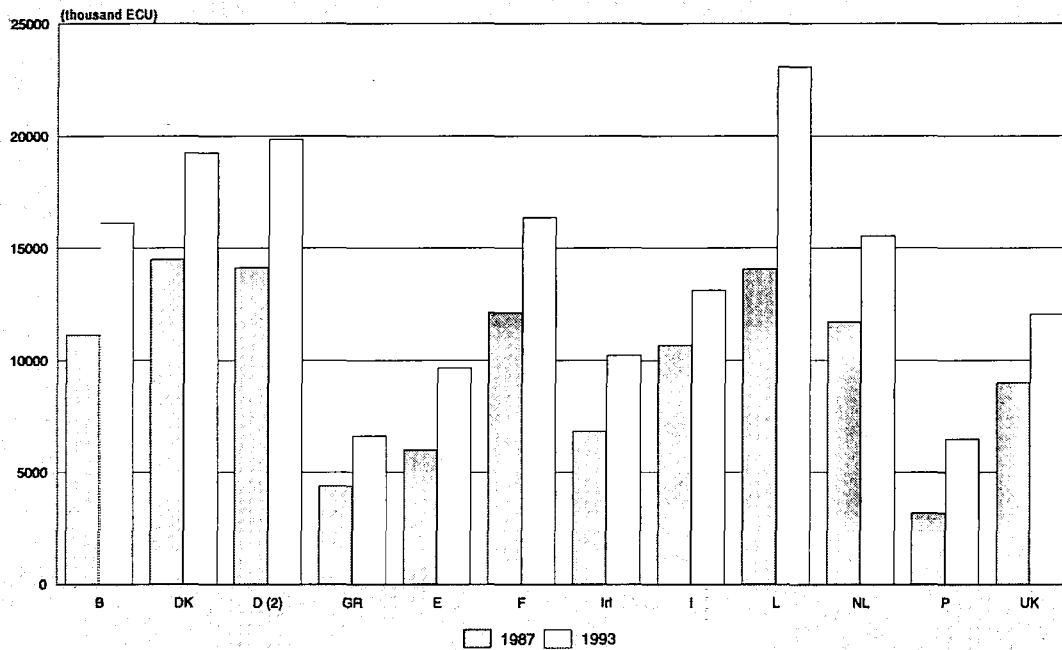
Source: DEBA

**Figure 1: Snapshots  
GDP by Member State (1)**



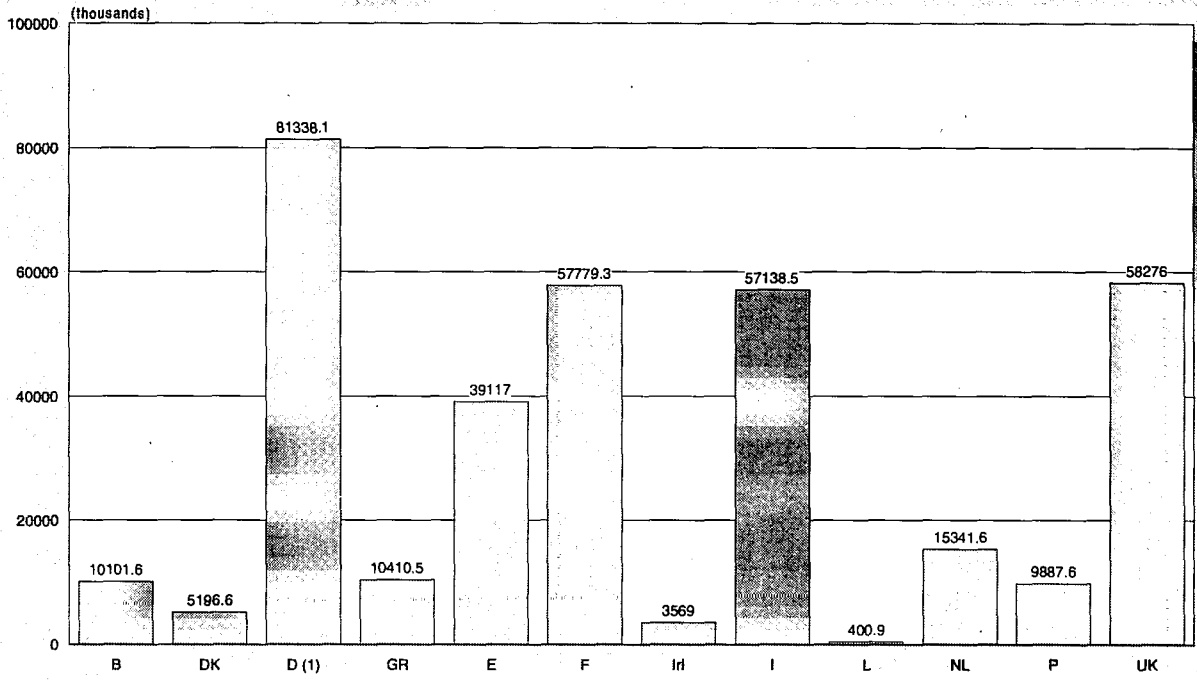
(1) At factor cost, in current prices.  
(2) Including former East Germany.  
Source: Eurostat

**Figure 2: Snapshots  
GDP per capita, 1987 and 1993 (1)**



(1) At factor cost; population annual average for 1987 and as of 1/1/94 for 1993.  
(2) Including former East Germany.  
Source: Eurostat

**Figure 3: Snapshots**  
**EU population by Member State**



(1) Including former East Germany.  
 Source: Eurostat



# A European approach to strategic alliances

## STRATEGIC ALLIANCES: MAIN ISSUES

Much of the debate on the significance of strategic alliances has traditionally been about the supposed conflict between "competition" on the one hand, and "competitiveness" on the other.

Free market economics, and much of both classical and recent theory on the subject, stresses that wealth creation is driven primarily by competition within the context of large, free markets. This idea is at the heart of most anti-trust and market-expanding legislation in the developed market economies and the European Union itself.

However, at the firm level, there are a number of arguments and indeed a considerable body of literature which suggests that there may be significant short and even long-term benefits from allowing some forms of "concentration" to develop.

In trying to resolve this apparent dilemma, it would be helpful to have a clearer picture of the following issues.

1) What are the criteria for assessing "gains" and "losses"? How can these be measured, and even if measured, are we still not in the territory of comparing different categories of impacts?

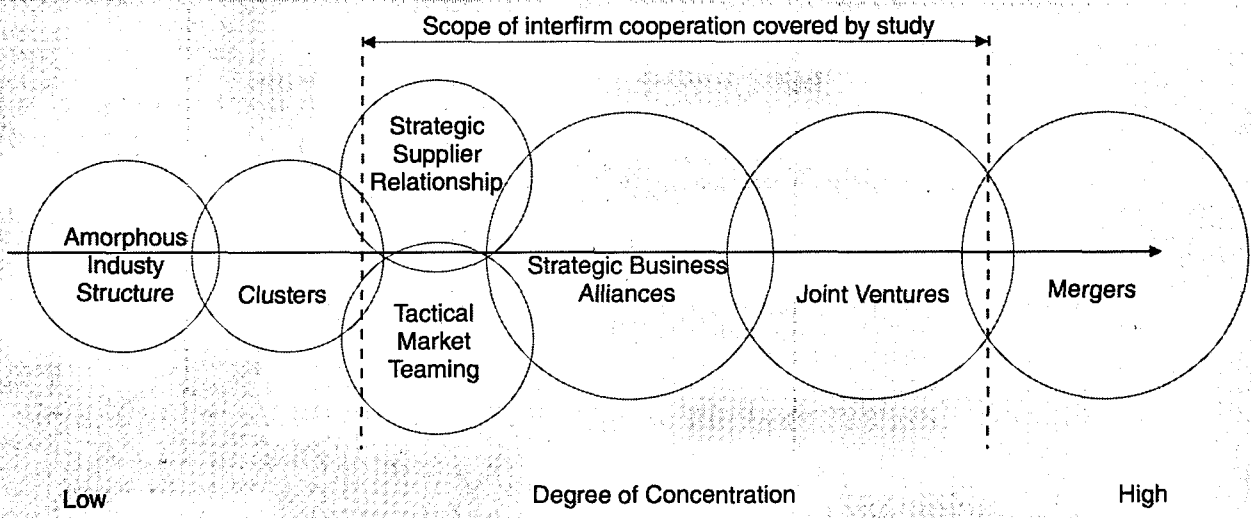
2) Case-by-case judgements do not resolve all the issues at stake. What is the overall pattern of such agreements? In general, should agreements be encouraged because they enhance competitiveness in global terms? Or should they be discouraged because they reduce competition? Or instead should we leave the forces of the market to determine general patterns and only intervene on specific cases as the need arises?

3) In many cases there may not be a "trade-off" at all. If an alliance allows two firms to survive that might have gone out of business separately, then the longer term impact of their association could well be to increase, not decrease, competition.

These issues are critical precisely because of more general questions that are already enshrined in European policy.

The European Commission White Paper on "Growth, Competitiveness and Employment"<sup>1</sup>, for example, calls for several measures which relate to alliances and competition between firms. These include the recognition that firms engaged in a number of critical sectors of the economy "come together in extremely complex groups and alliances" and that, "new balances must be sought between competition and cooperation". More specifically the White Paper calls for "the establishment

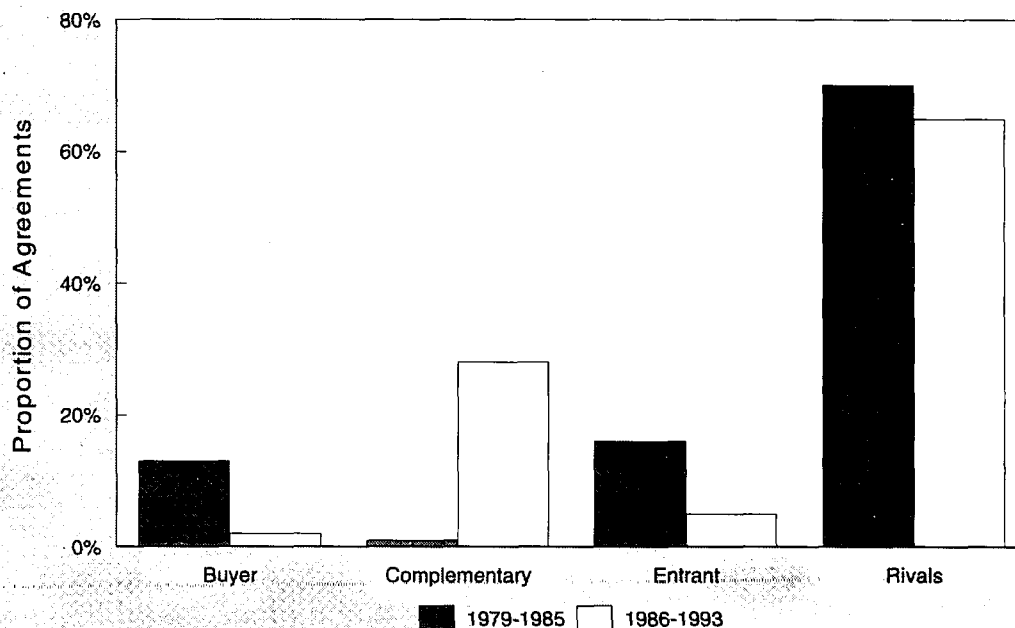
**Figure 1: Taxonomy of interfirm cooperation / concentration**



Source: Author



Figure 2: Strategic alliances: competitive position



Source: INSEAD database

of a coherent and concerted approach to strategic alliances" which prevents the development of "oligopolistic situations prejudicial to competition" but simultaneously does not go so far as to disadvantage Europe in terms of world competitiveness.

This study examines a number of key questions which have an important bearing on the Commission's further deliberations:

1) What is the most useful framework for thinking about alliances? Are all alliances the same or can they be usefully categorised into "types"? If so, what difference might this make in policy terms?

2) Is it possible to make empirical generalisations about alliances? This is important because supposed generalisations directly influence policy debates. For instance, the "supposition" that European businesses may be less likely to enter into alliances than, say, Asian ones, may be influencing our views about the importance of encouraging alliances. Or the "supposition" that alliances are very frequently motivated by a desire to collude or share markets may be important in assessing the stringency of anti-trust regulations. The data summarised here will help assess the weight which should be given to these, and similar perceptions, in discussing policy.

3) What can be said about alliance outcomes? Does it matter whether they are more or less prone to failure than, say, mergers and acquisitions? Is it possible, and perhaps more useful, instead, to provide managers and policy makers with some guidelines about what is more or less likely to lead to success? And in place of thinking about regulation in terms of a simple "Yes/No" proposition, can we use the research findings to suggest a more "conditional" set of approaches to the question?

### TOWARDS A USEFUL DEFINITION

Strategic alliances defy single one line definitions, just as they defy simplistic generalisations of other kinds (see below). A broad taxonomy of inter-firm cooperation (Figure 1) is a good place to start. Inter-firm cooperation is a continuum ranging from "Amorphous" at one extreme to "Mergers" at

the other. Various types of cooperative intensity occupy the space in-between.

Empirical evidence from the INSEAD database on Strategic alliances and from a number of case studies, further suggests that when an alliance is strategic it demonstrates some or all of the following main features:

- (1) Its "intent" is strategic. That is, the partners mean the alliance to further some highly important objectives for the firms concerned.
- (2) In so doing, the alliance is likely to exist for a longer rather than shorter period of time - in practice several years.
- (3) There is a specific goal or goals to do with generating competitive advantage in either products, key activities or major markets.
- (4) Partners often "give up" something important in their own competence in return for the success of the alliance. For example in Airbus the participants no longer individually possess all the technologies of commercial airliner design. So although partners may "gain" rewards, they sometimes lose the ability to operate alone in the longer term.

### TYOLOGIES AND CATEGORIES

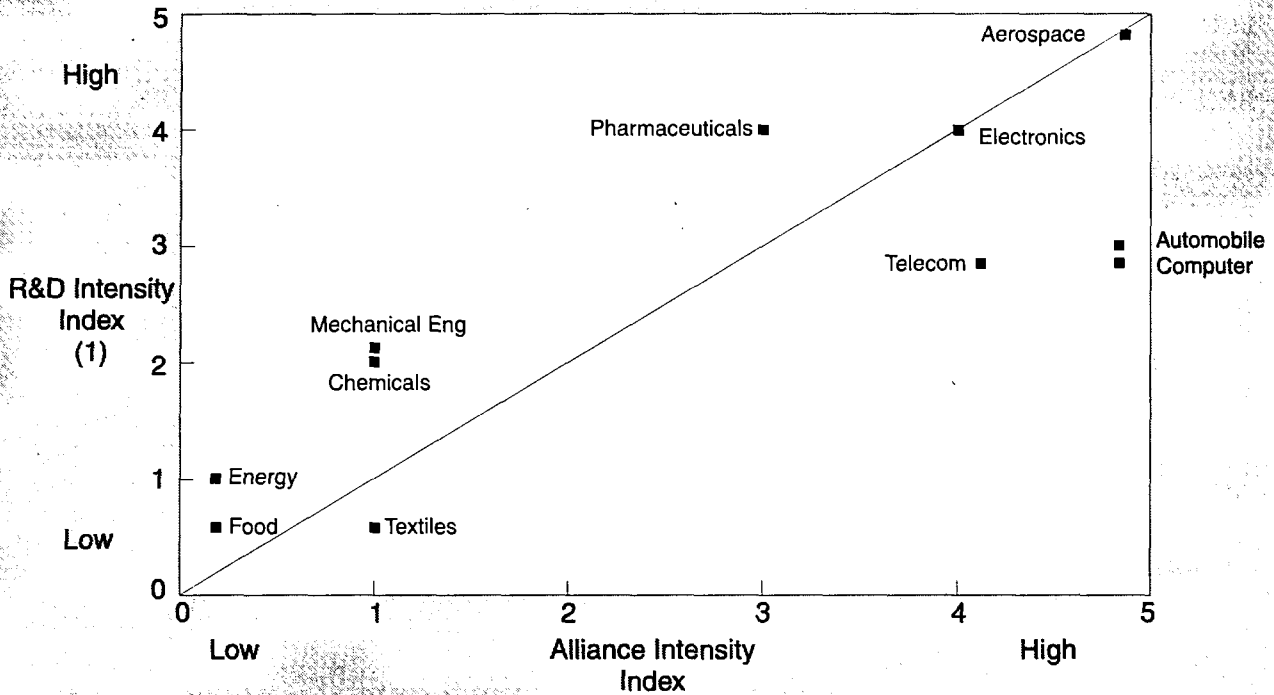
Much of the previous thinking on the question of alliances has been concerned about categorising them into "types". This has always seemed a promising line of enquiry because the data on alliances is so large and so "messy" that it has seemed difficult to think of them in a unified way. Management writers have suggested a variety of typologies.

Lorange, Roos and Simic Bronn<sup>2</sup> develop a taxonomy of motivation for forming alliances depending on the strategic objective. The four categories identified are:

- Defence
  - Company needs to defend its strategically important core business
  - Alliances might be formed for access to new competencies, new markets, new technology or other specific resources.



Figure 3: Alliances and R&D by sector: Europe



(1) R&D intensity is based on the relationship between the amount of R&D in each sector and the weight of that sector in the economy. Hence the aerospace sector has the highest R&D intensity, although the total spent is less than in electronics, for example. Alliance intensity is calculated in a similar way. Source: OECD 'ANBERD' 1992; Braxton/Horack Adler analysis

- Catch-up
  - Company needs to catch-up in a core business
  - An alliance can help bolster the firm's competitive position and allow it to retain leadership, examples may include access to new products or markets
- Remain
  - A company with a leading position in a peripheral business may use an alliance to extract the maximum value from that business
- Restructure
  - Alliances can be used to help restructure and exit businesses by allowing rationalisation of production capacity, etc.

Game theory has also been used to demonstrate that co-operative strategies can be more successful than competitive strategies. Axelrod<sup>3</sup> invited game theorists to test different strategies in a competitive simulation. The overall winner was a strategy called "Tit for Tat" which responds positively to co-operative moves but negatively to competitive moves. The strategy was further tested in a second, much larger, round of the game and was again the overall winner.

There is no doubt that alliances are somewhat "in fashion" at the moment, seemingly with many companies rushing to form alliances. However, although there may be an element of fashion now, it is clear that the literature supports the use of alliance as a means of gaining access to strategic resources.

In addition, successful management of alliances receives considerable attention in the literature. A recurring theme is that

strong, autonomous management is important for success of the alliance. Management of alliances clearly has great potential for conflict between parents, who may have different objectives, therefore the stronger and more autonomous the alliance, then the greater the chance of success.

Killing<sup>4</sup> looks in detail at the management structures most likely to be successful. He distinguishes between independent ventures which are usually successful (by definition) and those that are more closely tied to their parents, which may have shared management or dominant parent management. Shared management often results in slow and confused decision making, whereas ventures which have one of the parents dominating the management of the venture are most likely to be successful. Only in situations where it is essential for both parents to be involved in the day to day management of the venture, i.e. where the skills of both parents are critical to success, should shared management be adopted.

Partner top management have to be fully committed to the alliance and set clear objectives for the alliance which are communicated throughout the alliance organisation.

Understanding cultural differences between partners, and the more tangible strengths and weaknesses of partners, is important to ensure that the alliance can benefit to the greatest extent from its parentage. The quality of the relationship is important to ensuring success; trust is often cited as an important factor. The greater understanding of cultural differences and partner strengths and weaknesses will be important in helping to avoid breakdown in trust. Development of alliances in phases is also recommended as a route to building trust gradually; as experience with alliances grows between

partners then the extent and depth of the alliance can be expanded.

Commitment of the best personnel to the alliance can, as with any business, increase the chance of success. Partners must resist the temptation to staff alliances with their second best personnel. The partner will also benefit through the greater learning capacity of the best personnel. Learning can also be facilitated through long term commitment of the individual to the alliance. The western career management system of continuous rotation can hamper the learning process.

Monitoring the progress of the alliance against objectives helps alert the partners to changing circumstances which may demand a change in the alliance structure, or indeed withdrawal from the alliance. Constant monitoring can ensure problems are avoided; an alliance is like a marriage, it has to be worked at all the time. Exit strategies should be planned at the time the alliance is formed. Partners need to avoid becoming "alliance dependent", such that they can still continue their business without access to the alliance.

There are two main conclusions from the management literature.

First, the most useful and meaningful framework for categorising alliances is one that depends more on looking at the purpose or intent of the alliance than at its form or structure, or indeed whether it involves firms from the same production and marketing stage (horizontal) or a different one (vertical). This is discussed in more detail below.

Second, the analysis of the INSEAD database as well as the case studies, demonstrates that the distinction between joint ventures, cooperative agreements or other forms and structures is largely irrelevant to the actual impact or outcome of an alliance. Differences in treatment by the regulatory authorities based on structure or form rather than on intent or outcome are therefore problematic or even confusing.

Through their work looking at core competencies, strategic alliances and global strategy, Hamel, Doz and Prahalad have

developed a taxonomy of alliances which is useful in understanding where different theories and ideas can be applied in practical situations.

### Alliances aimed at managing maturity and restructuring

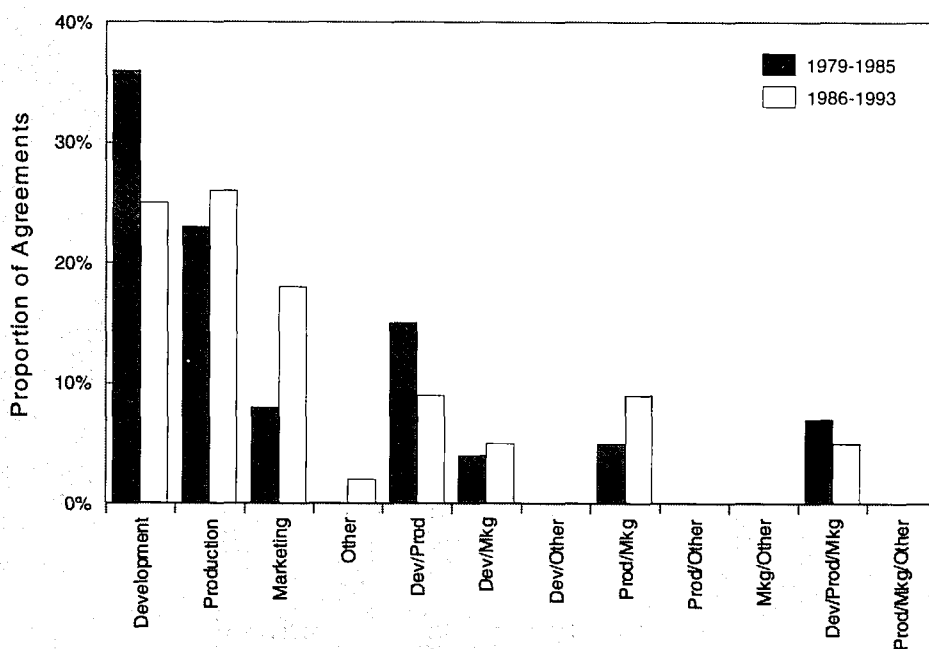
Here alliances are designed to allow reduction of productive capacity and the orderly restructuring of mature industries. They are frequently horizontal alliances which could be interpreted as collusive.

The logic of such alliances is essentially the management of over-capacity or the orderly reduction in scale of "sunset" industries. In one such alliance, EVC, it seems clear that while the potential for collusion and anti-competitive behaviour is real, the critical issues are also related to the logic of restructuring. In this instance, the European Commission allowed the agreement in order to facilitate the restructuring of the PVC industry in Europe while maintaining its role in the investigation of alleged price-fixing. The joint venture has had, on balance, some success in achieving its objectives of restructuring the PVC industry in Europe, while avoiding a much more painful and unmanaged reduction in capacity had it not been allowed.

Broadly speaking, such cases will always involve complicated trade-offs between permitting otherwise prohibited market sharing and the difficulties of market restructuring. However, the alternative to permitting agreements may be the closure of both parties' business and with a consequent reduction, not increase, in competition. In this, as in other similar instances, the use of conditional approvals which are time-bound and performance-related seems extremely sensible.

The other real difficulty with this category of alliance is the possibility of such agreements being informal or "subterranean". Of course in such cases regulations which depend on notification are in any case meaningless. The suspicion that market power may be exercised to the detriment of competition will always be present.

Figure 4: Strategic alliances: type of agreement



Source: INSEAD database



### Alliances aimed at establishing technical standards

Where fragmentation of technical standards may prevent or delay the introduction of a new product or technology, then alliances may be formed to establish industry standards and allow orderly development of new markets. The most commonly quoted examples are the alliances designed to establish a common VCR format.

When VCRs were first introduced, a number of different technical standards were introduced by companies such as Sony of Japan and Philips of the Netherlands. However, none of these standards dominated, VCRs remained expensive and total market penetration was low. In the late 1970s Matsushita introduced the VHS format which gave the longer play time which consumers were demanding. Matsushita formed a number of alliances around the world including those with Thomson in France and Thorn in the UK which ensured that a number of manufacturers had access to the technology and key components.

The much larger manufacturing volumes ensured that low costs could be achieved for the key components, thus ensuring much more rapid penetration of VCRs than would otherwise have been possible. Thus consumers have clearly benefited by such co-operation by having access to VCRs earlier than they would have done otherwise.

An important aspect of this type of alliance is that it alters the basis of competition from the core technology itself to other "non-core" product features and indeed, price. This type of alliance can also eliminate the genuinely economically wasteful development of different standards.

Not all alliances of this type have been successful. Through the Japanese Broadcasting Corporation (NHK), the Japanese government sought to set a technical standard for high definition television (HDTV); the development effort included

NHK and a number of the major electronics manufacturers. However, rapidly changing technology and the high cost of the HDTV televisions resulted in failure to establish a standard. In contrast, in the USA, a competition was used to select the best technical standard for HDTV from a number of competing consortia.

### Alliances aimed at achieving complementary advantages

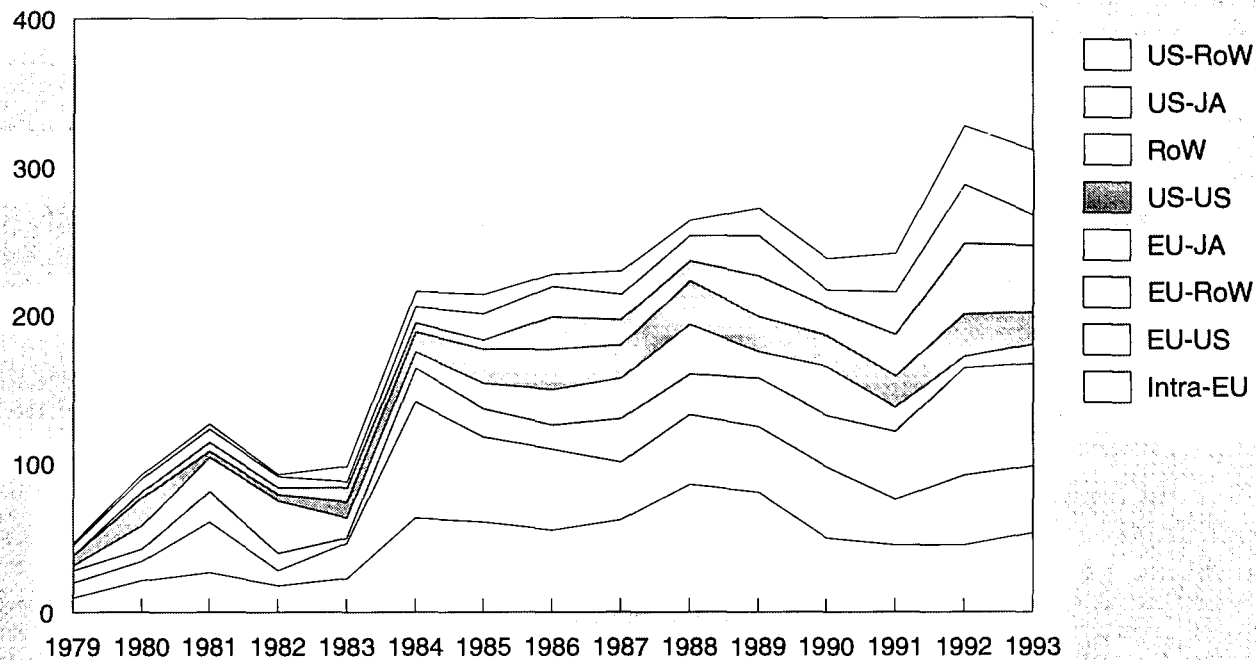
Complementary alliances are formed where partners either undertake different activities within an alliance or collaborate on one central activity. The partners may be from the same or different industries. Of course, the partners are able to undertake specific activities because they have the technology, assets and organisational ability necessary to execute those activities.

Very many alliances have partners from the same or related industries undertaking complementary activities. Examples include "technology for market access" alliances which are very common, as well as OEM supply agreements. From a policy perspective, a key issue is how close the shared activities become and therefore whether the alliance effectively reduces competition.

Alliances which genuinely share different activities would not usually be considered anti-competitive provided that there is no evidence of collusion in the end product market.

A less traditional use of alliances is for un-related industries to collaborate in the development of new product types or even completely new industries. The most commonly used example is the convergence of computers and communications, e.g. the use of software in PABX exchanges. Here, alliances have been used to combine the different technologies needed to create new products and even establish a new industry. The ability to form alliances of this nature is core to the competitiveness of emerging industries. This is an example

Figure 5: Strategic alliances



Source: INSEAD database



**Figure 6: Alliance typology: summary of key issues**

Type of alliance	Purpose/Intent	Regulatory questions	Measurement issues	Industries
Managing maturity / restructuring	Capacity reductions; orderly restructuring; changing competitive structure	Balancing potential for collusion against need for change in industrial structures	How to measure market power; how to monitor "subterranean" agreements	Mature, end of life cycle industries. Social and employment impacts likely to be important, especially in specific regions
Establishing standards	Creation of technical standards for products and processes; changing the basis of competition	Balancing potential for collusion against need to encourage new markets	Recognition of need for standards; balancing market creation against potential for abuse	Usually "sunrise" or embryonic industries
Achieving complementary advantages	Achieve fairly rapid competitive advantages of scale, specialisation	Complex cooperation / competitive industry structures, blurring edges of corporation	Inherent complexity of industrial structures makes traditional rules of thumb (e.g. degree of concentration) obsolete. New measures needed	Probable coverage nowadays of most industries at most phases of product life cycles
Learning	Often "pre-competitive" or "catch-up"; strong R&D focus aimed at developing core competences	Should public authorities intervene at all? Should such alliances be encouraged as a key part of industrial policy?	How to assess effectiveness; how to pick winners not losers?	Should focus on technologies and processes as well as industries

Source: Author

of a situation where alliances can be economically more efficient than arm's length economic transactions as the work of Balakrishnan and Koza<sup>5</sup> demonstrates.

Such alliances represent the great majority of strategic alliances. Figure 2 shows that explicitly "complementary" alliances (between firms in different industries) represented about 30 % of all alliances in the period 1986-1993. Alliances between "rivals" (firms in the same approximate industry) - the largest single category - include a majority whose "intent" was to achieve complementary advantages.

For example, in the case of the advertising agency Publicis, the company had several choices in implementing a growth strategy. It could have allowed itself to be bought, but this was not acceptable either to the owners or management.

A second alternative, that of buying another agency was discarded because the company would have had to stretch itself financially, putting the rest of the group at risk.

Unwilling to be bought and unable to buy, Publicis decided to form an alliance with FCB. It seemed clear that from a strategic point of view, the alliance seemed "a good fit." Publicis was the largest agency in France, with a successful European network; FCB was strong in the United States and Asia, but its presence in Europe was negligible. The client portfolios were complementary: besides Nestle, the two agencies shared SC Johnson and Colgate-Palmolive. In addition, there were few competing clients, an important consideration since many advertising industry joint ventures had run into difficulties because clients were unwilling to deal with an agency which also served a competing brand.

Figure 3, showing the relationship between the intensity of alliances by sector and the intensity of R&D, adds further weight to the view that most alliances are formed to solve real competitive problems (sharing R&D or production "effort") rather than to engage in explicitly collusive behaviour.

An additional consideration is the fact that many alliances, especially successful ones, evolve and change over time. In Airbus, for example, the participants began with competencies in all aspects of aircraft design and manufacture. Over time, and because of specialisation, participating firms could no longer sustain all the skills necessary to build high performance commercial aircraft. What was once a "horizontal" alliance may now be a "vertical" one.

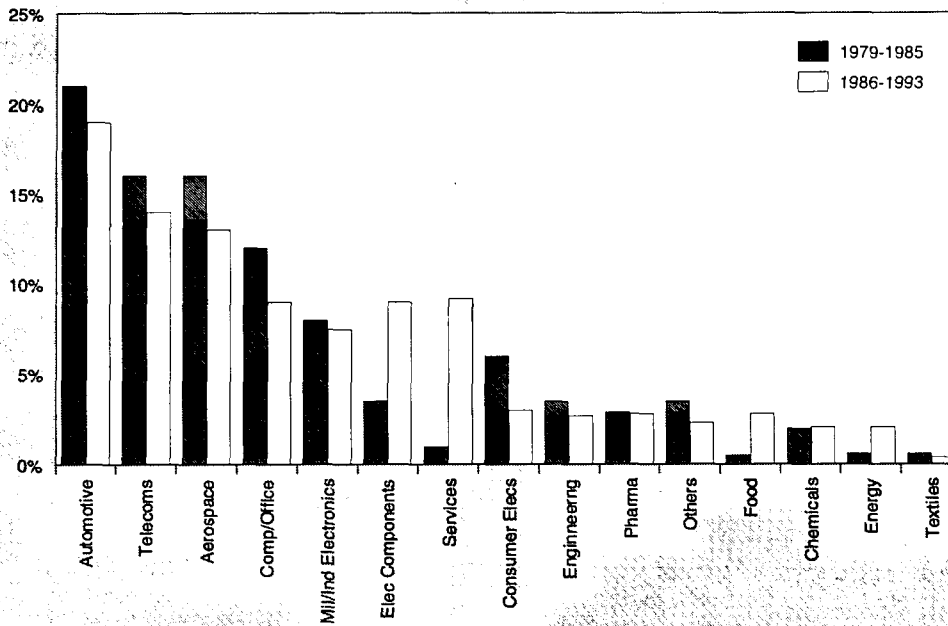
In most cases, there is more variation in the relative degree of success or failure than in the degree of threat to the public interest through collusion, price-fixing or anti-competitive behaviour.

To take another, example Corning's skill in forming and managing alliances effectively has given the company the ability to leverage technical development rapidly and widely. Such an ability, might, in some circumstances, enable the lead partner to exert undue market power, especially where competition is restricted through natural or legal monopolies. An example with some potential for this was the situation involving agreements between Corning and the European cable manufacturers.

These agreements were designed to develop and exploit the development of fibre optics. The cable companies were essentially sole suppliers to monopoly telecom operators in each of the major European countries. Corning initially formed joint development agreements in 1973-74 with each of the European cable companies, with the purpose of developing the cabling technology necessary to use fibre optics in practical situations.

Between 1975 and 1978 Corning also formed an exclusive distribution agreement with each partner for the sale of optical fibres in their respective countries. The agreements also allowed Corning to sell directly in each country. The main reason for offering exclusive agreements was to ensure the interest of the European manufacturers.

Figure 7: Strategic alliances: proportion of agreements by sector



Source: INSEAD database

These agreements were further developed during the early to mid 1980s into manufacturing agreements with each of the partners. In 1981 Corning formed a 50/50 joint venture with BICC in the UK as an unlimited partnership called "Optical Fibres" and a 40/60 joint venture with Compagnie Financiere pour les Fibres Optiques in France, called "Fibres Optiques Industries". The joint venture with Siemens (Siecor) was also expanded to include a 50/50 manufacturing agreement in 1985. In addition, Corning were licensor to one of Pirelli's three factories. Through these agreements, Corning developed considerable strength in the European market.

The underlying reason for Corning's strong position in the European market was built upon the optical fibre technology that Corning had been the first to develop. However, the use of exclusive distribution agreements had the effect of increasing Corning's influence in each individual market, eliminating any potential competition in the manufacturing and marketing activities of the joint venture companies.

In this instance, the outcome of what were originally technical and market access agreements, might have been to significantly leverage Corning's technological advantage into significant market power. The nature of the industry with regulated monopoly telecom providers was also a significant multiplier. This is one example where the use of alliances showed some potential of developing into an anti-competitive situation, hence the European Commission decided to reduce Corning's power while still allowing an important new technology to develop. The Commission gave Corning the option of withdrawing from all but one of the joint ventures or moving to a minority voting position in all of them. Corning chose the latter option.

In such cases, competition is maintained if the "end product" markets retain competition. Although this conclusion begs the question of how this degree of competition should be measured or ascertained, it seems that the principle at least is clear. Moreover, it is certainly possible to show that competition was increased relative to the prior situation in the case of most of the alliances reviewed in depth. However, it does not necessarily follow, that other options may have existed which would have allowed competition to develop even further.

### Learning alliances

Global competitive advantage is increasingly dependent on the development and exploitation of core competencies. Core competencies are the core technologies, skills and abilities which define the corporation's competitive ability. As such, competencies are difficult to acquire in the short-term. Even if competencies are available through acquisition, it is sometimes difficult to transfer knowledge and learning from an acquired company.

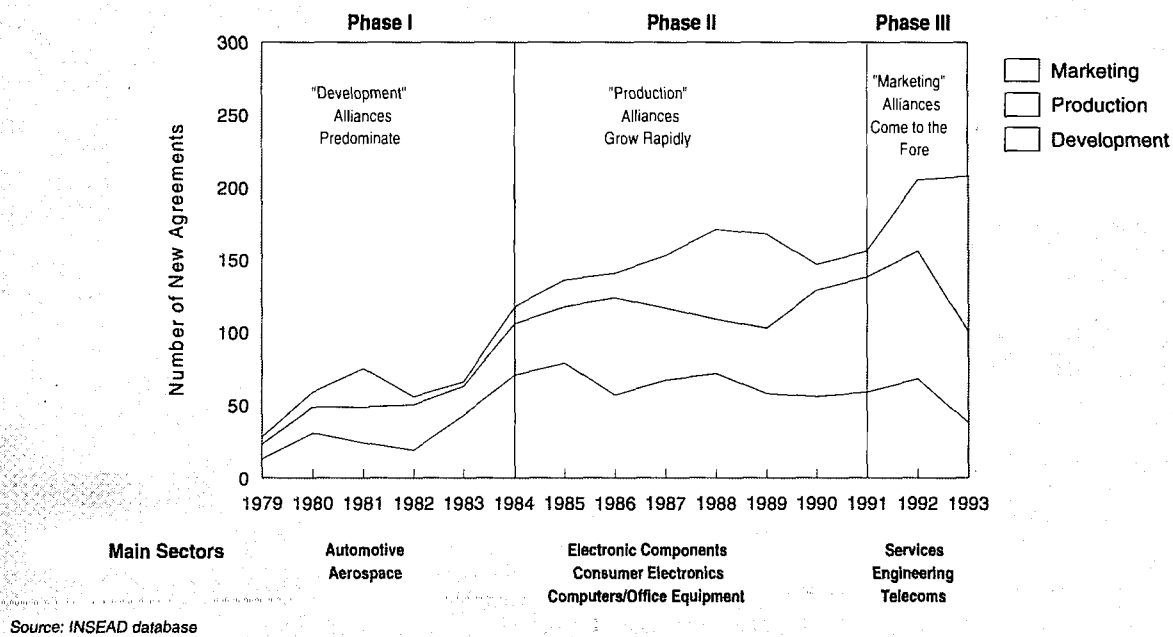
Alliances are a route through which corporations can acquire new learning. Increasingly, the objective of alliances is to acquire new skills by learning from partners. An example of a learning alliance may be the Rover-Honda alliance in which Rover was given an opportunity to improve its manufacturing skills in return for providing Honda with European production capacity and access to distribution.

Honda also had an opportunity to learn from the alliance. Honda's core technical competence is well known to be in engine and other powertrain components. Like most Japanese automotive manufacturers, Honda's abilities in chassis engineering were less well developed because the driving conditions in Japan and the USA are relatively undemanding compared to Europe. Honda needed to develop the ability to engineer cars for the European market if it was to become a truly global automotive manufacturer.

Although the complementary nature of the alliance was probably the most important reason for its formation, the ultimate success was due in no small measure to the intent of both partners to learn from each other. Indeed with complementary abilities, it is almost inevitable that one of the potential outcomes of such an alliance will be significant learning for the partners. It seems that in this case, the learning intent was recognised and deliberately developed and became a defining feature of the alliance.

In the INSEAD database, it is possible to track alliances that have strong "learning" agendas by looking at those which involve development. These are defined as alliances designed for pre-competitive and basic research, as well as product and component development. Alliances that explicitly address

Figure 8: Strategic alliances: number of agreements by type



development account for 25 % of agreements in the period 1986-1993 (see Figure 4).

Learning alliances are essentially about gaining or enhancing the core competencies of the organisation. As such they are frequently "pre-competitive" in nature and include programmes such as Europe's ESPRIT and Japan's VLSI programmes. Although the latter have strong governmental inputs, many learning alliances exist at the initiative of firms themselves.

In several case studies which involve learning, the European partner in each case probably learned as much or more than the non-European partner (although other benefits from the alliances were more equally shared). Other evidence suggests that where "learning" is an explicit goal, European firms can be as effective in this regard as any other nationality (e.g. Thomson's learning of micro-mechanical technology from JVC). However, studies of Asian firms' attitude to collaboration suggest a far greater "learning orientation" on their part. In other words, learning depends on whether managers explicitly see collaboration as a learning device.

In addition, there is little very serious evidence that alliances on balance favour non-European companies or result in general in unwanted or undesirable transfers of knowledge to non-European companies. Although this may happen in specific instances, it seems that the opposite is about equally likely to occur. The critical questions are about management's orientation to the process.

Furthermore, as Figure 5 shows, there is nothing inherent in the proportion of alliances between firms from the major economic blocs which suggests that European firms are fundamentally missing out on learning or alternatively giving too much away.

The arguments set out in this section are summarised in Figure 6.

### MAIN TRENDS IN ALLIANCES

Alliances continue to grow rapidly in the world economy as a major tool of strategic management for companies in almost all industries and most major trading blocs (see Figure 5). In the face of these trends, it is probably meaningless to ask whether alliances should or should not be encouraged or indeed

whether they are "good" or "bad". The fact is they are now an established and major feature of the business landscape.

For this reason, it may no longer make much sense to keep looking for any broad generalisations about alliances. Simplistic generalisations are almost certain to be misleading because of the multiplicity of counter examples.

First, there is little or no evidence that Europe is in some way "missing out" or "losing ground" in terms of propensity to alliance behaviour. About one-quarter of the agreements in the INSEAD database involve intra-EU agreements while about another 40 % involve Europe plus another partner. A growing number of alliances involve a European plus another non-US, non-Japanese partner from Asia or East or West Europe.

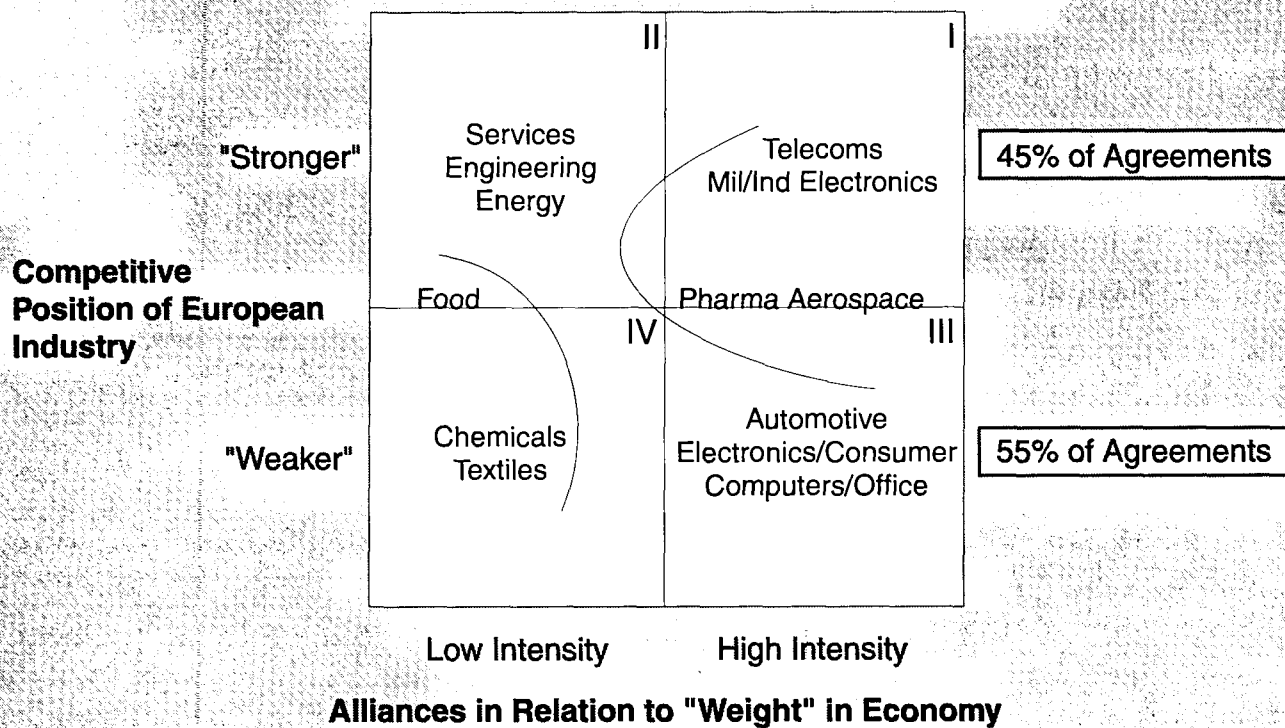
Second, the sectoral pattern as well as the "drivers" of alliances have changed considerably over time. Early adopters of alliance behaviour tended to concentrate in automobile, aerospace and other similarly capital intensive industries. More recently, we observe alliances spreading to other sectors especially services and electronic components (Figure 7).

Third, these changes are accompanied by changes in the nature of alliances (see Figure 8). Whereas in the early 1980s, (Phase I), "development" was the most frequent reason for entering into an alliance, by the mid 1980s (Phase II) production sharing agreements were more common. Most recently (Phase III) there has been a remarkable upsurge in alliances focused on marketing as more service oriented businesses have become global players and improvements in computer systems and telecommunications have facilitated worldwide coordination of activities on a day-to-day basis (e.g., airline and hotel reservations systems).

Fourth, agreements do not appear, in the vast majority of cases, designed to reduce competition or increase collusion. "Complementary" alliances which are between firms in different product/market segments and tend to emphasise new product development are now 30 % of the total in the INSEAD database for the period 1986-93. Even alliances between "rivals" are usually of a developmental nature.

Of course, this does not mean that regulatory authorities do not need to remain diligent and continue to monitor, or if

Figure 9: Relationship between alliances and competitive position of European Industry (1)



(1) Based upon work carried out by DRI, we have classified industrial sectors according to whether European companies are broadly stronger or weaker in international competitive terms (left axis) and whether there are more (high intensity) or less agreements (low intensity) than could be expected by the size of the sector. Source: DRI; Braxton; INSEAD database

necessary, bar, agreements which reduce competition. But it strongly suggests that alliances, in general, do not seek to reduce competition as a primary goal, or have that result in the majority of cases.

The evidence also suggests that alliances are about as likely to occur in economically "stronger" as in economically "weaker" segments of the economy. According to a classification by DRI of segments defined by whether they are economically "stronger" or "weaker", roughly 45 % of agreements have been in the "weaker" segments and 55 % in "stronger" ones (Figure 9).

In terms of industrial policy, there is an interesting comparison to be made between sectors which are generally weaker but also alliance intensive versus sectors which are weaker but where alliances are less common. The evidence suggest that alliances are frequently a beneficial strategy for "weaker" firms (GE SNECMA, Honda Rover). This view is strengthened by other examples such as Toyota/GM, Thomson/JVC, etc. Provided that alliances are well managed, they can provide life-saving advantages for the weaker, as well as benefits for the stronger, participants.

**MANAGEMENT ISSUES**

Alliances pose particular difficulties in terms of management. Their complexity, relative to the comparatively straightforward merger or acquisition of one company by another - which results in a single, wholly owned, corporate structure - requires that extremely careful consideration be given to the way in which the alliance is structured and managed. If the management approach is unsound, the alliance is likely to founder and, indeed, management complexity is often cited as a reason for the relatively high failure rate perceived in alliances<sup>6</sup>.

As described earlier, the structure of alliances can take many forms, ranging in fact from informal agreements, through contractually based arrangements including licensing, to formal

joint ventures. However, within the joint venture format, many management possibilities still exist. For example:

- What should be the proportion of ownership by the interested "parents"?
- Should the joint venture be a new stand-alone venture, or can it be "carved out" organisationally from "pieces" of the parents' existing structures?
- How should it be staffed, with new managers or secondees from the parent organisations?
- What form of governance and control should be adopted - relative autonomy via an overseeing board or a more directly "operational" link to executives in one (or both?) the parents?

The most important factor to consider in reviewing policy towards a particular alliance is the intent underlying its establishment. In many cases, it may be that some aspects of the alliance carry potential for counter-competitive or collusive activity. However, it could be considered that on balance, the introduction of new technologies or new entrants into the market via the alliance is a more than offsetting factor, provided the objectives or intent of the alliance are effectively fulfilled. For example, this was clearly the case in the Honda-Rover alliance and the Corning optical fibre alliances. In other cases potentially positive results may founder as a result of faulty implementation. This may well have been the case of AT&T/Olivetti, where the alliance clearly had the potential to strengthen Olivetti's position as a viable competitor in personal computers, with a strong position in the economically crucial North American market, based on AT&T's support there. In practice, however, this alliance did not prosper. The reasons appeared to relate to unclear management objectives and structures, and cultural incompatibility between the alliance partners. As a result of this, some years of alternative independent development were "missed" by both parents. For

**Figure 10: Strategic alliances: critical success factors**

	Success more likely	Success less likely
<b>Background variables</b>	New markets / geographies Explicit criteria for partner choice	Same markets / geographies Partner choice serendipitous
<b>Strategic focus</b>	Development challenges Alliance seen as dynamic and long term	Business as usual Alliance intent fixed
<b>Management structures</b>	Simple Autonomous Equal rewards Learning orientation Strong commitment at senior level	Complex Seconded for short period Unequal rewards Product orientation Ambiguous signals

Source: Author

example, key skills and capabilities in North American marketing and sales which might otherwise have been built up by Olivetti - say by organic growth or other means - were not developed during the high growth phase of the market in the mid 1980s. As a result, therefore, of trusting this development to AT&T's role in the alliance, Olivetti was left without a comfortably viable North American market presence.

Because of the significance of the link between intent and management execution, it may well be, in cases involving different trade-offs in assessing the balance of public interest, that it is important to develop and maintain some insight into the management structure and processes being adopted by the parents and within the venture. It may be helpful to consider as a guide the following management principles gleaned from case studies performed within the current work. Inputs from public presentations on this topic by Corning, generally acknowledged to be one of the most effective operators of alliances internationally, were particularly helpful in compiling this list:

- Partner compatibility, mutual trust and commitment  
Both must be interested deeply in the success of the alliance and benefit from that success ("no winners, no losers")  
Perhaps paradoxically this can be helped by equal enterprise shares ("50/50") rather than one partner taking a majority
- Partners should make comparable business contributions to the venture  
For example, both bring key skills or capabilities, not "just money"
- Strong management, with autonomy, focused on the success of the new enterprise - not on their individual parent's success  
If "seconded" into the enterprise from one or other parent, this should be permanent - a "one way ticket" - rather than for a limited period

Finally, most successful proponents of alliances agree that since no one can ever foresee in advance all the issues that will affect an alliance and its success over time. Patience, flexibility and mutual understanding are vital management success factors!

The discussion in this section is summarised in Figure 10.

## CONCLUSIONS

Strategic alliances now cover businesses in almost all economic sectors. Even in parts of the economy which have not had much alliance activity, such as services, international groupings are forming with tremendous speed.

The main drivers of this are increasing globalisation of markets and competition. But two additional key factors are emerging. First, the power, speed, and low cost of networking computer systems permits a degree of business coordination never before possible (e.g., hotel or airline reservation systems). Second, new market opportunities are rapidly emerging with the convergence of previously distinct business segments (e.g., media, telecoms and IT to create multimedia).

In fact, the 'logic' of alliance behaviour is changing. Whereas in the past, the purpose of alliances was often to share the burden of high capital or R&D costs in industries like automobiles and aerospace, many recent alliances are service orientated with strong marketing and development agendas.

Because of this, and because the geographic spread of alliances is broadening to include multicultural deals with companies from different linguistic and historical background, alliances are frequently much more complicated and difficult to manage. The challenge for European managers to collaborate successfully with firms not only in Europe, but also with non-western firms, is particularly great.

Meanwhile, strategic alliances continue to challenge the assumptions of free market economics. Partners may well be rivals in similar product-market segments; partners in one business may be rivals in another. These complex webs of interlocking relationships will in all probability continue to grow in importance and pose even greater conundrums for both managers and policy makers.

<sup>1</sup> Growth, Competitiveness, Employment: The Challenges and Ways Forward Into the 21st Century; White Paper; 1994

<sup>2</sup> "Building Successful Strategic Alliances" Long Range Planning vol. 25 no 6 1992

<sup>3</sup> "The Evolution of the Corporation" Basic Books, New York, 1984

<sup>4</sup> "How to make a Global Joint Venture Work" Harvard Business Review, May - June 1992

<sup>5</sup> "Information asymmetry, adverse selections, and joint ventures" INSEAD working paper 90/32/OB

<sup>6</sup> Strategic Alliances: "Guidelines for successful management" - The Conference Board Report 1028

Written by: Braxton Associates, Horack Adler and Associates, Prof. Delgan Morris





## Typical forms of transnational investments by EU firms outside the EU

Despite an acceleration over the past 2-3 years, foreign direct investment by EU firms in the developing regions of the world still only represents a very small share of total EU foreign direct investments. Transnational involvement of EU companies outside the EU can, however, take very different forms, not all of which involve financial transfers in the form of direct investment. Among the other less- or non-equity forms of transnational expansion, are international strategic alliances, licensing agreements and subcontracting. Some of these correspond to expansion moves by EU firms in regions that cannot easily (or competitively) be served through exports, while others actually correspond to "relocation moves" of EU firms in non-EU countries.

This study seeks to quantify the extent to which the EU firms transnational development strategies may have reduced production and employment in Europe by "relocating" production activities in other parts of the world, by:

- analysing the various forms that strategic "relocation" and other co-operation moves involving EU firms in non-EU countries have take in recent years;

- analysing the sectoral differences, if any, in the typical forms taken by transnational investment by EU firms in non-EU countries;
- identifying the main differences in the pattern of these strategic moves by region of destination.

The following five forms of transnational expansion are considered in the analysis:

- Greenfield investments
- Mergers and acquisitions
- Joint ventures
- Licensing and franchising agreements
- Subcontracting arrangements.

There is no one-to-one relationship between the above classification and different motives for the transnational moves. In all of the above cases, the transnational expansion move by the European company can correspond both to the relocation of an activity previously undertaken within Europe, or to an international expansion move (aimed at serving foreign markets). In both cases, however, there can be spill-over effects

**Table 1: Main reason for selecting one form of transnational investment over another**

Form of expansion	Main advantages	Conditions under which strategy is to be preferred
Greenfield investment	Parent company has full control of the new operation Gives access to resources that may not be available locally	In case of entry in new markets (i.e. where the product/service is not yet available, or imported) There is no risk of over capacity
Acquisition / merger	Acquire capacity more easily Benefit from EOS in procurement, management, administration, finance Strong cultural/national behaviour Need to maintain some control over new operation	Market is regulated There are risks of overcapacity
Joint ventures	Less expensive than M&As or greenfield investments Useful if there are barriers to entry or if minimum critical size is required More flexible than M&As or greenfield investments	Typically preferred by SMEs Common in capital intensive sectors & sectors where there are EOS in R&D
Licensing arrangement	Lower risk Increased flexibility	No need for control of operation Preference for flexibility
Subcontracting	Gives purchaser complete flexibility to switch suppliers High risk business	Very competitive market upstream

Source: Author



on activity and employment in Europe, which will also be assessed here.

## FORMS OF TRANSNATIONAL EXPANSION

This section briefly reviews the regional and local factors which influence the relative attractiveness (and profitability) of different forms of transnational investment.

Table 1 presents the different forms of investment that can be chosen and reviews the conditions under which each strategy is likely to be preferred to any of the other transnational investment strategies considered.

### Greenfield investments

Greenfield investments are a good way to expand in foreign markets when either one or a combination of the following conditions are met:

- there is no risk of excess capacity either in that market or at world level;
- there are no cultural or regulatory barriers that make it difficult for a foreign company to operate in this market;
- the production activity requires certain skills or inputs that are not currently available within the local economy, and which have to be imported (whether technological equipment or human skills).

An important characteristic of this forms of investment strategy is that the parent company retains full control of the operation.

### Mergers and acquisitions

In contrast to greenfield investments, mergers and acquisitions (whether 100 % or majority acquisitions) present the following advantages:

- they give easy (and rapid) access to new production capacity;
- there are less risks of overcapacity than with a greenfield investment;
- the acquisition can give the parent company access to technology and production experience within the country of operation;
- the acquisition can facilitate R&D, enable sales maximisation or result in an immediate expansion of market share (in other words, enhance market power).

Moreover, in the case of an acquisition the investing company often benefits from tax advantages, at least in the first years following the investment.

One of the main advantage of mergers between two companies on an existing market is that they can generate savings from economies of scale (in production, transport, procurement, or from spreading of fixed costs), from economies of scope (from producing more than one product together) and from the rationalisation of administration and/or management. When taking place within a single country or region, mergers also permit savings in stock management, reduce downtime risks and eliminate duplication.

In the case of transnational mergers, economies of scale in production and transport are typically less important but the other factors (economies of scale in procurement, economies of scope,...) still play a role. From the point of view of the acquired company, being merged into or acquired by a (foreign) company can also be a means to secure inputs that were difficult to obtain due to a shortage of foreign exchange for imports, or that were subject to important price fluctuations. This latter factor explains several acquisitions in Africa, for instance, and in the basic metals sector. Of course, in all cases, increasing in size or simply changing ownership may enable the new company to raise capital more easily or to reduce interest costs, in addition to obtaining better prices from suppliers.

### Joint ventures

Here, joint ventures are taken to include any arrangement in which the operation of two or more firms are partially but not fully functionally integrated. The existence of equity stakes is thus not necessary, so that both contractual ventures and strategic alliances are covered. Ad-hoc agreements are excluded, however.

Joint ventures present many of the same advantages as M&As, generally at a lower cost. Joint ventures have the additional advantages that they allow to spread risk even further, can be more limited in scope and more flexible in nature, and that they make it possible to build a multiplicity of links with other companies as necessary. Hence, joint ventures tend to be preferred over M&As when the risk associated to an acquisition in an unfamiliar environment looks too high compared to the price of the acquisition.

The disadvantage of joint ventures over acquisitions, however, is that the parent company has less control over the new venture. Joint ventures are also typically more difficult to manage than mergers, because of lack of clear authority, of relatively high costs of coordination and sometimes conflicting objectives and interests. Non-equity ventures also tend to reduce the commitment of the participants to the success of the venture. This has negative spill-over effects on their duration and on their overall success rate.

Joint ventures tend to be preferred by SMEs who do not have the critical size or the financial means to undertake an acquisition nor are willing to take the risks of a setting-up a greenfield operation. In contrast, large companies will generally prefer to take a minority (or majority) stake in a new business, in order to have better control of the new operation.

Both greenfield investments and M&As represent an investment by the acquiring firm, and are thus included in the statistics of foreign direct investment flows that are available through various sources. In contrast, joint ventures do not necessarily have an equity component and, when they do, the "financial" involvement is typically less than in the case of an acquisition.

### Minority acquisitions

In economic literature, the view is that a firm will prefer to detain a majority stake in a company when control over a resource commitment is highly valued and the firm perceives that it can absorb the transaction costs of acquiring and monitoring that control. In practice, however, the preference for one form over another (i.e. for a majority versus a minority acquisition) depends on the nature of the business and the capabilities of the firms in presence, rather than on broader geographic, cultural or other aspects.

Because the spill-over effects on employment and activity in Europe depend on the relative importance of the foreign venture rather than on the share of ownership of the parent company, in this study we will not differentiate systematically between minority and majority acquisitions.

### Buyer/seller arrangements

Licensing and franchising agreements and subcontracting arrangements, are often referred to as "buyer seller" ventures. Such agreements do not imply equity transfer and often involve companies at different stages in the value-added chain. To some extent, they are thus alternatives to backward vertical integration.

Depending on the nature of the buyer/seller agreement, the rights, risks, responsibilities and potential returns for the investor vary.

There are essentially two broad types of buyer-seller ventures: licensing and franchising agreements and subcontracting arrangements.

**Table 2: Intensity of transnational involvement by EU firms in selected sectors**

	Share in EU Employment	Importance of transnational activities	Impact on EU employment	
			in sector	in related sectors
Energy (1)			0	+
Mining & metals			0/-	0/+
Basic chemicals			+	0/+
Pharmaceuticals			++	+
Mech. & electrical engineering			+	+/-
Consumer electronics			---	--
Electrical components & computers			--	+
Motor vehicles			-/+	++
Food, drink & tobacco			0/+	0
Textiles & clothing			--	+/-

(1) France, Germany, Italy and UK

- Moderate, mainly for international expansion
- Important, mainly for international expansion
- Very important, mainly for international expansion
- Moderate, mainly relocation of activity
- Important, mainly relocation of activity
- Very important, mainly relocation of activity

Source: Author

Licensing agreements involve the transfer by the licensor (called here the "parent" company) of a right to use a specific piece of proprietary technology (for instance a patent) relevant to the production of a given product. Although the licensee (the user of the license) is usually responsible for the production, the agreement generally gives the parent company some control over the use which is made of the license to ensure that his own competitive position is protected. Such control may apply to the sourcing of inputs (from the patent company or one of its subsidiaries), to the production methods, to the use made of the technology and/or to the markets than can be served. The usual payment for a license is a fee or royalty based on the volume or value of the output which

embodies the information and knowledge provided by the license.

Franchise agreements are in many ways the extension to the services sectors of license agreements in manufacturing. Franchise agreements typically specify extremely detailed requirements and conditions, for example with respect to quality control, which the franchiser expects the franchisee to observe. Franchise agreements are common in the hotels, restaurants and catering sector (hotel chains, McDonalds, etc..) as well as in the retail trade sector (specialised cosmetics stores such as the Body Shop, toy stores, etc.). As in the case of licensing, the terms of the franchise agreement will normally allow the contractor some control over the deployment of the transferred



rights. Payments typically consist of a lump sum payment from the franchisee to the franchiser plus a fee based upon unit sales.

Subcontracting agreements cover loser types of contractual relationships between the contractant (or "parent" company) and the contractor. These are arrangements according to which the buyer (in our case the EU firm) specifies what he needs from the supplier, and accepts or rejects the product once manufactured according to whether or not it meets the agreed specification. Some subcontracting relationships thus involve a detailed and on-going interface between customer and supplier, which can include the provision of information and/or financial assistance by the contractant, advice on methods, pricing, component sourcing, testing procedures, costing etc.

Subcontracting agreements are typical of the textiles & clothing sector and of automotive and aerospace component manufacturing, amongst other.

### REGIONAL DIFFERENCES IN THE PREFERRED FORMS OF TRANSNATIONAL DEVELOPMENT

The transnational expansion of companies from industrialised countries into other regions of the world has taken many forms, with no obvious dominance of one form over another. When considering the typical transnational strategies by region, however, distinct patterns emerge which are illustrated in Figure 1. Whereas in North America the main form of transnational expansion by EU firms in the past has been majority acquisitions, followed at a distance by joint ventures and greenfield investment, in Japan there have been very few acquisitions - whether majority or minority acquisitions - and the bulk of the transnational development has been through joint ventures. In developed Asia, the dominant form of involvement has either been through majority ownership and greenfield investment, or through subcontracting and licensing agreements. The situation in the less developed world is still different, with Latin America (where the history of building relationships is older) generally following the same pattern as developed Asia, Africa seeing a dominance of majority ownership and Eastern Europe seeing a dominance of non-equity forms of involvement, followed by majority acquisitions.

The lack of a consistent pattern of transnational development across all the world regions reflects the fact that, both in the developed and in the developing countries, there is a multiplicity of empirical factors which influence the type of strategy that ought to be chosen by a given firm. Moreover, as most of these factors are dynamic, not static (for instance, changes in the regulatory environment, in the rate of growth of the market, in political or socio-economic factors), the transnational expansion strategy that will yield the highest returns will itself tend to change over time.

In general, one can say that strategic alliances (joint ventures) and majority acquisitions have dominated transnational development strategies of EU firms into the industrialised countries. Indeed, where such alliances involve companies at similar levels of development or companies originally involved in different markets, they often bring technological cross-fertilisation as the technologies originally developed by one industry are increasingly applicable to other sectors. In some cases, the joint ventures and other forms of strategic alliances also reflect a need to break anti-monopoly laws (as in the US), or to consolidate manufacturing production to gain competitive advantage in regional (essentially local) markets.

In the developing countries, the key market factors which influence the preferred form of investment are:

- the present size and distribution of firms in the economy;
- the ownership structure of firms in the market;
- the degree of technology intensity of the sector.

Many developing country markets are, indeed, characterised by:

- a high degree of state involvement in industry (there are very few public limited companies accessible to outsiders);
- a relatively small number of medium-and large-size firms (most are small family owned businesses);
- a high concentration of ownership amongst the interesting target companies (groupings of family controlled companies which control a relatively large share of industry are common in some developing countries).

Greenfield investment has thus been an important form of transnational expansion by companies from the industrialised countries into the developing countries. One exception is the technology intensive industries where joint ventures dominate. There is, in fact, a high concentration of joint venture agreements involving firms from both the developed and the developing countries in sectors such as electronics and electrical engineering, fabricated metals, chemicals, automotive and industrial supplies, as well as in the food, machinery and tools sectors. In the less technologically advanced developing countries, however, joint ventures have been confined to a few industries such as the pharmaceutical, agri-food or mining sectors.

Although industry structure factors would give the preference to greenfield investments in most sectors and to joint venture agreements in the more technology intensive sectors, in practice there are other factors which have come into play and have influenced the selected form of transnational involvement. In Asia, for instance, take-overs have tended to dominate because of the difficulty in gaining access to the market through other means. In Latin America, the possibility for foreign companies to make debt/equity swaps and the privatisation programme has shifted the balance in favour of M&As. The same applies to the countries of central and eastern Europe where the privatisation programmes under-way have put a lot of companies on the market for potential EU and other acquirers.

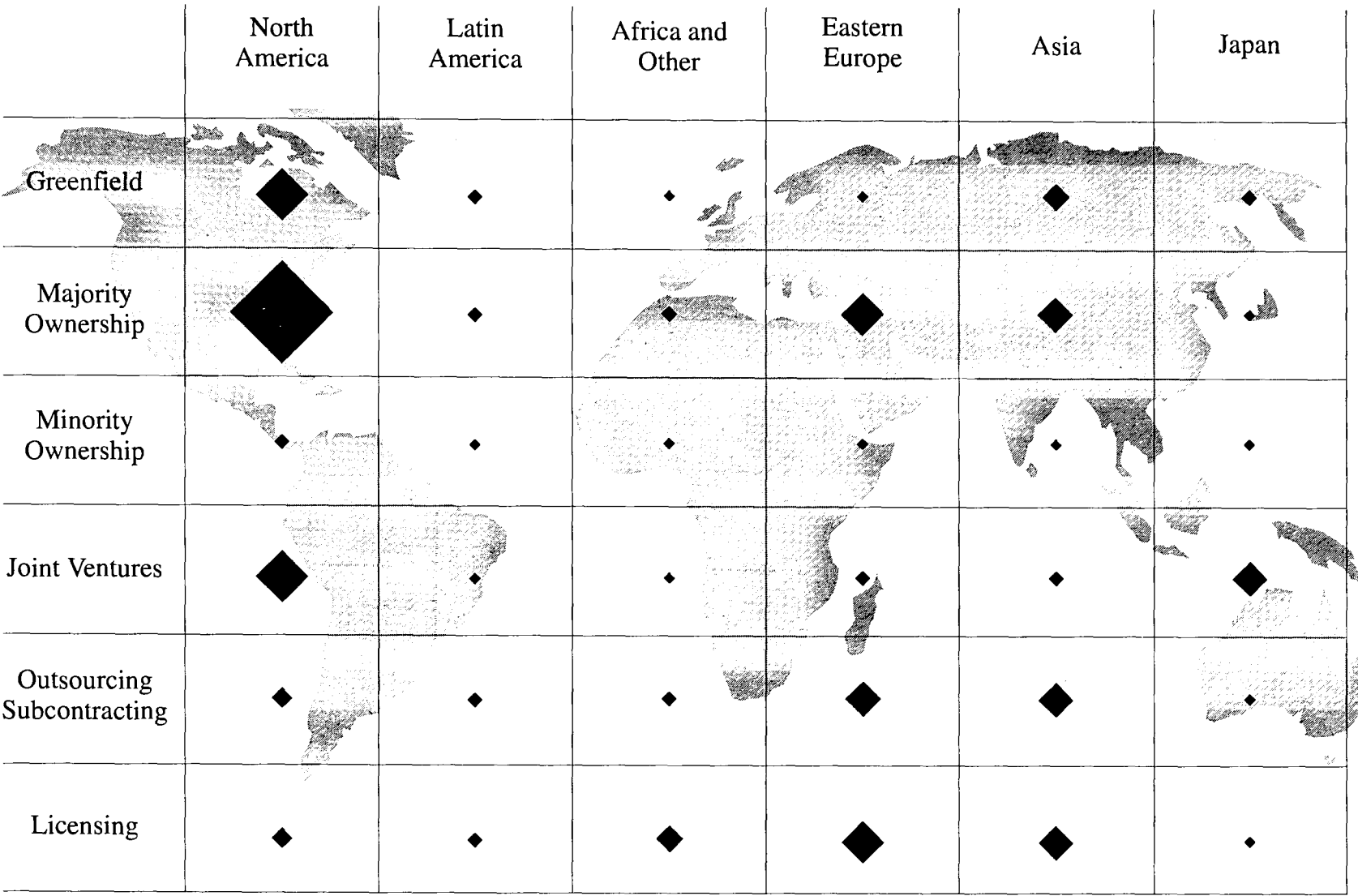
### SECTORAL DISTRIBUTION OF EU FIRMS' TRANSNATIONAL INVESTMENTS

Figure 2 shows the sectoral distribution of the world's top 100 non-financial transnational corporations, based on foreign assets held in 1990. Figure 3 illustrates the degree of internationalisation of these top 100 transnational corporations, by showing the proportion of these firms' total assets that are not in the home country, while Figure 4 shows similar figures for employment (i.e. the share of these companies' employment which is not located in the home country).

Based on the total value of foreign assets, the sectors which dominate the ranking of the top 100 transnational companies are petroleum refining, motor vehicles & parts, electronics and chemicals, in that order.

This distribution partly reflects the relative size of these sectors in world markets and the degree of concentration in each of these sectors. Among the 16 sectors which have representatives in the list of top 100 world transnational companies, those which are most "internationalised", i.e. those which have the highest share of foreign assets as a percentage of total assets, are printing and publishing, followed by rubber and plastics processing, pharmaceuticals, and food and drink (Figure 3). With a few exceptions, the share of foreign employment in total employment is similar to the share of foreign assets in total assets (see Figure 4), the exceptions being the trading sector, the food and drink and the electronics sectors, where the share of foreign employment is higher than the share of foreign assets. In contrast, in the printing and publishing sector the proportion of foreign employment is less than the share of foreign assets in total assets, indicating a tendency to main-

Figure 1: Regional patterns in the preferred form of transnational investment



Source: DRI Europe



tain the "labour intensive" activities (journalists, writers, marketing) within the domestic economy.

In summary, the observed differences in the forms taken by transnational investments across sectors and regions typically reflect:

- differences in industry structure or in the degree of concentration of companies in the market (if a market is small and there is already one large supplier or potential supplier, the potential benefits of market entry by a new firm are low);
- the degree of reliance on local sources of inputs - be they material inputs, human capital or physical capital;
- the degree of government involvement in that sector;
- regulatory barriers and differences in attitudes towards foreign firms in the country of destination.

The next section analyses the forms taken by EU transnational investments by sector. The analysis below covers the ten manufacturing and resource-based sectors in which the transnational activity has been particularly important.

### Energy

Because of its heavy reliance on local input sources, the energy sector - and, more specifically, the petroleum refining sector - is one of the world's most transnational industries. About 45 % of the total assets of the world's top 12 petroleum refining companies are held abroad.

During the 1980s, the stock of FDI in energy in the developing countries grew rapidly - in fact, it grew faster than in any other sector - due to the combined effect of intense merger activity and a search for safe investment locations. This partly reflected the high degree of uncertainty which prevailed in oil markets, which caused many oil companies to diversify geographically to spread risk. Some oil companies also diversified horizontally, for the same reason, taking stakes in mining for instance (such as British Petroleum). Most of this investment was directed towards Africa and the Middle East.

In more recent years, however, foreign investors' interest in the energy sector has shifted to central and eastern Europe, in particular to the former USSR where EU companies are developing activities in petroleum exploration and exploitation.

In this sector, low equity forms of transnational investment are commonplace for new investors (such as Germany or Japan), to reduce risk. In petroleum refining for instance, successful transnational operations have been established in many developing countries through turnkey and engineering contracts. UK investors, however, which have a long history of investing in the energy sector, generally have a majority or full ownership.

### Mining and metals

Mining is also a sector in which transnational investment reflects the need to have access to a natural resource. The EU metal producers have long been involved in transnational activities, both to ensure long-term access to mineral supplies for processing into the EU market and to serve growing local market demand.

Although the sector itself is highly internationalised, the relative importance of transnational activities in mining and metals is small compared to sectors such as petroleum refining, chemicals or automotive (see Figures 2 to 4).

There has been a considerable slowdown in transnational activity in mining and metals production in past years. Greenfield investment has considerably declined, partly due to the nationalisation process in developing (and ore producing) countries which took place during the 1970s and which led to substantial disengagement of EU firms from the capital of

the local mining companies. EU companies have also been hardly hit by the recent economic downturn and by the structural excess capacity problem. Instead of developing their transnational activities, EU companies are now concentrating on restructuring domestically, focusing on core activities and reducing overall production capacity.

In parallel to the decline of FDI in the sector, other forms of international involvement have increased in importance. These include minority equity investments in local firms, the provision of management or technical assistance, the supply or the sharing of technology or know-how through licensing agreements, joint ventures and even international subcontracting.

In more downstream segments, mergers and acquisitions have been a popular form of involvement of EU firms in non-EU regions, especially in North America. One example is Pechiney's acquisition of US's American Can. By acquiring the American can manufacturer, the French aluminium producer has become the world leading producer of aluminium food packaging. Some mergers have also taken place amongst locally owned and foreign-owned companies in developing countries (for instance in the Philippines), for regulatory reasons.

As the trend is now for developing countries to attract foreign investors by introducing open and stable foreign direct investment regimes, one can expect to see renewed interest in transnational activity in mining by foreign investors, in particular in the newly liberalised economies of central and eastern Europe.

The strategic moves towards central and eastern Europe will, however negatively influence activity and employment within the EU. The lower labour and energy costs, the availability of raw materials, the lower environmental constraints along with the existence of a potentially huge consumer market in central and Eastern Europe are attracting EU producers into this region. Activity in upstream sectors will not be much affected by such relocation moves, as mining activity is already quite marginal within Europe. Activity in immediately downstream sectors is, by contrast, potentially at risk. This applies in particular to the metal products industry, a sector which is characterised by a high labour intensity and a moderate technological intensity.

### Basic chemicals

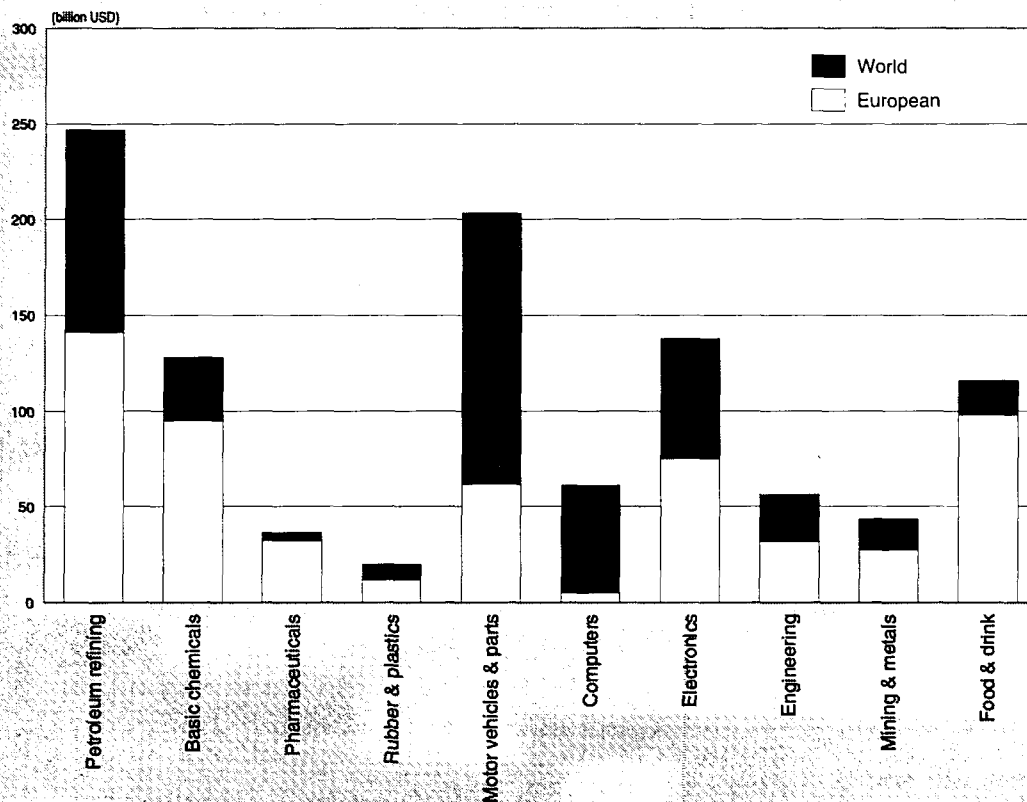
The chemical sector is one of the sectors in which the importance of transnational operations is greatest. In fact, not only are the world's largest chemical companies very dispersed geographically (with over half of the assets of the world's major companies held abroad), but, from the point of view of the recipient countries, chemical companies are among the most important foreign investors.

In most cases analysed, the establishment by EU firms of facilities outside Europe has responded to the need to serve local (distant) markets, as opposed to relocation moves. Usually, the local market absorbs the entire output of the subsidiaries, such that there are no or only limited negative spill-over effects on domestic production in Europe.

Generally speaking, European chemical firms have pursued one of three main types of internationalisation strategies:

- Greenfield investment has by far been the favourite strategy. Recently, greenfield sites operating in the basic chemicals segment have been flourishing, particularly in Asia where demand is expected to grow particularly rapidly over the coming years.
- In a number of cases, European basic chemical companies have preferred to rely on joint ventures to establish a presence in new markets. The main reason underlying these joint ventures has been to share the prohibitive start-up

Figure 2: Sectoral distribution of the largest world and European transnational companies



Source: 1993 World Investment Report

and development costs which are typical to this sector. Most of the existing joint ventures were concluded with local partners who bring a good knowledge of the market and can help circumvent possible regulatory or market entry barriers.

- The third "typical" transnational development strategy in the chemical sector has been through acquisitions. Some of these operations have involved large enterprises and have therefore been highly publicised (e.g. Hoechst's purchase of Celanese, Rhône-Poulenc's acquisition of Rorer). In other cases, the size of the targets of M&A activity have been smaller, the acquisition being part of a more global expansion strategy (for example, the recent acquisitions by EU firms in Mexico are to be seen as part of a supply chain for the whole NAFTA area).
- Although the three above strategies dominate, a number of chemical firms have invested outside the EU via licensing agreements. These kinds of agreements are often part of a wide joint venture agreement whereby the EU companies also license the technology to local partners.

Eastern Europe has only recently become a favourite target for investment from all major European chemical groups, in particular the three German giants Hoechst, BASF and Bayer. In this area of the world, all kinds of investment strategies have been employed: for instance, in 1992, Hoechst acquired through its controlled Schwartzkopf a cosmetics manufacturer in Poland, established a joint venture in advanced ceramics in the Czech Republic and purchased holdings in two gas companies in Croatia.

The multinational nature of the European chemical industry implies that a sizeable proportion of its workforce and of the supporting services are located outside the EU. None of the segments of the chemical industry are very labour intensive,

however. The spill-over effects of chemical activities on the rest of the economy are nevertheless important, with DRI calculations suggesting that, of the total employment creation which is induced by a given rise in final demand for chemical products, more than half takes place outside the sector itself (i.e. is induced employment).

The negative effects on EU employment of the transnational strategies of firms in the basic chemical sector are most important. In this subsector indeed, a combination of high production costs (mainly feedstock and capital costs) and tight environmental regulations threaten to make European enterprises uncompetitive compared to other world regions. This creates incentives for EU companies to relocate production abroad. Two compounding factors are the weak rate of growth of domestic demand in Europe and the persistent situation of overcapacity. Our research, however, indicates that the fundamental reason underlying the interest of EU basic chemicals producers in Asia is that this is a fast growing demand market. Hence, if the strengthening of world market demand continues and the overcapacity problems are eliminated, the recently set-up production capacities in Asia will mainly serve the local (Asian) market, leaving room for a renewed expansion in production and employment in Europe.

### Pharmaceuticals

The pharmaceutical sector is also a highly de-localised industry, though for other reasons than the other chemical sub-sectors.

Greenfield investment has been the dominant form of transnational involvement in the pharmaceutical sector, followed by strategic alliances. The necessity for the industry to think globally and to serve its markets from a local base has indeed made the use of greenfield investment and of M&As the preferred strategies in this sector. This also results from the highly

segmented nature of national pharmaceutical markets, due to differing regulations and licensing rules. Also because of the high degree of market segmentation, the set-up of independent distribution networks is usually a condition for operating in this sector. Most transnational operations of the world's largest pharmaceutical companies thus operate as stand-alone units within the local economy.

To date, EU pharmaceutical companies have expanded in this way in most regions of the world, in particular in Latin America (Mexico, Brazil, Colombia), as well as Japan and Asia. The pharmaceutical sector is, in fact, the only sector in which European companies hold a sizeable share of the Japanese market.

The impact of transnational activity on downstream and upstream activities is fairly limited, because the pharmaceutical sector is not highly labour intensive and because most transnational investment moves have responded to the need to establish a local presence to operate in fragmented markets, rather than to a relocation of EU production.

### **Mechanical and electrical engineering**

In the engineering sector, non-equity forms of investments such as licensing, OEM agreements or subcontracting have been widely used as they are particularly suited to small and medium sized firms. In general, the pattern of involvement abroad is the following:

- EU mechanical engineering enterprises have preferred joint ventures to M&As or greenfield investment to penetrate foreign markets. This is true mainly in those countries where the industrial culture is very different from the western culture. Contrary to the situation with US or Japanese producers, JVs involving European companies are usually applied to small-scale collaboration experiments involving standard parts of machinery.
- Apart to reinforce their sales and distribution chain, firms in the sector have made more limited use of greenfield investment or mergers and acquisitions to expand internationally. The acquisition of established local manufacturers has nevertheless been the main avenue for international expansion by firms such as Mannesmann. The German producer, one of the world's leading mechanical engineering firms, has made use of M&As in order to reinforce its position on foreign markets where it was already present (notably in the US).
- Recently, outsourcing has become a favourite strategy to cut production costs in this sector. Outsourcing agreements usually apply to the production of components with a low labour content, which are then fabricated in high volumes through highly automated production processes. Another form of transnational investment which is growing in importance is licensing. This supply policy is commonly used for parts and components which are not crucial for the accuracy of the machinery. Contrary to outsourcing, licensing typically involves a long-term relationship between the licensor and licensee.

Whether it is relying on subcontracting or OEM agreements, the activity of the transnational mechanical engineering producer must remain closely linked to that of the parent company as the products or equipment must precisely fit the requirements of the transnational corporation. Thus, whatever the contractual form taken by the operation, the subcontracted firm must to some extent be integrated into the parent firm's value chain through the integration of some corporate functions (product development, R&D, etc.).

To date, the transnational activity of EU mechanical engineering producers has only limited effects on downstream and upstream activities within the EU. The share of supporting services which are supplied by domestically based EU firms

to support their foreign subsidiary is presently estimated at 1 %. This figure is not likely to increase in the coming years.

In the long term, both the direct and the indirect effects of transnational expansion moves in this sector are likely to be important as many of the larger firms have plans to slowly expand their activity outside the EU market. The increased reliance on outsourcing and licensing agreements will have a detrimental effect on employment in the component industry. As to the indirect employment effect, based on the French I-O matrix, DRI has calculated that for every 10 jobs that are created within the mechanical engineering sector following a rise in demand for capital equipment, 8.2 jobs are created up-stream in the supplier industries. Some of these may be at threat if EU production is replaced by imports.

One of the factors that will limit the reach of this phenomenon is that outsourcing and licensing agreements can only apply to parts that are relatively standard, i.e. that are neither too sophisticated nor unique to the machinery. On the other hand, to the extent that part of the value added from the machinery continues to be produced within the EU, as is the case with "simple" transnational investment moves (whether it is the assembly, the production of highly sophisticated components or the R&D), the transnational activities of EU firms can also have a positive, albeit likely limited, impact on employment in Europe. This could result from increased exports, as is the case at present with the Italian mechanical engineering sector. Most of the job creation in Italy indeed originates from SMEs who have to satisfy growing demand from customers located in Southeast Asia and Latin America.

### **Consumer electronics**

Consumer electronics companies are highly involved in transnational operations because of the need to be close to the end-users and because of the extremely competitive world market, which provides continuous pressure to reduce production costs. In the past, consumer electronic products were manufactured close to their end market. As the competitive climate heightened while standards and norms were being harmonised, European firms started to relocate their production facilities to lower wage regions in order to reduce production costs. As a result, there has been a surge in EU investment in consumer electronics in South East Asia, the region in the world which offers both high market growth and low labour costs.

Mergers and acquisitions have undoubtedly been the most widely used form of expansion, in particular in the industrialised world. Today's European multinationals have increased in size by absorbing competitors, both in Europe and abroad (e.g. the takeover of RCA in the USA by Thomson, Nokia's acquisition of the German SEL). Medium-sized companies have also followed this path in order to create a more comfortable market niche (e.g. Seleco's acquisition of Elbe in Spain).

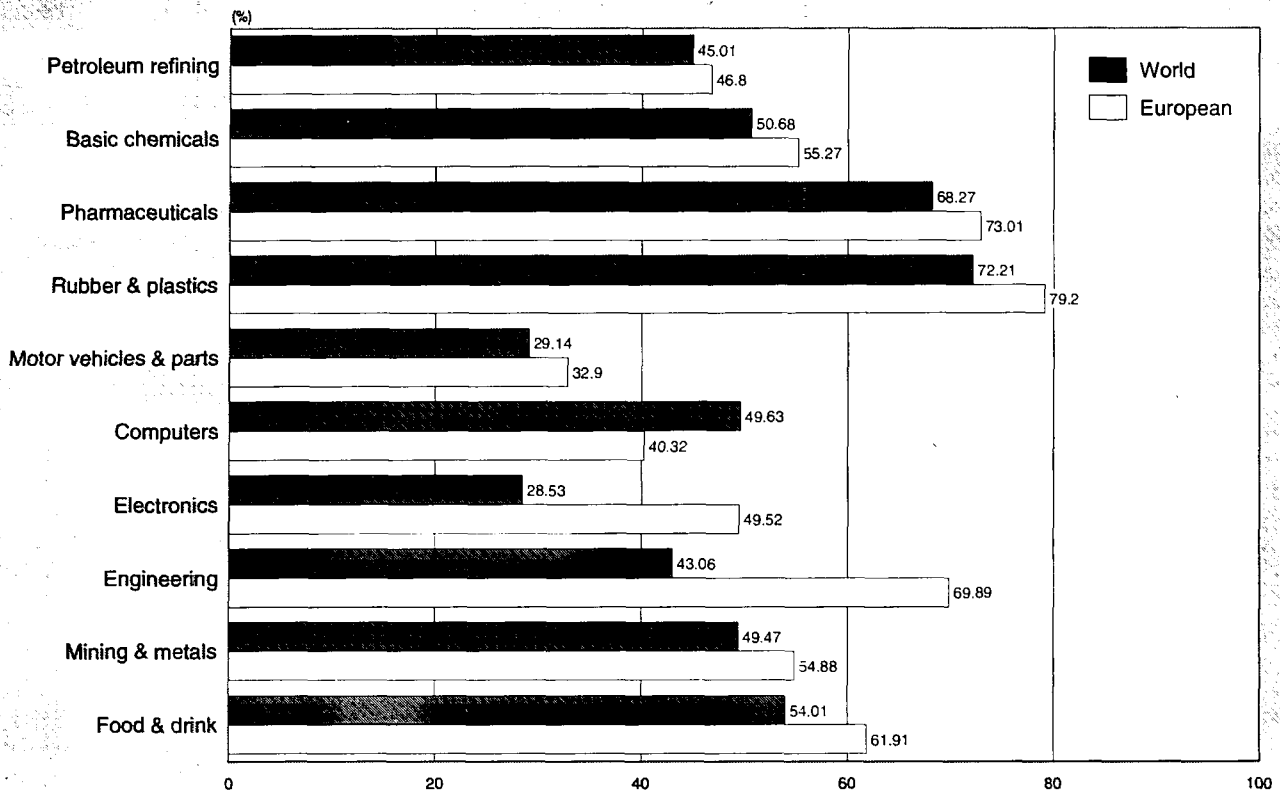
Greenfield investment has also been popular, mainly in the less industrialised countries. All the major multinationals have established production facilities abroad to serve the foreign markets and profit from low labour costs. The scale of the phenomenon in the consumer electronics sector is larger than in other manufacturing sectors: Philips for instance transferred the headquarters of its Audio division from Holland to Singapore, a move justified by the fact that about 80 % of the division's workforce is now based in South East Asia.

Whereas in the industrialised region joint ventures are motivated by the need to build on synergies and reap economies of scale (EOS) in R&D, in the developing countries they have chiefly been put into practice for marketing purposes.

In comparison to EU firms, Japanese consumer electronics producers have relied more on greenfield investments to expand internationally. All the major Japanese consumer elec-



Figure 3: Share of foreign assets in total assets of the top transnational companies by sector



Source: 1993 World Investment Report

tronics producers have or are about to set up production facilities in Europe, in the US and particularly in South East Asia. Nearly all of their output is for export, both to Japan and to the rest of the world.

Similarly to the situation in the mechanical and electrical engineering sector, it is important in the electronic industry to integrate the activity of the foreign operation into that of the parent company, as the foreign operation often manufactures parts of the final product and not the complete product itself. This is why formal OEM arrangements, including licensing or subcontracting agreements are also common in this sector.

The expansion of EU companies into Asia rather reflects a desire to be present in a growing market. The firms which have invested there have set up production facilities which were originally essentially aimed at serving local markets, through greenfield investment. Increasingly, however, these production facilities supply other markets. Thus, for example, Philips produces audio equipment in Malaysia and Taiwan, and in-car entertainment in Singapore; Thomson manufactures television sets and components in Singapore, Thailand and Malaysia.

A similar pattern of investment can be found in Latin America, where all major multinationals (both European and extra-European) have established production facilities (e.g. Philips in Brazil, Thomson in Mexico). Marketing joint-ventures have been arranged in most countries in the region, but the original investment was also greenfield.

Eastern Europe has recently become a major target by European consumer electronics manufacturers, attracted by cheap labour and good medium term growth perspectives. Philips for instance has established a video-cassette recorder manu-

facturing operation in Hungary to serve the entire European market.

The intense transnational activity of EU consumer electronics firms has important spill over effects on activity and employment within the EU, in particular in the upstream segments of the business. The relocation of several EU consumer electronics firms in non-EU regions to benefit from lower costs of production has thus had spill-over effects on related industries, in particular on OEM production in Europe. This negative impact has, however, been partly offset by the fact that Japanese and Korean manufacturers have opened consumer electronics manufacturing plants in Europe to avoid trade barriers, and have themselves have attracted Japanese and Korean component manufacturers into the EU.

The consumer electronics sector also offers a good example of the potential effect of relocation on supporting services, i.e. on employment other than blue-collar employment. The already mentioned case of Philips, which moved its Audio division headquarters to Singapore, is emblematic in this sense: the share of relocated production has become so important that it has inevitably pulled with it the accompanying services that had traditionally remained in Europe.

#### Electronic components and computers

Although electronic component manufacturers do not stand out as being important foreign direct investors, EU producers have nevertheless been very active internationally through other means. The sector is indeed the second largest international subcontracting industry after textiles and clothing manufacturing.

The computer industry is much more international than the electronics production, with a share of foreign assets in total assets close to 50 % for computer manufacturers and less than 30 % for the top 11 electronics producers. These, how-



ever, typically rely on non-equity forms of transnational development, such that the above figures based on assets do not give a fair view of the high degree of internationalisation of the sector.

Generally speaking, transnational investment strategies in the electronic components and computer industries were originally driven by the necessity for companies to serve (new or fast growing) local markets. Cost reduction considerations represent a secondary albeit far from negligible factor for companies to locate productive activities outside of their domestic market. They have, however, been a major factor in the computer industry.

Between 1986 and 1993, the total number of strategic alliances, including joint venture agreements involving companies in the electronic components sector, increased dramatically, with a major shift away from EU-US agreements towards EU-Japan and EU-Asia agreements. This reflects a fundamental difference in the strategies pursued by US and EU firms respectively, with the former having a tendency to move PC production to the Far East, whereas the Europeans have continued to assemble PCs locally: this strategy allows European producers to configure products nearer to the customer, to respond quicker to market changes and to minimise inventories of high value added (and thus expensive) components. This does not give them access to mass markets, however.

Because of the huge cost associated to the research and the development of new components, collaborative agreements are increasingly common in this sector. The production plants resulting from these collaboration agreements are typically highly automated and rely on the availability of a highly skilled workforce. Such collaborative ventures are therefore more likely to be located in the US, in Europe or in the Far East, i.e. in regions combining the advantages of high skills and fast growing consumer markets.

In comparison, there has been very little transnational investment by EU firms in this sector taking the form of greenfield investment or acquisitions, and there are only a few cases of joint venture agreements. The integration strategy which is most frequent in this sector from the part of EU firms is the one in which components are built wherever it is cheaper to produce them, before being re-imported for assembly into the final product.

The manufacturing location for electronic components is determined by the size of regional markets, the availability of skills and the economics of production. This latter factor explains the recent shift in the location of electronics production from the US and Europe towards the Far Eastern NICs. The high production growth rates in the region (close to 30 % annually) are also explained by the fact that in some of the countries of the Pacific Rim, governments are making the electronic component industry (and in particular the semi-conductor industry) a cornerstone of their industrial strategy.

Being a major growth area, the Pacific Rim has naturally come to be a preferred location for EU electronic component manufacturers. It is important to note, however, that foreign involvement by Japanese and US firms in those countries far exceeds that of the European companies.

Favoured by lower wage rates, the east European countries hope to be able to account for a significant share of the world electronic components' production in the future. The location of such productive activity will be mostly driven by the need to serve locally key customer industries (automotive, electrical engineering, and others) which have set up or are expanding production in the region. Today, however, the emerging economies of the region do not yet meet the conditions that are necessary to the success of electronic component producers. One stated problem is the lack of flexibility of the east European workforce. Production equipment is indeed evolving apace, requiring suitably trained employees, capable of being

retrained almost continually and of acquiring new skills and responsibilities.

As in the case of the consumer electronics industry, the impact of the relocation of the electronics components industry on employment in Europe has been partly offset by moves in the opposite direction by US and Asian companies which have set up production facilities in Europe to avoid potential import barriers. Nearly half of the EU microprocessor requirements is currently supplied by non-EU firms based in Europe. The spill-over employment effects of electronics and computer manufacturing are relatively low, as total employment in the sector represents less than 2 % of total EU employment.

### Motor vehicles

Whereas chemical companies dominate the list of the largest foreign direct investors from the industrialised into the developing countries, automotive producers dominate the list of companies undertaking joint ventures in the developing countries. At world level, automotive firms have expanded abroad in search of lower labour costs and to get around trade barriers.

Practically all forms of transnational operations have been put into practice by the European carmakers over the past decades. In comparison, US and Japanese investors have until recently shown a distinct preference for greenfield investments to expand into new markets.

- Joint ventures with local partners have been the preferred strategy used by European motor vehicles manufacturers to expand abroad. This form of investment presents the same advantages as greenfield investment, but at the same time enables the EU firm to share the risks and costs associated with the new market entry while benefiting from the partner's experience of the local situation.
- Greenfield investment has, in contrast, been less used in this sector due to the high cost and the risk involved in setting up wholly owned operations outside Europe. Where it did happen, the greenfield investment was typically aimed at supplying local and regional markets. In some cases, however, as with the production of engines and other components, a growing share of production is now being exported to Europe.
- Mergers and acquisition have mainly characterised transnational moves within Europe. The present (growing) degree of concentration of the sector largely reflects sustained M&A activity throughout the eighties, which has left no independent small to medium carmaker in Europe. The industry is now making increasing use of outsourcing and subcontracting agreements both domestically and internationally, particularly in the field of components (engines, gear boxes, etc.). All original equipment (OEM) manufacturers commonly outsource components from foreign countries.
- Licensing agreements have been set up by all the major carmakers in many developing countries to supply the local market. These agreements mainly consist in assembly operations on kits imported from abroad.

The main reasons for the transnational expansion of EU automotive producers are: the need to sell to distant markets; the need to circumvent often restrictive trade regulations; and, the need to reduce risk associated to exchange rate fluctuations.

Trade regulations have also played an important role. Local production or assembly can indeed shun protective tariffs and other entry barriers. Another reason for international expansion has been the fluctuations in exchange rates, and, more particularly, the appreciation of the Japanese Yen which has made it imperative for Japanese producers to establish a presence

abroad to retain market share. The same applies to a lesser extent to European investment into dollar-driven economies.

European car manufacturers are involved in all kinds of transnational activities in practically all regions of the world. At present, the "hottest" geographical area for the car industry is South East Asia, and in particular China. This huge and rapidly growing market is a primary target for all European carmakers who are striving to find outlets for production outside the mature European market.

The few greenfield investments by EU companies outside Europe have mainly been located in the US. Here, BMW has established a production facility, followed by Mercedes-Benz which is building a plant for 4-wheel-drive cars. Both firms invested in the USA because it is the world's largest market for luxury and 4-wheel-drive vehicles.

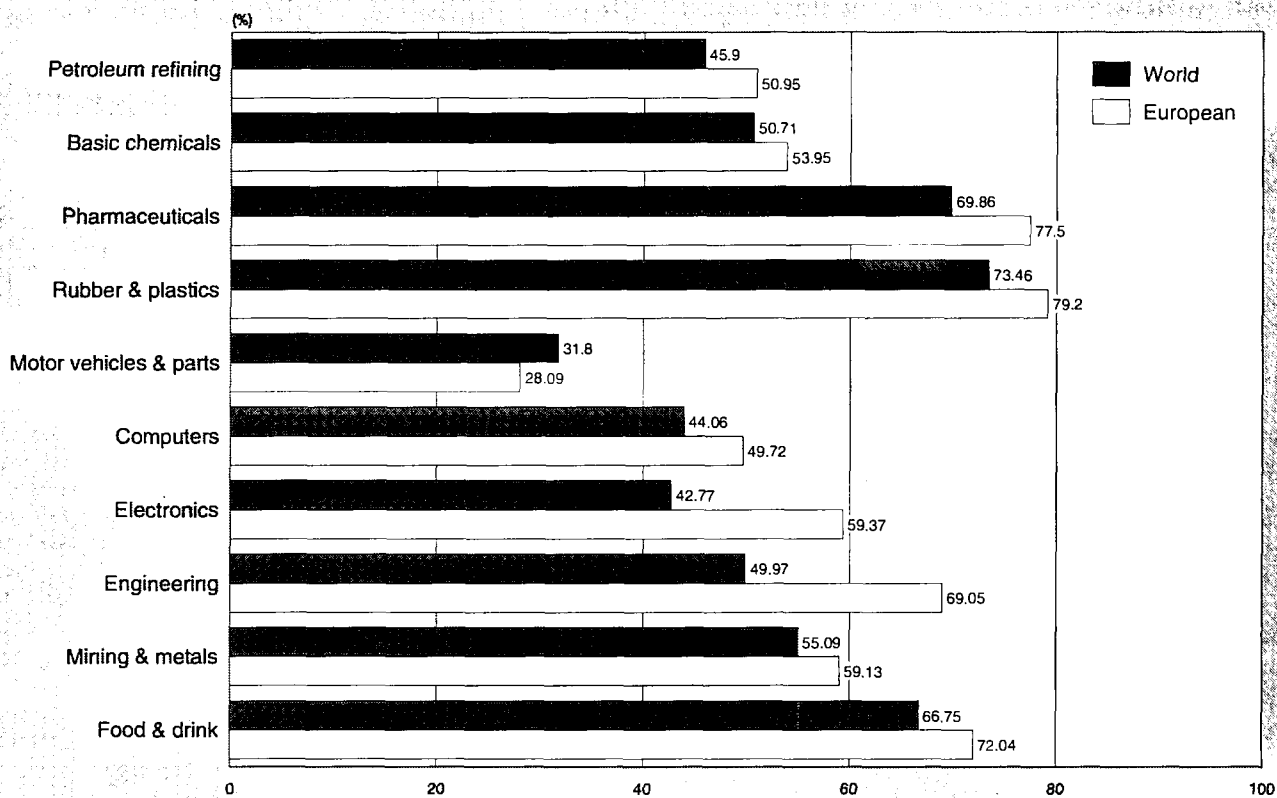
Latin America has long been a primary target for the European car industry, given its market size and low labour cost structure. The world's largest carmakers have been investing in the region, in particular in Brazil, Mexico and Argentina. Most of the investment took the form of joint ventures (e.g. Renault in Colombia, Peugeot in Chile, Fiat in Brazil) or greenfield investment (e.g. Volkswagen and Renault in Mexico), along with few licensing agreements for assembly in smaller countries (e.g. Daimler-Benz in Uruguay, Fiat in Venezuela). A common feature of the car industry's investment in Latin America has been the government's pre-requisite of local content, which was set at quite a high level (generally at least 80 %). Recently, European investment in the region has been propped up by the NAFTA agreement between the USA, Canada and Mexico. The latter country has been the target of intense investment activity from European companies aiming to use it as a springboard for the North American market, in virtue of its low labour cost nature.

Expansion by EU automotive producers into the promising Eastern Europe market has taken three main forms. Many EU carmakers have been active on the acquisition front: the best example is provided by the purchase by Volkswagen of the Czech car manufacturer Skoda. The second strategy adopted to penetrate the East European market has been the joint venture: here, we can recall the operational venture between Fiat and the Polish carmaker FSM, which is now producing the new Fiat 500 for the European market. Last but not least, several west European manufacturers such as Opel, Volkswagen and Mercedes-Benz have set up production units in former east Germany after the fall of the Berlin wall. Additionally, thanks to its proximity to the west European market and to its low labour cost, east European component producers have often been involved into outsourcing agreements for standard components.

In the coming years, the transnational activities of European carmakers outside the EU will have important effects on the automotive components industry. The trend towards outsourcing components is expected to strengthen over the coming years, as increased competitive pressures within the world automotive industry will push for cost reductions, which will be achieved also a via a lowering of component costs.

The impact of the international activity of EU car manufacturers on employment in Europe is already quite evident. Although in past years the prime reason for building a plant abroad was to supply the local (regional) markets, a growing number of producers are now relocating some of their production units outside the EU with the aim of serving both the local and the EU markets. For example, Fiat is manufacturing the Fiat 500 in Poland after having produced the Duna model in Brazil for some years. Both models are sold on the European market. The impact of such international investment strategies on direct employment in the car industry within

Figure 4: Share of foreign employment in total employment of the top transnational companies by sector



Source: 1993 World Investment Report



the EU is clearly negative, and will continue to be so as the relocation trend is set to continue in the near future. On the other hand, the vast majority of supporting services upon which European car manufacturers rely will remain located within the EU. There are no signs that this situation might change because of increased transnational activity of European carmakers.

### Food, drink and tobacco

In the food sector, differences in consumer tastes and habits, along with trade barriers and often high local content requirements (for practical as much as for regulatory reasons), have frequently required transnational companies to adopt multi-country strategies to penetrate new markets rather than rely on exports. For a number of reasons which have to do with the nature of the products, such as the fact that they are difficult and/or costly to transport over long distances, different customers' tastes and preferences across countries and that the control of local distribution channels is essential, food and drink companies have typically expanded internationally through joint ventures and acquisitions of local firms, as opposed to greenfield investment or even subcontracting.

Companies from this sector who engage in transnational investment strategies are thus seldom "relocating" their activities, but rather seeking to expand sales by reinforcing their presence in distant markets. Among the factors that influence the form of international investment in the food and drink sector are:

- the nature of the regulatory environment in the target market (existence of standards, entry barriers, import tariffs, packaging and other regulations);
- the need to have access to distribution networks in the country of location of the investment, and eventually also in neighbouring countries;
- cultural differences making it important to adjust supply to the structure of local demand and to consumer preferences;
- the fact that in most segments demand grows only slowly, such that expansion can typically only be at the expense of a competitor, through an increase in market share.

Transnational investments by EU, US and Japanese food producers have mainly taken the form of mergers and acquisitions. The largest food multinationals have increased their market share by acquiring rivals and growing in size. This expansion, which was once limited to their home market, has recently boomed at the international level, as "going global" has become the motto for the 1990s.

Large food companies prefer to invest in wholly or majority-owned subsidiaries because this allows them to assure a consistent product quality around the world. Once acquired, however, in most cases the foreign subsidiary operates as a stand-alone unit within the foreign market. Indeed, by acquiring an existing firm the parent company obtains immediate access to local distribution channels and locally known brands.

The sector also provides some examples of joint ventures, which are, however, much less numerous than the two previous forms of investment. In some cases these have been set up with competitors in order to share the costs of an investment. Most joint ventures are, however, between western firms and local producers and/or the authorities, in order to reduce risk and avoid market entry barriers.

It is important to note that the majority of transnational investment moves in the food sector have been undertaken by large multinationals such as Nestlé and Unilever. The smaller and less financially endowed groups usually limit the scope of their activity to the European market and achieve higher market share by specialising in their strongest lines of business.

The extra-EU operations of the European food industry have only minimal spill-over effects on upstream and downstream activities in Europe, for two main reasons. First, food products can not be transported over long distance. Secondly, and consequently, the vast majority of transnational operations aims at supplying local markets, thus the entire output of these production units remains in the country/region of location of the investment. A few luxury food products (e.g. caviar), alcoholic beverages and tobacco products are an exception to this rule, as they can be easily shipped and are more or less universally appreciated.

One market segment in which there is a real threat to employment and manufacturing activities within Europe, however, is cigarettes manufacturing. Cigarettes are a standard product which does not require high technology in production. The recent expansion of cigarette makers, both European and American, into eastern Europe entails the risk of increased exports to western Europe, with consequent negative effects on production and employment within the EU. At present, most cigarette makers are already responding to the weakening in domestic demand by restructuring their operations in western Europe, rationalising production lines and closing down obsolete units (e.g. Philip Morris in Belgium). This trend is bound to be reinforced as a result of the building up of modern production capacities in eastern Europe.

### Textiles and clothing

Textiles and clothing companies do not appear as major international investors based on FDI figures. The sector is nevertheless highly internationalised, as indicated by the importance of textiles & clothing trade to and from the industrialised countries. In this sector, largely because of the small average size of companies and because of the need for flexibility, non-equity forms of investment dominate, such as OEM, subcontracting and licensing agreements.

In the clothing sector, the bulk of transnational activity takes the form of international subcontracting, followed by licensing, which is mostly found in the more fashion oriented products. Many EU clothing companies are indeed gradually turning the corner from manufacturing to purely distributive activities, and source their purchases in low cost countries. This procedure enables them to benefit from price advantages and to enjoy reduced commitment to a given subcontractor or licensee.

Textile producers are also commonly involved in transnational activities. These often take the form of an international sourcing of raw materials, but also (and increasingly) of semi-finished textile products. In this area, subcontracting is the most important form of link between EU textile companies and their non-EU counterparts. Subcontracting is mostly found in such activities as spinning and weaving, but does not usually involve equity ties. The subcontractor commonly remains independent from the contractor company. Licensing is also found in textile producing activities, but mostly in brand name textile production or in man-made fibre production in conjunction with plant construction or turnkey ventures. In developing countries, licensing has permitted EU textile manufacturers to generate returns from their technology, while the licensee has to assume most of the financial and marketing risks associated with the agreement. In the developed countries, by contrast, licensing and sometimes even cross-licensing is quite a common transnational strategy for EU firms as it enables the partners to share the costs of R&D and of marketing.

There are considerable differences in the form that relocation activity takes according to geographical area. For outward processing trade (OPT) operations, which require quick response and are based on just-in-time strategies, delivery times are a crucial factor in the choice of the country of location of activity. Proximity of the subcontracting country is therefore seen as fundamental. OPT operations are commonly developed

between Germany, France and the Benelux countries on the one hand, and the east European countries and countries of the Mediterranean rim on the other hand. Mediterranean countries and Africa are, in addition to the above-mentioned relocation forms, privileged locations for establishing own production facilities. The importance of OPT operations is largely explained by labour cost differences, as the production of garment is a highly labour-intensive process.

The general cost structure of textile and clothing production does not permit EU firms to compete against low-wage countries which have furthermore benefited from advantageous trading conditions under the auspices of the Multi-Fibres Arrangements. The relocation of some segments of textiles and clothing production has thus been essential to the survival of other business segments in Europe. The EU textile industry has thus benefited from the development of OPT operations by EU clothing firms which continue to source most of their input materials within the EU.

Unfortunately, this positive point has to be seriously tempered by the ongoing process of relocation of upstream activities, reflecting clustering patterns in production. The case of the Italian Marzotto and Miroglio is illustrative in this matter: these textile and clothing producers which had relocated their garment assembly activities in low-wage countries (in particular in the Mediterranean rim) a long time ago have recently continued their relocation process by moving textile production capacity in the Maghreb.

## CONCLUSION

The above analysis has shown that, although the typical forms of transnational involvement do vary significantly by sector, for each sector region couple one can indeed identify a specific pattern of transnational investment.

In most sectors, the transnational investment strategies of EU firms outside Europe have been driven by the desire of establish a presence or expand in a new (and/or fast growing) market. This trend has been further reinforced in recent years by the effects of the recession which prompted manufacturers to look for new outlets for their products. The overall importance of transnational investments by EU companies outside Europe is however, still relatively low, and there is a distinct trend towards lower equity, less riskier, forms of transnational involvement.

Investments aimed at re-exporting to Europe indeed only represent a small share of all transnational moves by EU firms, and they are generally quite limited in scope. Their spill-over effects on European employment levels are thus moderate. EU investment abroad is also still somewhat conservative in form: it is concentrated in mature sectors and in countries with which the EU Member States have historic ties. This also holds for EU investment in eastern Europe.

Finally, the employment effects (in Europe) of the EU firms' transnational involvement strategies are small in most sectors (the two exceptions being textile and apparel, and consumer electronics), if only because the sectors in which EU firms have the strongest presence abroad - or which are most internationalised - are not those with the highest labour content. There are, nevertheless, some important spill-over effects of these investments in up and downstream sectors, both positive and negative (see Table 2).

Written by: DRI Europe



# The world's largest industrial groups

*This article compares the relative performance of the world's 200 largest industrial companies by region and by sector in terms of turnover, profit and other key indicators, then describes in more detail the past trends in the key financial indicators of Europe's top 200 companies by sector. All the data underlying this analysis comes from the Commission's database on large enterprises (DABLE), with all figures presented in current ECU. The data covers the period 1987-93, and relies on official figures from the companies' annual reports. Complete 1994 figures for Japan were not available at the time of writing, as the Japanese 1994 fiscal year only ends in March 1995. The data presented below thus only goes to 1993.*

## THE WORLD'S TOP 200 COMPANIES

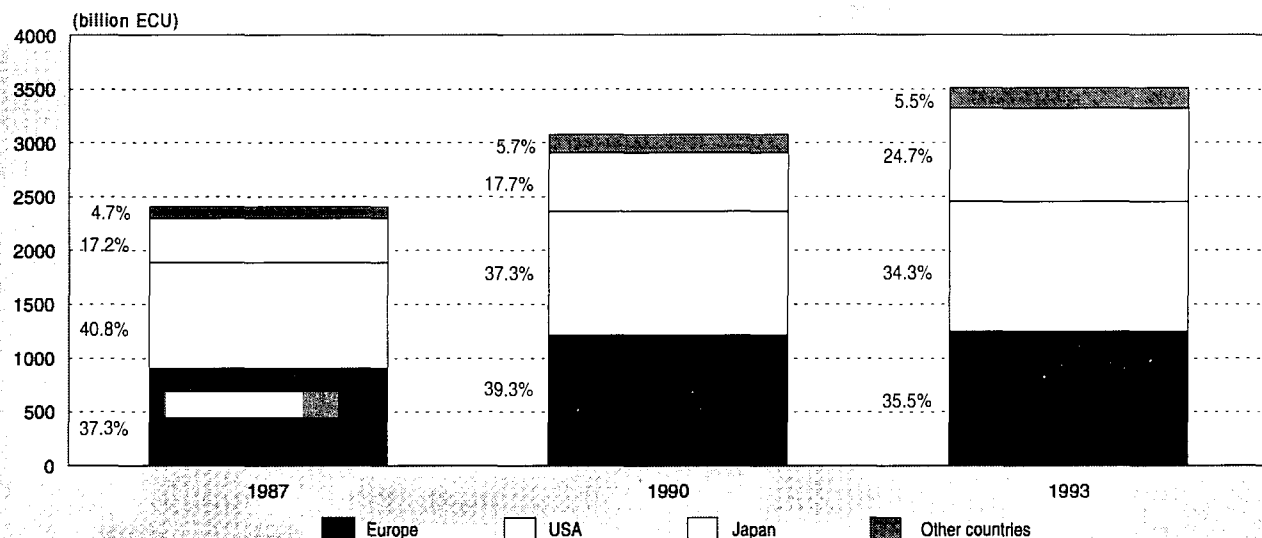
### Overall performance

The total turnover of the world's 200 largest industrial companies was just over 3 500 billion ECU in 1993, 1 100 more than in 1987 (Figure 1). The rate of growth of turnover of the world's largest companies was, however, higher in the first part of the period (+8.5 % per year on average between 1987-90) than in the second part (+4.5 % per year on average between 1990 and 1993). This slowdown in turnover growth after 1990 results from both the deceleration in overall economic growth in the USA and Europe over that period, and

from less intense M&A activity by the top firms. In Europe, the number of cross-border acquisitions, which hovered around 1 840 in 1989-90, fell to 1 612 in 1991 and to just over 1 400 in 1992 and 1993. The average value of cross border acquisitions involving European companies also decreased over the period, to a little over 30 billion ECU from close to 50 billion ECU in 1989-90. The number of cross-border acquisitions started increasing again in 1994, when companies emerged from the previous period of corporate retrenchment characterised by 'survival' strategies.

The influence of the business cycle - with Europe at the bottom of the business cycle in 1993, whereas the USA was on the way to recovery and Japan was only beginning to slow down - is highly notable on Figure 1. Whereas the EU companies accounted for a rising share of the total turnover of the largest top 200 world companies until 1992 (from 37.3 % in 1987 to 39.3 % in 1990, then stabilising at that level until 1992), this share fell back significantly in 1993, to 35.5 %. The share of turnover of the top USA companies has, in contrast, decreased continuously since 1986, falling from 44.1 % in 1986 to 40.8 % in 1987, 37.3 % in 1990 and 34.3 % in 1993. In fact, the number of USA companies in the top 200 ranking has also been falling since the mid-1980s, whereas the number of Japanese companies risen continuously, from 36 in 1986 to 52 in 1993.

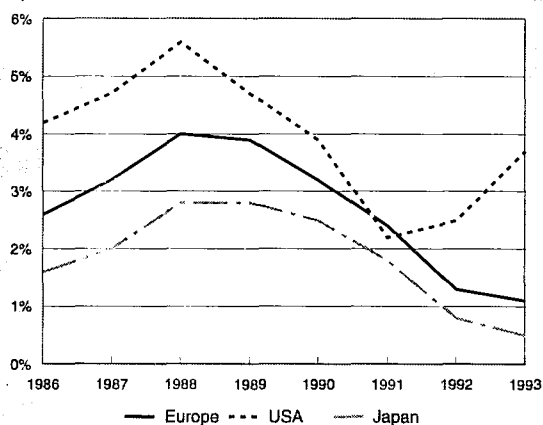
**Figure 1: The 200 largest industrial groups in the world**  
Turnover growth at current prices



Source: DABLE



**Figure 2: The 200 largest industrial groups in the world  
Net profit / turnover**



Source: DABLE

Given this increase in both the average size and the number of Japanese companies in the world top 200 ranking, it is not surprising to find that these have also significantly increased their share of total turnover by the world's largest 200 companies, from 17.2 % in 1987 to close to 25 % in 1993.

Looking at the trend in turnover in more detail, one finds that there was a turnaround in the USA companies' relative position in 1993. The weak relative sales performance of the large USA companies, which was very notable until 1992, actually ended in 1993: in 1993 there were 65 USA companies in the top 200 ranking, two more than the year before, and their share of total turnover had increased from 34 % to 34.3 % (Table 1). In contrast, there were only 71 European companies (from either the EU or the EFTA) in the top 200 in 1993, compared to 76 the year before.

There are four factors which will push for a reversal of the downward trend in the European companies' relative performance in 1994 and 1995. First and foremost, the acceleration of economic activity in Europe at the end of 1993 has given a boost to the top companies' turnover. Secondly, M&A activity in Europe, which had fallen back in 1991, 1992 and 1993, has since been on an upward trend: in 1994, the number of intra-European cross-border acquisitions increased again, to 1 536 according to 'Acquisitions Monthly', and the total value of the deals was up by 50 % from the 1993 level. Thirdly, economic growth in Japan slowed down in 1994 and 1995, implying a comparatively slower growth of the turnover of the top Japanese companies. And, fourth, the depreciation of the US dollar against the ECU comparatively reduces the US companies' share of total turnover when measured in current ECU.

In 1994 and 1995, thus, both the number and the share of turnover of the largest European companies are likely to have increased again from the levels shown in Figure 1.

The analysis of the trend in the profit ratio of the top companies by region over the period 1987-1993 also shows an interesting pattern, even if somewhat worrisome as far as the European and Japanese companies are concerned (Figure 2). In 1993, the financial performance of the major European companies continued to deteriorate, albeit at a slower pace than in 1992. This slower deterioration reflects the progressive improvement in the economic situation in Europe throughout the year, with both production and sales resuming an upward trend in the last months of 1993, and the result of the cost-cutting efforts of many of the European companies. One will, however, have to wait until 1994 to see an improvement in European companies' net profits and in their net profitability, the latter being measured by the net income to turnover ratio. This will be much needed since, as illustrated in Figure 2, the net profitability ratio of Europe's top companies has fallen consistently from its level of 4 % in 1988 to just over 1 % in 1993. As the rate of utilisation of production capacities has been on an upward trend since the middle of 1993 and as real interest rates in Europe remain high, it is essential for companies to restore their profitability in order to have the means to finance new investments.

The downward trend in profitability in Europe is not a unique phenomena, however. The largest USA companies also experienced a decline in their average profitability ratio in the late 1980s/early 1990s, but a turnaround took place as early as in 1992 thanks to the strengthening of economic activity in that country. In 1993, the average profitability ratio of the largest USA companies was back to 4 %, the peak level observed in Europe in 1988-89.

The average profitability ratio of the top Japanese companies has followed a trend very similar to that of the top European firms though falling as low as 0.5 % in 1993. Exchange rate movements and the timing of the business cycle also explain the observed downward trend in profitability of the top Japanese firms.

Considering the trend in profitability in the USA, it is unclear the extent to which the increase in competition at world level which resulted from globalisation and deregulation in many country markets has squeezed the "structural" profit margins of the world's largest firms, though this may have played a role in Europe and in Japan.

The long term borrowing to total assets ratio of the largest USA firms has been falling regularly from its peak of 21.7 % in 1990-91 to just above 20 % in 1993. The same indicator for the Japanese firms increased consistently over the period considered and is now close to the USA level, at 19.8 %. In Europe, a high self financing ratio and comparatively low indebtedness level of the larger companies, along with low investment levels, has made it possible to keep the long term borrowing to total assets ratio stable. At 14.5 %, this ratio is well below the level in either the USA or Japan. This, however, is both a positive and a negative point for EU businesses: on the one hand, the low level of indebtedness makes European firms financially sturdier than their competitors, but on the other hand this does reflect a structurally (too) low level of investment in fixed capital by the European firms.

**Table 1: The top 200 companies at world level**

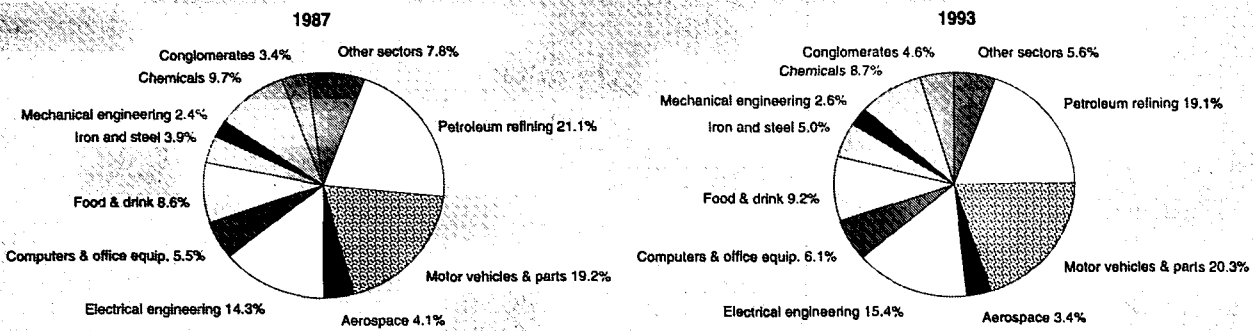
(number)	1986	1987	1988	1989	1990	1991	1992	1993
Europe	73	74	76	76	79	77	76	71
USA	79	74	71	72	68	64	63	65
Japan	36	40	43	40	40	46	49	52
Other	12	12	10	12	13	13	12	12

Source: DABLE





**Figure 3: The 200 largest industrial groups in the world  
Turnover by sector**



Source: DABLE

As profit margins were being squeezed in the early 1990s, many European companies engaged in a second wave of rationalisation and restructuring. This 'survival strategy' has taken the form of divestment of non-strategic units, some (generally limited to only a few sectors) acquisitions of business units seen to represent a good potential for economies of scale or synergies, and cost reductions, in particular labour cost reductions. A good indication of the magnitude of the efforts undertaken is provided by the fact that, contrary to what usually happens in business cycles, the average labour productivity in the top firms did not fall when production and sales started to weaken, but rather increased throughout the recession. This trend was observed in all three regions considered (the USA, Europe and Japan), indicating that labour shedding was both significant and spread out.

Other expenditure items which were cut as part of the cost saving efforts were fixed investment in new capacity and some renewal and modernisation investment, as indicated by the fall in the share of investment in turnover in many sectors of the European economy. One exception was expenditure on R&D, which continued to grow in a number of critical sectors in Europe, in particular in the pharmaceuticals and electrical equipment sectors. Thus, despite the recession in a number of technology intensive sectors, the larger EU companies are still spending a comparatively higher share of their turnover on R&D than their competitors. There are nevertheless three sectors in which the European R&D efforts remain well beyond those of their world competitors: these are computers and office equipment, instrument engineering and advanced materials (part of which are in the rubber and plastics sector, and part in the stone, clay and glass sectors).

The restructuring moves which were undertaken by most of the top firms in the early 1990s have started to bear fruit. In the USA, the financial situation of the larger companies started to improve as early as in 1992, whereas in Europe this was the case as of 1993 (Table 2).

This can be seen in particular through the reduction in the number of companies from those regions which reported losses in those two years (Table 2). Not surprisingly given the very low average profitability ratio of the Japanese firms, the number of Japanese firms in the top 200 reporting a loss continued to increase in 1993, reaching 13 or nearly one in four of all Japanese companies in the world top 200.

The breakdown of turnover of the world's top 200 industrial groups by sector in 1987 and 1993 is illustrated in Figure 3. In 1993, the larger automotive producers accounted for 20.3 % of the total turnover of the world's top 200 firms, followed by the electrical engineering and petroleum refining companies.

This ranking is quite different from that observed in 1987. Between 1987 and 1993, indeed, the weakening of oil prices limited the growth in the turnover of the larger oil and chemical companies and made these firms lose their first place in the ranking. The motor vehicles and parts sector thus became the sector with the highest turnover within the world's top 200 ranking, despite a relatively poor sales performance over the period 1990-1993. In fact, nearly all the sectors listed in Figure 3 increased their share of turnover in the world top 200 ranking, with the exception of the chemical sector and "other" industries. In many of the above cases, intense M&A activity by the top firms boosted the combined turnover of the companies within these sectors. It is interesting to note

**Table 2: Groups showing a loss**

Year	Total	Europe	USA	JPN	Others
1986	21	8	5	7	1
1987	9	6	2	1	0
1988	7	4	3	0	0
1989	7	2	5	0	0
1990	15	6	7	2	0
1991	36	12	18	4	2
1992	45	21	12	11	1
1993	38	18	6	13	1

Source: DABLE

**Table 3: The largest industrial groups in the world, 1993**

The 25 largest profit earners				The 25 most profitable			
		Net income (million ECU)				Net income/Turnover (%)	
1	Royal Dutch Shell	EUR	7 425	1	Intel	USA	26.1
2	Exxon	USA	4 510	2	Glaxo Holdings	EUR	24.5
3	General Electric	USA	3 779	3	Merck & Co	USA	20.6
4	Philip Morris	USA	3 047	4	American Home Products	USA	17.7
5	Ford Motor	USA	2 160	5	Roche Holding	EUR	17.3
6	General Motors	USA	2 106	6	Bristol-Myers Squibb	USA	17.2
7	Chrysler	USA	2 062	7	Abbot Laboratories	USA	16.6
8	Intel	USA	1 960	8	Coca-Cola	USA	15.7
9	Coca-Cola	USA	1 869	9	Smithkline Beecham	EUR	13.7
10	Merck & Co	USA	1 850	10	Johnson & Johnson	USA	12.6
11	Mobil	USA	1 780	11	Sandoz	EUR	11.3
12	Bristol-Myers Squibb	USA	1 673	12	B.A.T. Industries	EUR	10.3
13	Glaxo Holdings	EUR	1 672	13	BTR	EUR	9.6
14	Nestlé	EUR	1 669	14	General Electric Co (UK)	EUR	9.3
15	Unilever	EUR	1 662	15	Royal Dutch Shell	EUR	9.1
16	Amoco	USA	1 554	16	Minnesota Mining & Mfg.	USA	9.0
17	Johnson & Johnson	USA	1 537	17	Pfizer	USA	8.8
18	B.A.T. Industries	EUR	1 500	18	Emerson Electric	USA	8.7
19	Roche Holding	EUR	1 432	19	American Brands	USA	8.1
20	Pepsico	USA	1 356	20	Ciba-Geigy	EUR	7.9
21	American Home Products	USA	1 255	21	Broken Hill Proprietary	AUS	7.8
22	Abbot Laboratories	USA	1 195	22	Hanson	EUR	7.6
23	Toyota Motor	JPN	1 166	23	Raytheon	USA	7.5
24	Chevron	USA	1 080	24	General Electric Co (US)	USA	7.4
25	Minnesota Mining & Mfg	USA	1 078	25	Amoco	USA	7.2
Number of representatives:		EUR	6	Number of representatives:		EUR	10
		USA	18			USA	14
		Japan	1			Japan	0
		Others	0			Others	1
The 25 richest				The 25 biggest employers			
		Net worth (million ECU)				(employees)	
1	Royal Dutch Shell	EUR	44 730	1	General Motors	USA	711 000
2	Toyota Motor	JPN	30 980	2	Pepsico	USA	423 000
3	Exxon	USA	29 720	3	Siemens	EUR	391 000
4	Pemex	MEX	29 642	4	Daimler-Benz	EUR	366 736
5	Matsushita Electric	JPN	26 420	5	IRI	EUR	366 471
6	Hitachi	JPN	23 771	6	Hitachi	JPN	330 637
7	General Electric	USA	22 059	7	Ford Motor	USA	322 213
8	Petroleos de Venezuela	VEN	20 623	8	Unilever	EUR	302 000
9	IBM	USA	16 861	9	FIAT	EUR	261 500
10	Mobil	USA	14 724	10	IBM	USA	256 207
11	Ford Motor	USA	14 549	11	Matsushita Electric	JPN	254 059
12	Elf Aquitaine	EUR	12 700	12	Volkswagen	EUR	251 643
13	British Petroleum	EUR	12 508	13	Philips Electronics	EUR	238 469
14	Chevron	USA	11 956	14	General Electric	USA	222 000
15	Amoco	USA	11 673	15	Nestlé	EUR	209 755
16	Petrobras	BRA	10 738	16	ABB Asea Brown Boveri	EUR	206 490
17	Sony	JPN	10 680	17	Alcatel Alsthom	EUR	196 500
18	Roche Holding	EUR	10 357	18	Samsung	KOR	191 303
19	Nissan Motor	JPN	10 136	19	B.A.T. Industries	EUR	190 308
20	Philip Morris	USA	9 932	20	Toshiba	JPN	175 000
21	Ciba-Geigy	EUR	9 875	21	Philip Morris	USA	173 000
22	Siemens	EUR	9 809	22	Hoechst	EUR	170 161
23	E.I. Du Pont De Nemours	USA	9 592	23	United Technologies	USA	168 600
24	FIAT	EUR	9 471	24	Robert Bosch	EUR	156 615
25	Bayer	EUR	9 141	25	Bayer	EUR	151 900
Number of representatives:		EUR	8	Number of representatives:		EUR	14
		USA	9			USA	7
		Japan	5			Japan	3
		Other	3			Others	1

Source: DABLE

that even the iron & steel sector saw its share of the total turnover of the top companies increasing, despite the very weak sale and production performance of the sector as a whole. The ferrous metals industry, which has seen many concentration moves since 1986, had more firms in the top 200 list in 1993 than in 1987 and the combined turnover of these firms had increased from 95.3 billion ECU to 167.3 billion ECU in 1993.

The larger companies from all three regions reported a lower rate of return on sales (ROS) in 1993 than in 1987, with only a few exceptions. The trend in profitability between 1992 and 1993 was, however, very different by sector and by region. In the USA, the improvement in the financial situation of the larger firms in 1993 was felt by the companies from nearly all sectors. Notable exceptions were the computer and office equipment sector, where increased competition at world level triggered a price war which squeezed margins for all producers, along with apparel and paper manufacturing, two industries highly vulnerable to competition from imports. The USA autos sector, however, continued to improve its financial performance and moved back to profit, posting a return on sales of 2.3 % in 1993 following figures of -0.7 % in 1992 and -2.9 % in 1991.

In Europe, five sectors reported losses in 1993. These were computer and office equipment, aerospace, metals, motor vehicles & parts and rubber and plastics. In the case of the aerospace sector, the total loss of the top European producers in 1993 was nevertheless much lower than that recorded in 1992, indicating that the restructuring measures undertaken by the top companies in the sector have started to bear fruits. The highest profit makers (measured by the rate of return on sales (ROS)) in Europe were the printing and publishing sector, followed by tobacco products manufacturing and chemicals (including pharmaceuticals).

Within Europe, the largest groups in terms of turnover are from Germany, France and the UK, in that order (Table 5). Together, the top companies of those three countries accounted for close to 70 % of the total turnover of Europe's top 200 firms in 1993, the same share as in 1987. Two other countries which also host a large number of Europe's top firms are Italy and the Netherlands, along with Switzerland. The Netherlands is, in fact, home to a number of Europe's largest oil and chemical companies (Royal Dutch Petroleum, Unilever, Akzo, DSM), as well as to other giant corporations such as Philips (electrical engineering), Hoogovens (metals) and Heineken (food and drink). Switzerland hosts two of the world's best known companies, Nestlé and ABB, as well as several large chemical firms such as Ciba-Geigy, Sandoz, and Roche, amongst others.

As in 1993, the largest profit earner in the world was a European company, Royal Dutch Shell. The second European company ranked by profit, however, only ranked 13th in the world ranking: this was Glaxo of the UK, now the world's largest pharmaceutical company. In total, there were only 6 European companies amongst the top 25 largest profit earners in 1993, two less than in 1992 (Table 3).

Most of the companies in the list of largest profit earners are from the oil, chemicals and food and drink sectors, alongside a few equipment producers such as Toyota Motor. Toyota was, in fact, the only Japanese firm in the list.

It is interesting to compare the list of largest profit earners with that of the most profitable companies at world level. First of all, there were no Japanese companies amongst the 25 most profitable companies at world level in 1993: Fuji Photo Film, which ranked 23d in 1992, has since disappeared from the top 25 ranking. Secondly, only eleven of the world's biggest profit earners rank amongst the 25 most profitable firms: these are all the pharmaceutical companies in the list of largest profit earners, along with a few diversified chemical

companies such as Johnson and Johnson and B.A.T. Industries, along with the giant soft drinks company Coca Cola, and the electronics giant Intel. PepsiCo, which is the 20th biggest profit earner in the world, does not rank amongst the list of most profitable companies, contrary to its rival Coca Cola. None of the oil companies which dominate the ranking of the largest profit earners are amongst the "most profitable" firms, as the average profit ratio in the petroleum refinery sector is generally low.

Below, we look at the overall performance of the world's top 200 firms by main sector of activity. The next section will then focus on the relative performance of the largest European companies, both by country of origin and by sector.

## Sector profiles

### *Petroleum refining*

The world energy sector is dominated by a few large companies, most of which have important transnational operations and some of which are still owned or largely controlled by government. Healthy economic growth in the second half of the 1980s combined with low energy prices hence lower incentives to conserve energy led to a healthy growth in turnover of the top energy companies. As a result, the number of energy companies in the top 200 world ranking and in Europe's top 200 list increased during the decade of the eighties, then stabilised in the early nineties. In 1993, there were 30 petroleum refinery groups in the list of the world's 200 largest firms.

Because oil prices have remained low for a number of years, however, and there have been comparatively fewer mergers/acquisitions in this sector than in manufacturing, the share of total turnover generated by the larger European oil producers in the total output of the world's largest petroleum refineries has remained broadly stable between 1987 and 1993, at around 37.5 %. Over the period, the turnover of the top firms increased by 5 % per year on average, reaching 670.4 billion ECU in 1993.

The USA companies seem to be the ones which suffered the most from the recent economic downturn: although their situation in 1993 improved significantly over 1992, with an 8.8 % increase in the combined turnover of the top 10 USA refineries increased by 8.8 % (which compares with a figure of 3.1 % for Europe), their share of the total turnover of the world's largest 30 petroleum refineries is, at 38.8 %, well below the 1987 figure of 46.6 %. The most impressive increase in relative market share over the period has been that of the Japanese and Korean producers, whose top companies posted a 29 % growth in turnover in 1993 over 1992. These companies now account for close to 16 % of the total turnover of the top oil producers.

In 1993, there were six Japanese and two Korean companies in the ranking of the 30 largest petroleum refineries: the larger of these were Nippon Oil, which ranked 11th, and Japan Energy which ranked 15th. The largest Korean refinery, Sunkyong, ranked 16th.

Exxon of the USA, which was already at the top of the list in 1992, remained the leader in 1993 with a turnover of 83.6 billion ECU. It was closely followed by Royal Dutch Shell at 81.3 billion ECU. The difference in turnover of the two groups has thus shrunk again from the 6.5 % difference of 1992. In fact, in 1990, it was Royal Dutch Shell which led the world ranking both in this and in all sectors.

As indicated above, the total turnover of the larger USA refineries increased much more rapidly than that of the larger European firms, between 1992 and 1993, largely because of the faster economic growth in the USA in that year. A direct result of this is that the difference between the average size of the top USA and European oil groups has shrunk. In 1993, the average USA oil company had a turnover of around 26 billion ECU, compared with a figure of 28 billion ECU for

the average EU oil refinery group. In comparison, the Japanese and Korean top producers are still much smaller, at 13.2 billion ECU or about half the size of the EU companies.

### Iron and steel

Between 1987 and 1993, the total turnover of the world's largest metal producers increased at an average annual rate of 9.8 %, which brought their share of total turnover from 3.9 % to 5 %. This rapid growth reflects in part the increase in the number of companies in the list (from 13 in 1987 to 15 in 1993) and, mainly, intense ownership restructuring activity amongst the top firms: as competitive pressures were rising, both because of the arrival of Central and Eastern European producers on the market and because of the weakening of demand, the top western producers engaged in major restructuring efforts, diversifying away from basic metals production and moving upstream in their product lines.

The heightening of competition at world level is highly notable in Figure 5, even though this only shows the regional market shares of the top 15 producers and not the market shares of all producers in the sector (hence, East European production is not accounted for in Figure 5). Between 1987 and 1993, thus, the share of the European producers' turnover decreased moderately, by one percentage point, while that of the USA fell from 13.9 % to 4.6 %. This, in fact, prompted the USA to tighten restrictions on imports of steel into the USA in that year, which created some disruptions on the trade front.

The financial performance of the larger iron and steel manufacturers has deteriorated significantly over time, such that in 1993 all three regions reported a negative ROS in this sector (-1.3 % in Europe, -0.7 % in the USA and -1.0 % in Japan). As a matter of fact, amongst the largest 10 world

ferrous metals producers only two reported profits in 1993. These were VIAG of Germany and Broken Hill Proprietary of Australia. The largest deficit was reported by the French company Usinor Sacilor, at 920 million ECU, a ROS of -8.1 %.

Figure 5 also shows the relative dominance of the Japanese producers in this sector.

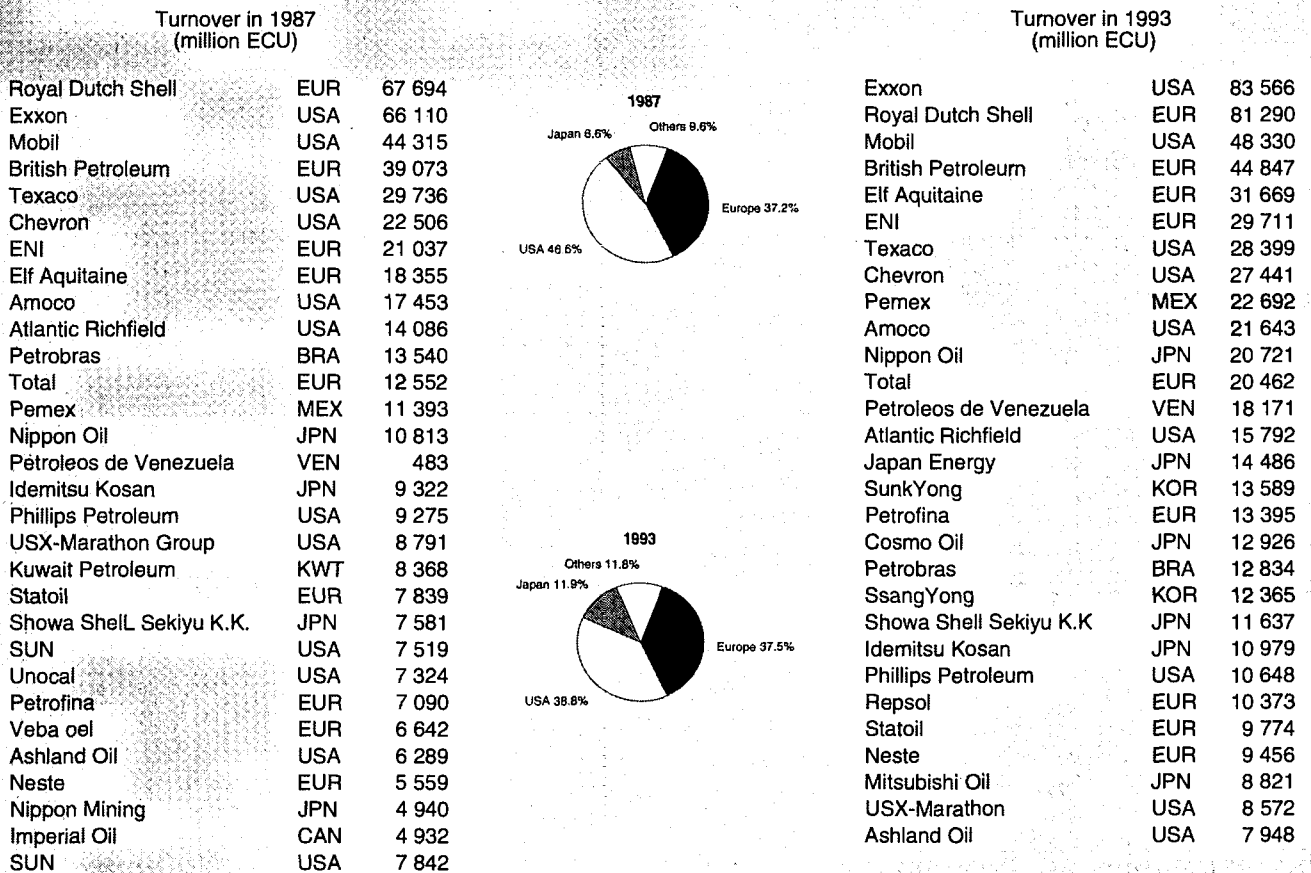
Among the 15 world largest basic metal producers in 1993, seven were from Japan. The first two Japanese producers ranked in 1st and 3d place respectively. Thyssen, the largest European metal producers, ranked second at world level, as in 1987, whereas Usinor Sacilor receded in 5th position behind VIAG of Germany.

Although they dominate the world ranking and their share of total turnover by the top firms remains high, the largest Japanese producers were not sheltered from the recession which badly hit their client industries. The steady appreciation of the Japanese Yen throughout the period also contributed to dampen the companies' financial situation, bringing all five major producers into the red in 1993. As demand prospects remained dull, a number of them announced large job cuts spread over 1994-96, similarly to the situation in both the USA and Europe.

### Chemicals

The total turnover of the world's largest chemical companies (including the pharmaceutical producers) increased by 30 % between 1987 and 1993, a 4.5 % average annual rate of growth, less than the average for all the top firms. As a result, the share of turnover by the top firms which was accounted for by the largest chemical producers decreased, from 9.7 % in 1987 to 8.7 % in 1993. The trend in turnover between 1992

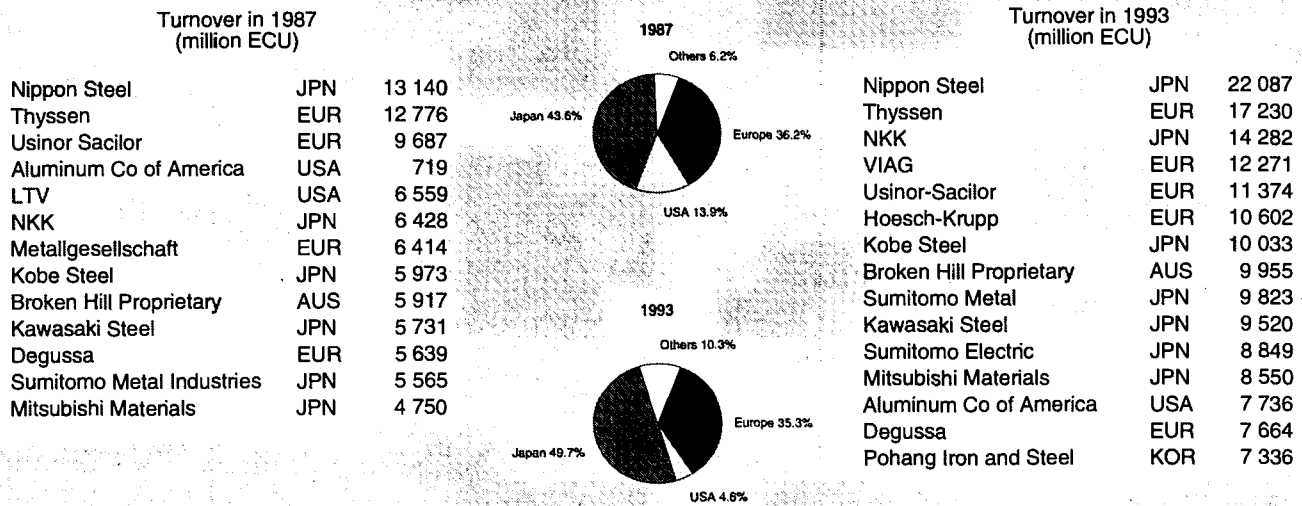
Figure 4: Petroleum refining



Source: DABLE



**Figure 5: Iron and steel**



Source: DABLE

and 1993 was, at 5 %, not significantly different from the average over the previous 5-year period.

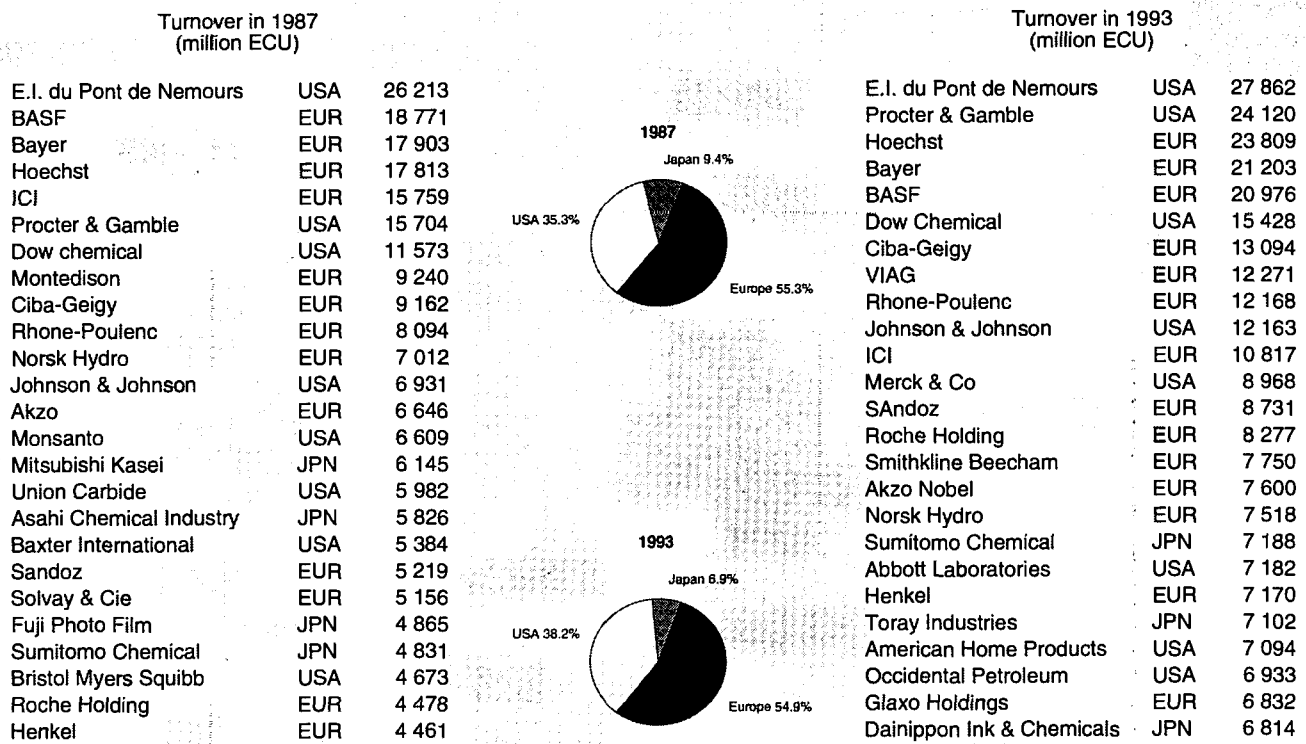
The regional shares of total turnover did not change significantly, however, with the European companies still accounting for about 55 % of the total sales of the largest world chemical producers.

The trend in the overall chemical sector masks very different performances across markets, however, as the pharmaceutical companies distinctly out performed the companies from the

basic chemicals or other specialty chemicals sector. Sales by the world's largest pharmaceutical producers thus increased at a steady rate throughout the period, while those of the basic chemical producers were much more vulnerable to the downturn.

The average financial performance of the world's largest chemical producers was also exacerbated by the overcapacity problems which plagued financial results in the basic chemicals segment and resulted in a fall in the prices of a number of key products.

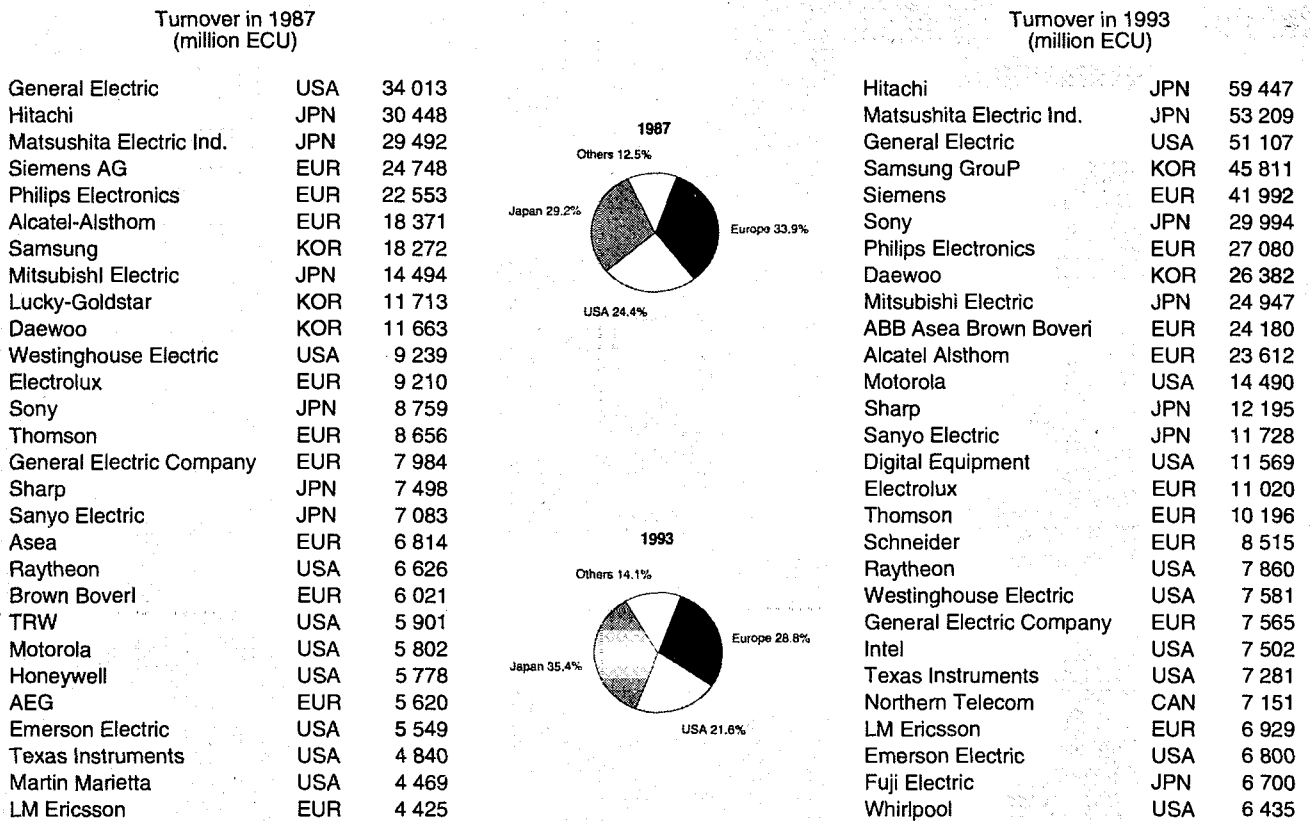
**Figure 6: Chemicals**



Source: DABLE



**Figure 7: Electrical and electronic engineering**



Source: DABLE

### Electrical and electronic engineering

The electrical and electronic engineering sector is a highly globalised industry at world level, dominated by a number of R&D intensive large companies. In 1993, among the 200 largest world enterprises ranked by turnover, 28 were from the electrical and electronic engineering sector. Nine of these were from Japan or Korea, nine from western Europe and 10 from the USA. The Japanese companies have grown faster than their competitors over the past years despite the constant appreciation of the Yen, as indicated by the growing share of the total turnover of the larger Japanese firms in this sector. Between 1987 and 1993, this share increased from 29.2 % to 35.4 % at the expense of both the European and the larger USA companies (Figure 7).

Between 1987 and 1993, the combined turnover of the larger firms in this sector increased by 8.9 % per year on average. The fastest growth rate was recorded by the Korean and Japanese companies, whose combined turnover grew at an average annual rate of 11.7 % over the period. In contrast, the turnover of the larger European electrical and electronic engineering producers grew at only 5.9 % per year on average, and slowed further, to less than 1 % in 1993 compared to a rate of 3.9 % for the larger Japanese and Korean companies in the same year. Hence, despite numerous acquisitions and major efforts to improve competitiveness and market share by streamlining costs and relocating part of the production to low-cost countries, the larger European electronic equipment manufacturers continue to lose ground in world markets.

The efforts made by the larger European firms are most visible in the rising share of R&D expenditure in turnover. In 1993, Europe's largest electrical and electronic equipment producers invested 6.9 % of their turnover in R&D on average, compared to a figure of 5.5 % for the larger USA companies and 4.8 % for the leading Japanese producers. Although these efforts

may bear fruit in the longer term, in the short term this does not seem to have given European companies a distinct comparative advantage.

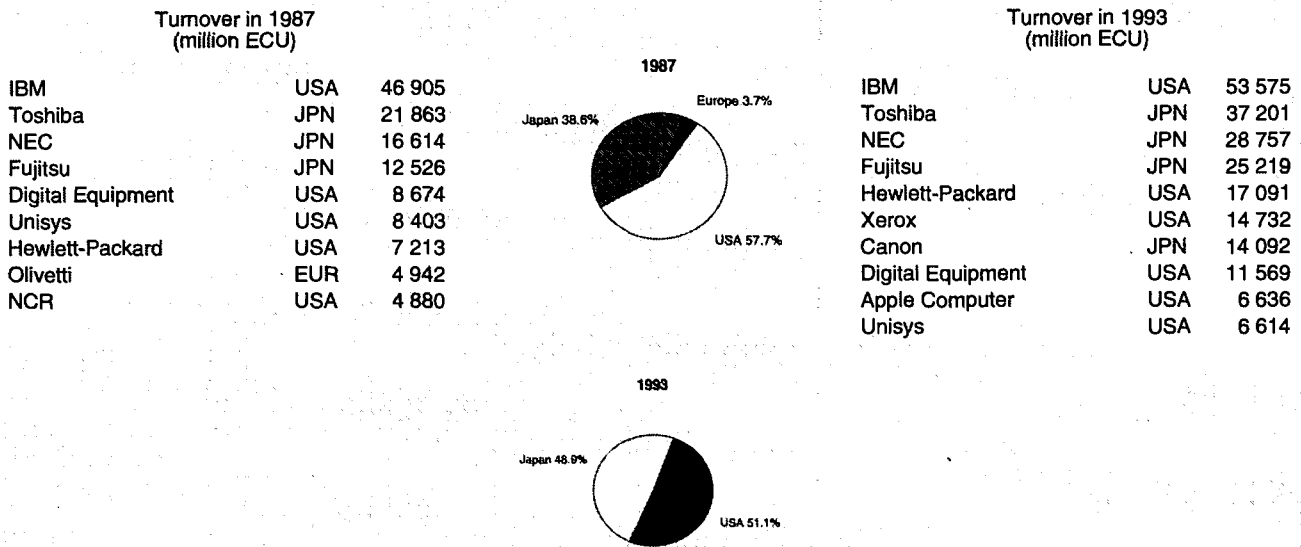
The growing competition in this market partly takes the form of a race for innovation, and partly of intense competition on prices. As a result, the profit margins of the larger producers in both Europe and Japan have progressively been squeezed over time. In Europe, the ROS fell from 2.5 % in 1989 to 1.4 % in 1993, whereas in Japan, it fell from 3.1 % in 1989 to 0.6 % only in 1993. Only the USA companies seem to have been able to maintain a high profit margin in this sector. This reflects the fact that most of the larger American companies in the list are manufacturers of equipment for industry as opposed to equipment for consumers, the latter being a sector with a much lower average profit margin.

The three firms which lead the 1993 ranking are Hitachi and Matsushita Electric of Japan, followed by General Electric of the USA. The first European company, Siemens, ranked fifth based on turnover, while Philips Electronics, the second largest European producer, ranked 7th. Between 1987 and 1993, there were relatively few changes at the top in this sector, the three leading firms being exactly the same. Two of the companies which were classified in this sector in the 1993 edition of the Panorama have since been re-classified into the computer and office equipment sector: these are NEC and Toshiba.

### Computers and office equipment

The world computer and office equipment market is dominated by only two players: the USA and Japan. Europe's Olivetti, which ranked 8th at world level in 1987, has since disappeared from the list of world top 200 companies based on turnover, and thus does not appear in Figure 8 in 1993.

**Figure 8: Computer and office equipment**



Source: DABLE

The total turnover of the largest firms in this sector was more or less evenly distributed between the top USA and Japanese companies, the sectoral leader being IBM of the USA, followed by Toshiba and NEC of Japan. IBM's position as world leader remains unchallenged, however, as its turnover of 53.6 billion ECU was still a comfortable 44 % higher than that of number two Toshiba.

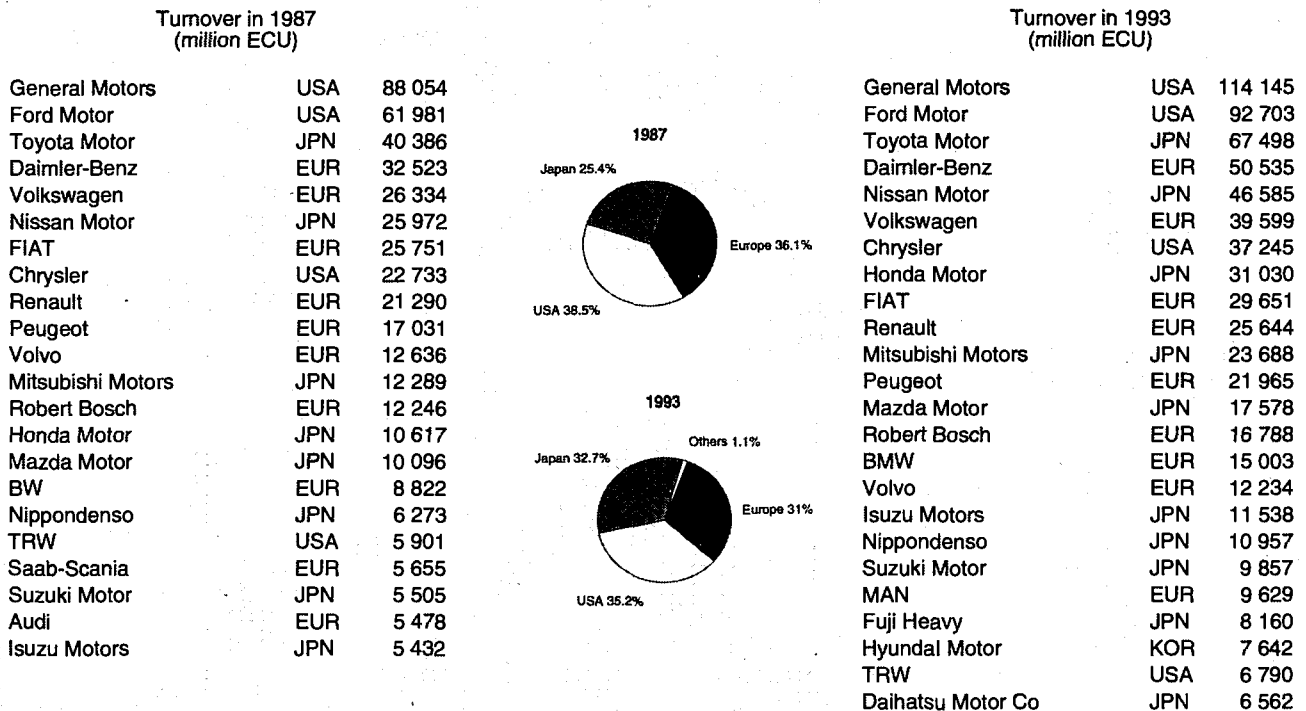
Between 1987 and 1993, the combined turnover of the largest companies in this sector increased by 8.5 % per year on average, to 215.5 billion ECU in 1993. Newcomers in the list of largest manufacturers since 1987 are Apple Computer, along

with Xerox and Canon which increased their presence in this market from being more traditional electrical equipment suppliers.

**Motor vehicles and components**

The triad's dominance of the world automotive and parts market is beginning to be challenged, with Hyundai Motor of Korea having made its entrance in the list of the world top 200 industrial companies. Hence, whereas until the late 1980s the three main producers, the USA, Japan and Europe more or less evenly divided the world automotive market amongst

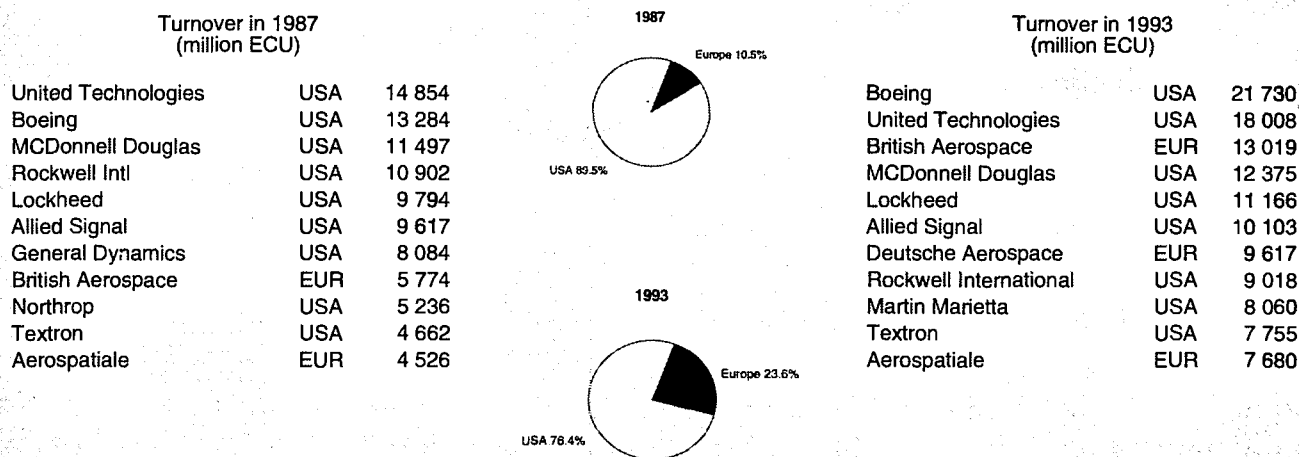
**Figure 9: Motor vehicles and components**



Source: DABLE



Figure 10: Aerospace



Source: DABLE

themselves, in 1993 Korea's Hyundai accounted for 1.1 % of the combined turnover of the 24 largest producers. The rise in the Japanese companies' market share is the other notable trend in Figure 9, this share having risen from 25.2 % in 1987 to 32.7 % in 1993. Between 1987 and 1993, the total sales of the larger firms in this sector increased by 7.5 % per year on average, the trend being distinctly faster in the first part of the period than in the second, and this for two reasons: first, demand itself slowed down in most regions after 1990, whereas secondly intense M&A activity amongst the top firms reduced the number of players and created more global firms. This was especially the case in Europe, where the number of producers in the world top 200 decreased by one (from 10 to 9) but the average size of these players grew significantly, from 16.8 billion ECU in 1987 to 24.6 billion ECU in 1993.

All the figures relating to the financial performance of the major European automotive producers in 1993 point to the difficult period that the industry is only now emerging from. The average ROS of the top European automotive producers was -1.0 % in 1993, compared to a figure of +0.4 % in Japan and +2.3 % in the USA. The company having posted the largest loss was Volvo (with a ROS of -3.1 % in 1993), followed by Volkswagen (-2.7 %). Two other EU companies (Fiat and Peugeot) reported small losses while the others reported a low profit. This is itself quite an achievement, given that the combined turnover of the main European automotive producers fell by 3.5 % in the year to 1993. Both investments in fixed capital and in R&D decreased in that year though the European R&D ratio in this sector remains well ahead of that of its two main competitors (5.2 % in 1993 in Europe compared with 4.1 % in the USA and 3.9 % in Japan).

General Motors remains the world's largest automotive producer, with a total world-wide turnover of 114.1 billion ECU, well ahead of the number two Ford Motor, whose turnover amounted to 92.7 billion ECU in the same year. The largest European producer, Daimler-Benz, ranked 4th with a turnover of 50.5 billion ECU, less than half that of General Motors. Although there have been a few changes in position at the top, the largest 10 automotive producers in 1993 were the same as in 1987.

#### Aerospace equipment

The world aerospace equipment market remains dominated by the top USA producers, who accounted for 74 % of the global turnover of the world's 11 largest aerospace producers in 1993. Their share has been falling progressively over time, however, as the three main European producers British Aero-

space, Deutsche Aerospace and Aérospatiale were reinforcing their presence in the world market. The European's relative expansion experienced a setback in 1993, however, as the difficulties experienced by many airlines in Europe combined with unfavourable exchange rate movements led to a major slowdown in European sales expansion: in that year, the total sales value of the three above-mentioned European companies only grew by 1.9 %, which compares with an average annual growth in turnover of the largest 11 companies of 4.6 % per year on average over the period 1987-93.

The very strong competitive pressures to which the sector is subject due to the continuous depreciation of the dollar are also notable through the comparison of the average profit ratios of the USA and European producers. Despite on-going cost control and restructuring efforts, the top European producers experienced a combined loss equivalent to 1.6 % of their 1993 turnover, which compares with a figure of +3.4 % in the USA that same year. The fact that the aerospace sector is one of the few sectors in the USA which actually reported a higher ROS in 1993 than in 1989 is highly significant in this respect.

Although they have been growing in size both through internal growth and ownership restructuring, the largest European aerospace producers remain smaller on average than their USA rivals. The average size of the largest three European aerospace manufacturers was 10.1 billion ECU, compared with a figure of 12.3 billion ECU for the USA.

#### Food, drink and tobacco

The food, drink and tobacco sector is one of those sectors which increased its share of the total turnover of the world's largest 200 companies, despite the fact that this is by nature a slow growing demand sector: between 1987 and 1993, the combined turnover of the world's largest food companies grew at an average annual rate of 7.7 %, i.e. faster than that of traditionally more dynamic sectors such as the automotive or aerospace industries.

The reasons for this comparatively faster growth are two fold. First, the sector is less cyclical than the equipment sectors, hence it suffered less from the downturn of the early 1990s. Secondly, this reflects the external growth strategies pursued by many companies in this sector, in particular by the European companies which grew through cross-border acquisition following the launch of the Internal Market programme. In 1993, for example, BSN, Grand Metropolitan and Cadbury Schweppes all acquired plants in India and China. BSN also expanded into Eastern Europe, through the acquisition of the largest dairy products plant in Hungary.



The largest world producer in this sector in 1993 was Philip Morris of the USA, with a turnover of ECU 43.2 billion, followed by two European food companies, Unilever and Nestlé. Philip Morris was particularly aggressive on the cigarette market, pursuing a strategy of price cuts to boost market share, and succeeding at it. Philip Morris also merged Kraft General Foods Europe and Jacobs Suchard in that year, creating a global multinational in Europe. These three companies already lead the ranking in 1992, in the same order. In total, among the top 22 firms in this sector in 1993, seven were European, two Japanese and 12 were from the USA. This compares with seven European companies, one Japanese, 14 USA and one South African company in 1987.

Profit margins in the food, drink and tobacco producing sector have traditionally been relatively high, but even so they have shrunk significantly between 1989 and 1993, both in Europe and in Japan. Again, only the USA companies saw an improvement in their profit margins over the period considered, thanks to their relatively strong internal market and to the limited degree of competition from imports in this low-trade intensity sector.

## EUROPE'S TOP 200 FIRMS

### Overall performance

In 1993, the total turnover of Europe's largest 200 largest companies amounted to 2 028 billion ECU, i.e. about 42 % of EU's GDP. Table 16 lists Europe's 200 largest manufacturing and services companies by country in 1987 and in 1993 respectively. Important acquisition moves by some of the larger Swiss companies (many of which are involved in the pharmaceutical sector) combined to exchange rate effects increased the Swiss companies' share of the total turnover of Europe's largest 200 companies. Similarly, acquisition moves by France's larger companies boosted the total share of Europe's turnover accounted for by the largest French producers. In contrast, the other countries' share of turnover shrank, the most important effect being observed in the UK, where the top companies' share of turnover has now fallen to 19 %,

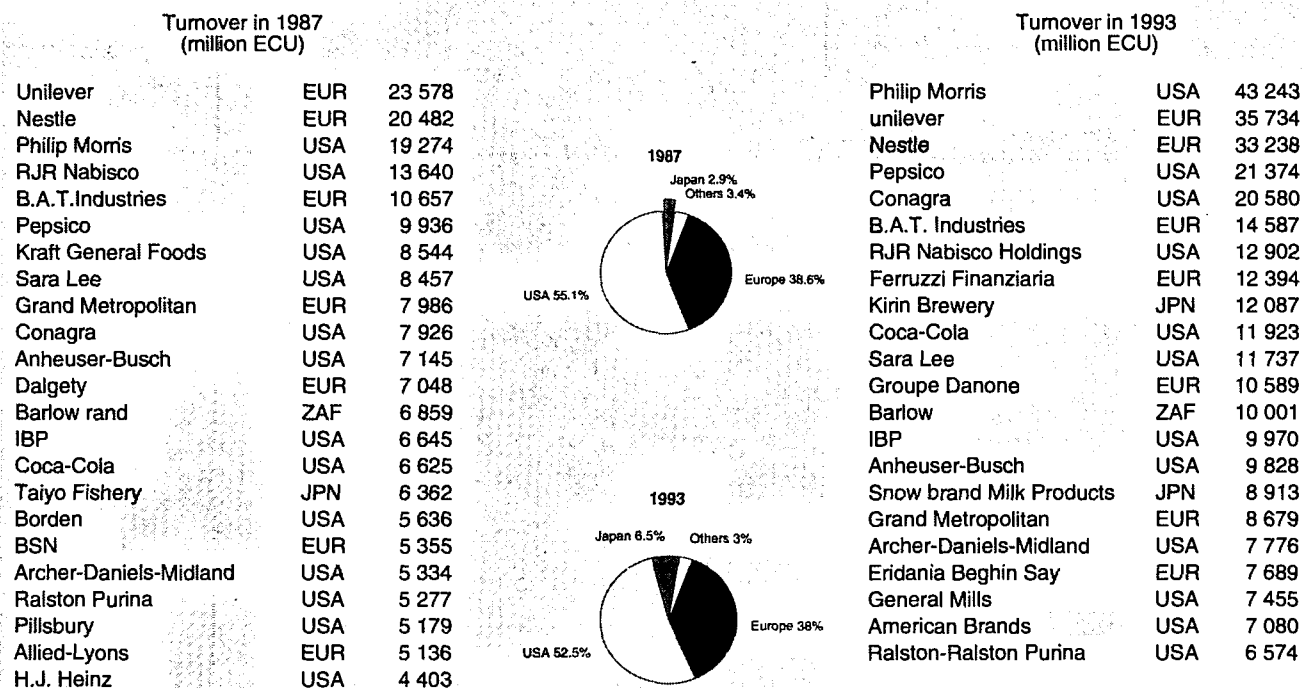
from 23.1 % in 1987. Although the UK economy strengthened in 1993, one year before the other European economies, a number of UK companies were acquisition targets for non-UK firms, while the petroleum refineries which dominate the UK list of top companies reported a poor sales performance in that year. Thirdly, exchange rate movements in 1993 played against the UK companies' financial performance when measured in current ECU.

Compared to the rest of the world, the breakdown of Europe's largest companies by sector is much more varied - implying that many sectors which are highly concentrated in the rest of the world have not yet reached the "critical size" in the EU (Figure 13). Petroleum refining companies for instance, which account for nearly one fifth of the total turnover of the world's top 200 firms, account for less than 13 % of the global turnover of Europe's top 200 companies. And indeed, excessive fragmentation is one of the factors frequently quoted as negatively influencing the relative competitiveness of Europe's petroleum refineries compared to their competitors in the USA or Asia.

In the motor vehicles sector also, the relative fragmentation of industry in Europe (mainly of the automotive components part of the industry) is reflected by the fact that the "large" European automotive producers only account for about 10 % of the total turnover of Europe's top 200 firms, whereas the equivalent share at world level is more than 20 %.

The sectoral distribution of companies in the top 200 list in Europe is broadly similar in 1993 to that observed in 1987, with one notable exception, which is the telecommunications sector. This sector's share of the total turnover of the top 200 European companies more than doubled thanks to rapid growth in demand and sales, and to cross-border ownership restructuring following the liberalisation and deregulation of the sector in Europe. The automotive sector, in contrast, saw its share of the total falling by two points due to a poor sales performance over the second half of the period.

Figure 11: Food, drink and tobacco



Source: DABLE

**Table 4: The world's 200 largest industrial groups, 1993**

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
1	General Motors	USA	114 145	2 106	5 166	711 000	1.5	Motor vehicles & parts
2	Ford Motor	USA	92 703	2 160	14 549	322 213	1.3	Motor vehicles & parts
3	Exxon	USA	83 566	4 510	29 721	91 000	6.3	Petroleum refining
4	Royal Dutch Shell	UK/NL	81 290	7 426	44 731	117 000	8.6	Petroleum refining
5	Toyota Motor	JPN	67 498	1 167	30 980	73 046	1.9	Motor vehicles & parts
6	Hitachi	JPN	59 447	548	23 772	330 637	0.8	Electrical engineering
7	IBM	USA	53 575	-6 823	16 861	256 207	-9.8	Computers & office equip.
8	Matsushita Electric	JPN	53 209	197	26 421	254 059	0.3	Electrical engineering
9	General Electric	USA	51 107	3 779	22 060	222 000	1.8	Electrical engineering
10	Daimler-Benz	D	50 535	311	9 092	366 736	0.6	Motor vehicles & parts
11	Mobil	USA	48 330	1 780	14 725	61 900	5.1	Petroleum refining
12	Nissan Motor	JPN	46 585	-698	10 136	143 310	-1.2	Motor vehicles & parts
13	Samsung	KOR	45 811	464	6 489	191 303	1.1	Electrical engineering
14	IRI	I	45 080	-5 556	N/A	366 471	N/A	Conglomerate
15	British Petroleum	UK	44 847	789	12 509	84 500	2.0	Petroleum refining
16	Philip Morris	USA	43 243	3 048	9 932	173 000	7.0	Food, drink & tobacco
17	Siemens	D	41 992	927	9 810	391 000	1.9	Electrical engineering
18	Volkswagen	D	39 599	-1 054	5 821	251 643	-2.6	Motor vehicles & parts
19	Chrysler	USA	37 245	2 063	5 840	128 000	5.8	Motor vehicles & parts
20	Toshiba	JPN	37 201	98	8 979	175 000	0.2	Computers & office equip.
21	Unilever	UK/NL	35 734	1 663	6 216	302 000	7.5	Food, drink & tobacco
22	Nestlé	CH	33 238	1 669	9 055	209 755	6.5	Food, drink & tobacco
23	Veba	D	31 692	427	7 801	128 348	1.5	Conglomerate
24	Elf Aquitaine	F	31 669	111	12 700	94 300	0.3	Petroleum refining
25	Honda Motor	JPN	31 030	190	7 771	91 300	0.8	Motor vehicles & parts
26	Sony	JPN	29 994	123	10 681	130 000	0.4	Electrical engineering
27	ENI	I	29 711	228	8 073	106 391	0.5	Petroleum refining
28	FIAT	I	29 651	-969	9 472	261 500	-2.1	Motor vehicles & parts
29	Nec	JPN	28 757	66	6 282	147 910	0.2	Computers & office equip.
30	Texaco	USA	28 399	912	8 781	32 514	4.0	Petroleum refining
31	E.I. Du Pont De Nemours	USA	27 862	474	9 592	114 000	1.5	Chemicals
32	Chevron	USA	27 441	1 081	11 957	47 576	3.6	Petroleum refining
33	Philips Electronics	NL	27 080	394	5 270	238 469	1.8	Electrical engineering
34	Daewoo	KOR	26 382	412	6 292	76 986	1.1	Electrical engineering
35	Renault	F	25 644	162	5 117	139 733	0.5	Motor vehicles & parts
36	Fujitsu	JPN	25 219	-303	8 498	54 091	-1.0	Computers & office equip.
37	Mitsubishi Electric	JPN	24 947	209	6 506	49 842	0.8	Electrical engineering
38	ABB Asea Brown Boveri	CH/S	24 180	58	3 013	206 490	0.3	Electrical engineering
39	Procter & Gamble	USA	24 120	213	5 897	104 941	1.1	Chemicals
40	Hoechst	D	23 809	295	5 773	170 161	1.4	Chemicals
41	Mitsubishi Motors	JPN	23 688	45	3 119	26 654	0.2	Motor vehicles & parts
42	Alcatel Alsthom	F	23 612	1 055	8 743	196 500	2.7	Electrical engineering
43	RWE	D	22 895	447	3 903	105 572	1.4	Conglomerate
44	Pemex	MEX	22 692	829	29 642	106 951	2.0	Petroleum refining
45	Mitsubishi Heavy	JPN	22 368	642	8 990	44 077	2.0	Mechanical engineering
46	Nippon Steel	JPN	22 087	-435	7 799	34 619	-1.2	Metallurgy
47	Peugeot	F	21 965	-213	7 633	143 900	-1.2	Motor vehicles & parts
48	Boeing	USA	21 730	1 063	7 823	125 500	6.1	Aerospace
49	Amoco	USA	21 643	1 555	11 673	46 317	6.4	Petroleum refining
50	Pepsico	USA	21 374	1 356	5 415	423 000	6.7	Food, drink & tobacco
51	Bayer	D	21 203	686	9 142	151 900	3.3	Chemicals
52	BASF	D	20 976	443	7 644	112 020	2.1	Chemicals
53	Nippon Oil	JPN	20 721	186	4 970	11 117	0.9	Petroleum refining
54	Conagra	USA	20 580	383	2 348	87 309	4.1	Food, drink & tobacco
55	Total	F	20 462	454	7 690	49 772	2.3	Petroleum refining
56	Petroleos de Venezuela	VEN	18 171	974	20 624	49 218	N/A	Petroleum refining
57	United Technologies	USA	18 008	416	3 224	168 600	3.3	Aerospace
58	Mazda Motor	JPN	17 578	-394	2 854	29 161	-3.2	Motor vehicles & parts
59	Thyssen	D	17 230	-535	1 823	136 975	-4.0	Metallurgy
60	Hewlett-Packard	USA	17 091	990	7 160	96 200	7.0	Computers & office equip.
61	Robert Bosch	D	16 788	200	4 052	156 615	1.5	Motor vehicles & parts
62	INI	E	15 917	-899	4 629	129 435	-3.2	Conglomerate
63	Atlantic Richfield	USA	15 792	230	5 234	25 100	1.1	Petroleum refining
64	Dow Chemical	USA	15 428	550	6 877	55 400	2.6	Chemicals
65	BMW	D	15 003	271	3 621	71 034	1.7	Motor vehicles & parts
66	Xerox	USA	14 732	-161	3 756	97 000	-0.5	Computers & office equip.



Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
67	B.A.T. Industries	UK	14 587	1 500	6 416	190 308	3.0	Food, drink & tobacco
68	Motorola	USA	14 490	873	5 475	120 000	7.6	Electrical engineering
69	Japan Energy	JPN	14 486	55	1 210	7 742	0.4	Petroleum refining
70	Mannesmann	D	14 458	-178	3 210	127 695	-1.3	Mechanical engineering
71	NKK	JPN	14 282	-324	3 280	22 214	-1.3	Metallurgy
72	Canon	JPN	14 092	162	5 537	64 535	1.0	Computers & office equip.
73	Eastman Kodak	USA	13 979	570	2 867	110 400	3.3	Instrument engineering
74	Sunkyong	KOR	13 589	48	2 956	21 299	0.4	Petroleum refining
75	Petrofina	B	13 395	177	3 133	14 696	2.0	Petroleum refining
76	Ciba-Geigy	CH	13 094	1 029	9 876	87 480	5.6	Chemicals
77	British Aerospace	UK	13 019	-275	1 938	87 400	-2.1	Aerospace
78	Cosmo Oil	JPN	12 926	70	1 272	3 648	0.7	Petroleum refining
79	RJR Nabisco Holdings	USA	12 902	-3	7 748	66 500	0.0	Food, drink & tobacco
80	Petrobras	BRA	12 834	587	10 738	N/A	3.3	Petroleum refining
81	Ferruzzi Finanziaria	I	12 394	-1 315	-919	41 392	-6.1	Food, drink & tobacco
82	McDonnell Douglas	USA	12 375	307	2 916	70 016	3.0	Aerospace
83	Ssangyong	KOR	12 365	74	3 185	25 470	0.7	Petroleum refining
84	Bridgestone	JPN	12 273	218	3 642	87 332	1.6	Rubber products
85	VIAG	D	12 271	131	2 289	80 683	1.1	Conglomerate
86	Hanson	UK	12 257	931	5 012	71 000	3.1	Conglomerate
87	Volvo	S	12 234	-381	2 981	73 641	-2.6	Motor vehicles & parts
88	Sharp	JPN	12 195	255	6 457	42 883	1.6	Electrical engineering
89	Rhone-Poulenc	F	12 168	225	4 973	81 678	1.3	Chemicals
90	Johnson & Johnson	USA	12 163	1 537	4 790	81 600	14.6	Chemicals
91	Ruhrkohle	D	12 103	6	895	111 150	0.0	Extraction
92	Kirin Brewery	JPN	12 087	329	4 974	8 242	3.1	Food, drink & tobacco
93	Preussag	D	11 978	121	1 635	73 319	1.3	Conglomerate
94	Minnesota Mining & Mfg	USA	11 976	1 079	5 563	86 168	10.4	Instrument engineering
95	Coca-Cola	USA	11 923	1 869	3 916	34 000	18.2	Food, drink & tobacco
96	Sara Lee	USA	11 737	567	3 146	132 545	6.5	Food, drink & tobacco
97	Sanyo Electric	JPN	11 728	-12	5 373	59 624	-0.1	Electrical engineering
98	International Paper	USA	11 690	247	5 318	72 500	1.7	Paper & paper products
99	Showa Shell Sekiyu k.k	JPN	11 637	60	1 312	2 364	0.9	Petroleum refining
100	Digital Equipment	USA	11 569	-202	3 933	95 809	-2.3	Computers & office equip.
101	Isuzu Motors	JPN	11 538	-32	426	13 084	-0.3	Motor vehicles & parts
102	Usinor-Sacilor	F	11 374	-920	2 278	67 984	-7.1	Metallurgy
103	Tenneco	USA	11 323	385	2 361	75 000	2.9	Mechanical engineering
104	Osterreichische Industrie	A	11 239	-546	1 187	64 859	N/A	Conglomerate
105	Lockheed	USA	11 166	360	2 087	83 500	4.7	Aerospace
106	Montedison	I	11 096	-742	1 067	32 774	-4.2	Chemicals
107	Electrolux	S	11 020	64	1 855	109 400	0.8	Electrical engineering
108	Idemitsu Kosan	JPN	10 979	10	500	5 273	0.1	Petroleum refining
109	Nippondenso	JPN	10 957	209	5 880	56 622	1.9	Motor vehicles & parts
110	ICI	UK	10 817	177	5 111	87 100	1.5	Chemicals
111	BTR	UK	10 807	1 036	2 697	129 814	9.0	Conglomerate
112	Saint-Gobain	F	10 805	198	4 902	92 348	1.4	Building materials
113	Phillips Petroleum	USA	10 648	237	2 605	19 400	2.6	Petroleum refining
114	Hoesch-Krupp	D	10 602	-321	865	78 376	-3.2	Metallurgy
115	Groupe Danone	F	10 589	497	4 820	56 419	4.2	Food, drink & tobacco
116	Repsol	E	10 373	541	3 563	18 765	5.3	Petroleum refining
117	Thomson	F	10 196	-458	382	99 895	-3.4	Electrical engineering
118	Allied Signal	USA	10 103	560	2 042	86 400	6.1	Aerospace
119	Kobe Steel	JPN	10 033	-67	2 911	19 415	-0.3	Metallurgy
120	Barlow	ZAF	10 001	190	1 253	145 700	3.0	Food, drink & tobacco
121	IBP	USA	9 970	66	523	29 200	5.0	Food, drink & tobacco
122	Broken Hill Proprietary	AUS	9 955	773	6 125	48 000	4.7	Metallurgy
123	Goodyear Tyre & Rubber	USA	9 946	417	1 965	90 384	5.8	Rubber products
124	Caterpillar	USA	9 922	582	1 878	51 250	4.6	Mechanical engineering
125	Suzuki Motor	JPN	9 857	122	2 202	13 218	1.9	Motor vehicles & parts
126	Anheuser-Busch	USA	9 828	508	3 635	43 345	5.5	Food, drink & tobacco
127	Sumitomo Metal	JPN	9 823	-312	4 203	21 595	-1.7	Metallurgy
128	Statoil	N	9 774	362	2 935	14 560	3.5	Petroleum refining
129	Bristol-Myers Squibb	USA	9 749	1 673	5 074	49 500	16.2	Instrument engineering
130	MAN	D	9 629	113	1 727	60 837	1.2	Motor vehicles & parts
131	Michelin	F	9 560	-554	1 077	124 575	-4.9	Rubber products
132	Kawasaki Steel	JPN	9 520	-177	3 760	17 276	-1.0	Metallurgy
133	Pechiney	F	9 519	-148	2 541	59 212	-1.4	Metal products
134	Neste	SF	9 456	168	490	12 541	2.5	Petroleum refining

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
135	Asahi Glass	JPN	9 419	85	4 764	9 760	0.7	Building materials
136	Dai Nippon Printing	JPN	9 202	328	5 614	14 308	3.4	Printing & publishing
137	Rockwell International	USA	9 018	467	2 458	77 028	5.9	Aerospace
138	Merck & Co	USA	8 968	1 850	8 561	47 100	10.9	Chemicals
139	Snow Brand Milk Products	JPN	8 913	63	985	7 753	1.5	Food, drink & tobacco
140	Sumitomo Electric	JPN	8 849	237	3 171	15 412	2.6	Metallurgy
141	Mitsubishi Oil	JPN	8 821	117	1 097	2 433	1.8	Petroleum refining
142	Toppan Printing	JPN	8 756	255	4 245	14 148	3.0	Printing & publishing
143	Sandoz	CH	8 731	986	6 104	52 550	8.4	Chemicals
144	Bertelsmann	D	8 714	230	1 107	50 437	4.8	Printing & publishing
145	Ishikawajima-Harima Heavy	JPN	8 684	94	1 506	16 173	0.8	Mechanical engineering
146	Grand Metropolitan	UK	8 679	524	4 710	87 163	4.2	Food, drink & tobacco
147	Kawasaki Heavy	JPN	8 598	138	1 108	17 404	1.4	Mechanical engineering
148	USX-Marathon	USA	8 572	-5	2 657	21 914	-0.1	Petroleum refining
149	Mitsubishi Materials	JPN	8 550	-23	2 419	9 723	-0.2	Metallurgy
150	Schneider	F	8 515	61	1 548	91 458	0.6	Electrical engineering
151	Roche Holding	CH	8 277	1 433	10 358	56 082	8.0	Chemicals
152	Fuji Heavy	JPN	8 160	-205	953	15 018	-3.2	Motor vehicles & parts
153	Weyerhaeuser	USA	8 154	450	3 388	36 748	4.2	Paper & paper products
154	Matra-Hachette	F	8 153	95	700	41 904	1.0	Printing & publishing
155	Martin Marietta	USA	8 060	385	2 457	92 000	5.8	Aerospace
156	Fuji Photo Film	JPN	8 029	450	8 155	25 074	3.7	Instrument engineering
157	Ashland Oil	USA	7 948	118	1 210	31 800	2.6	Petroleum refining
158	Kubota	JPN	7 869	66	2 495	16 046	0.7	Mechanical engineering
159	Raytheon	USA	7 860	592	3 671	63 800	9.5	Electrical engineering
160	Sun	USA	7 842	242	1 695	14 500	4.8	Petroleum refining
161	Ricoh	JPN	7 779	60	2 811	13 724	0.6	Instrument engineering
162	Archer-Daniels-Midland	USA	7 776	424	3 870	14 219	6.4	Food, drink & tobacco
163	Matsushita Electric Works	JPN	7 775	109	3 444	19 292	1.2	Metal products
164	Textron	USA	7 755	324	2 375	56 000	1.9	Aerospace
165	Smithkline Beecham	UK	7 750	1 062	2 303	52 700	15.7	Chemicals
166	Aluminum Co of America	USA	7 736	4	3 061	63 400	0.0	Metallurgy
167	Nippon Paper	JPN	7 724	1	2 365	8 510	0.0	Paper & paper products
168	Eridania Beghin Say	F	7 689	203	2 361	24 198	3.1	Food, drink & tobacco
169	Aerospatiale	F	7 680	-214	366	43 913	-1.8	Aerospace
170	Degussa	D	7 664	54	843	32 094	1.4	Metallurgy
171	Hyundai Motor	KOR	7 642	66	1 504	41 409	1.0	Motor vehicles & parts
172	Akzo Nobel	NL	7 600	319	2 832	60 700	4.5	Chemicals
173	Westinghouse Electric	USA	7 581	-231	893	103 063	-3.0	Electrical engineering
174	General Electric Company	UK	7 565	705	4 348	86 121	8.6	Electrical engineering
175	Norsk Hydro	N	7 518	361	2 741	32 455	3.4	Chemicals
176	Intel	USA	7 502	1 960	6 407	29 500	20.2	Electrical engineering
177	General Mills	USA	7 455	411	1 114	125 700	9.0	Food, drink & tobacco
178	Pohang Iron and Steel	KOR	7 336	313	5 318	22 622	2.6	Metallurgy
179	Texas Instruments	USA	7 281	407	1 978	59 048	8.3	Electrical engineering
180	Thyssen Handelsonion	D	7 250	20	295	26 748	0.7	Metallurgy
181	Sumitomo Chemical	JPN	7 188	98	1 869	12 310	1.0	Chemicals
182	Abbott Laboratories	USA	7 182	1 195	3 139	49 659	18.2	Chemicals
183	Henkel	D	7 170	161	1 684	40 480	3.0	Chemicals
184	Northern Telecom	CAN	7 151	-771	2 709	60 293	-9.3	Electrical engineering
185	Toray Industries	JPN	7 102	115	3 570	31 542	1.2	Chemicals
186	American Home Products	USA	7 094	1 255	3 311	51 399	19.1	Chemicals
187	American Brands	USA	7 080	571	3 649	45 600	4.1	Food, drink & tobacco
188	Occidental Petroleum	USA	6 933	63	3 381	19 860	0.4	Chemicals
189	LM Ericsson	S	6 929	312	2 345	69 597	4.3	Electrical engineering
190	Glaxo Holdings	UK	6 832	1 673	5 796	47 104	17.5	Chemicals
191	Dainippon Ink & Chemicals	JPN	6 814	42	1 475	23 867	0.5	Chemicals
192	Emerson Electric	USA	6 800	589	3 257	71 600	9.1	Electrical engineering
193	Komatsu	JPN	6 795	20	4 064	28 446	0.2	Mechanical engineering
194	TRW	USA	6 790	188	1 310	61 200	4.1	Motor vehicles & parts
195	Monsanto	USA	6 750	422	2 439	30 019	5.7	Chemicals
196	Fuji Electric	JPN	6 700	29	1 410	14 094	0.4	Electrical engineering
197	Apple Computer	USA	6 636	72	1 686	14 938	1.7	Computers & office equip.
198	Unisys	USA	6 614	309	2 303	49 000	5.2	Computers & office equip.
199	Ralston-Ralston Purina	USA	6 574	284	557	59 516	6.7	Food, drink & tobacco
200	Daihatsu Motor Co	JPN	6 562	-8	820	21 333	-0.2	Motor vehicles & parts

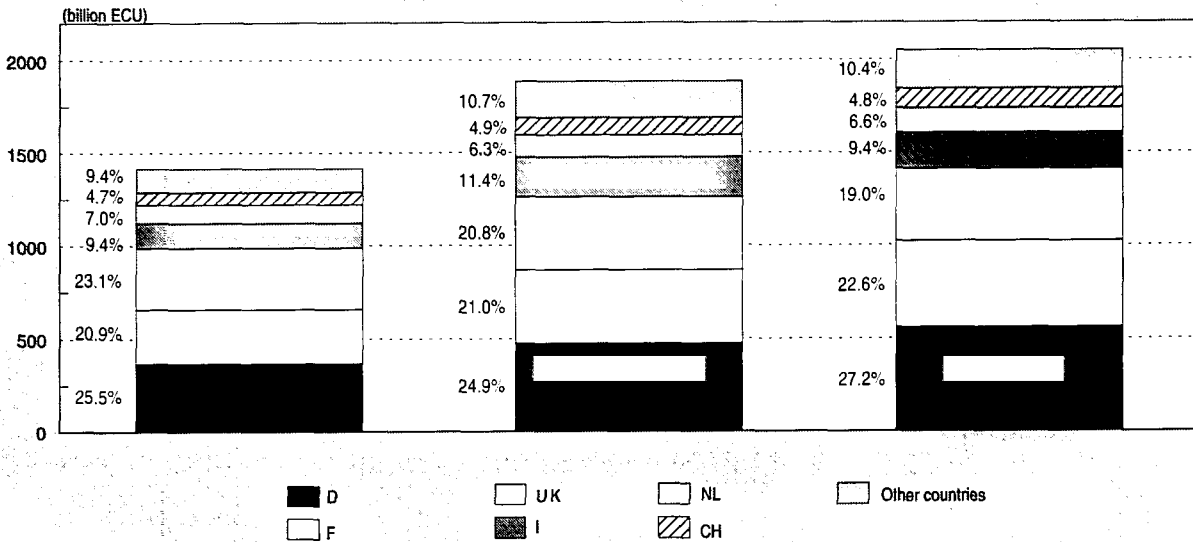
Source: DABLE

**Table 5: The 200 largest companies in Europe by country**

Country	Number	1987		Number	1993	
		Turnover	%		Turnover	%
BR Deutschland	39	361 994	25.5	43	558 473	27.2
France	47	296 057	20.9	48	467 055	22.8
United Kingdom	54	328 018	23.1	46	390 619	19.0
Italia	10	134 112	9.5	12	192 918	9.4
Nederland	10	98 991	7.0	11	129 654	6.3
Switzerland	12	65 962	4.6	11	103 492	5.1
Sverige	13	57 627	4.1	8	62 745	3.1
España	4	19 459	1.4	7	52 841	2.6
Belgique/België	5	20 385	1.4	6	39 110	1.9
Norway	2	14 851	1.0	2	17 291	0.8
Osterreich	2	13 038	0.9	2	17 261	0.8
Suomi-Finland	2	8 319	0.6	3	16 804	0.8
Luxembourg	1	4 755	0.2			
<b>Total</b>	<b>200</b>	<b>1 418 813</b>	<b>100.0</b>	<b>200</b>	<b>2 053 018</b>	<b>100.0</b>

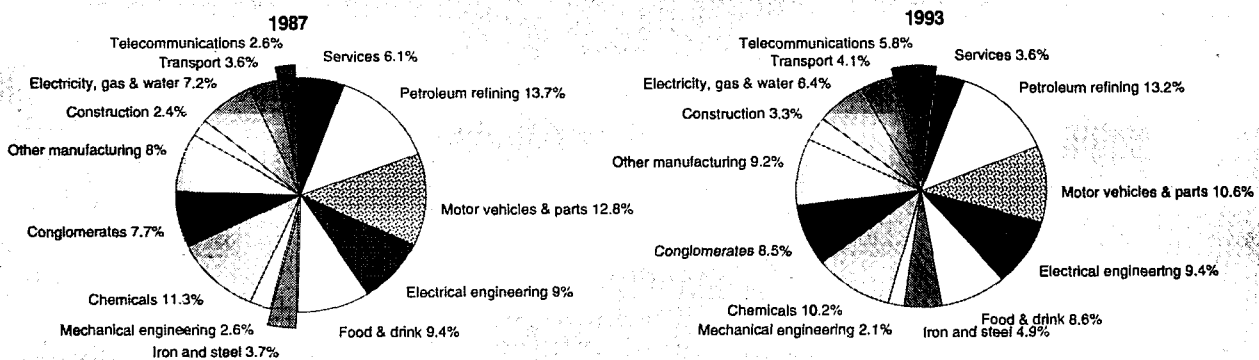
Source: DABLE

**Figure 12: The 200 largest companies in Europe  
Turnover growth at current prices**



Source: DABLE

**Figure 13: The 200 largest companies in Europe  
Turnover by sector**



Source: DABLE

**Table 6: The largest groups in Europe, 1993**

The 25 largest profit earners				The 25 most profitable			
			Net income (million ECU)			Net income/ Turnover (%)	
1	Royal Dutch Shell	UK/NL	7 425	1	Glaxo Holdings	UK	24.5
2	British Telecommunications	UK	2 305	2	Roche Holding	CH	17.3
3	Glaxo Holdings	UK	1 672	3	Empresa Nacional de Electricidad	E	15.9
4	Nestlé	CH	1 669	4	LVMH	F	15.0
5	Unilever	UK/NL	1 662	5	National Power	UK	14.3
6	B.A.T. Industries	UK	1 500	6	Reed Elsevier	UK/NL	14.2
7	Roche Holding	CH	1 432	7	Smithkline Beecham	UK	13.7
8	Smithkline Beecham	UK	1 062	8	British Telecommunications	UK	12.9
9	Alcatel Alsthom	F	1 055	9	Electrabel	B	12.9
10	BTR	UK	1 035	10	Guinness	UK	12.6
11	Ciba-Geigy	CH	1 028	11	Powergen	UK	11.8
12	Sandoz	CH	986	12	Sandoz	CH	11.3
13	Hanson	UK	930	13	Koninklijke PTT Nederland	NL	11.0
14	Siemens	D	927	14	Cable and Wireless	UK	10.9
15	Koninklijke PTT Nederland	NL	826	15	B.A.T. Industries	UK	10.3
16	British Petroleum	UK	789	16	Zeneca Group	UK	9.9
17	Empresa Nacional de Electricidad	E	788	17	BTR	UK	9.6
18	France Telecom	F	724	18	General Electric Company	UK	9.3
19	General Electric Company	UK	705	19	Royal Dutch Shell	UK/NL	9.1
20	Bayer	D	686	20	Bass	UK	8.4
21	National Power	UK	681	21	Polygram	NL	8.3
22	Cable and Wireless	UK	670	22	Ciba-Geigy	CH	7.9
23	Telefonica de España	E	650	23	Iberdrola	E	7.6
24	Electrabel	B	639	24	Hanson	UK	7.6
25	Zeneca Group	UK	564	25	Telefonica de España	E	7.4

The 25 richest				The 25 biggest employers			
			Net worth (million ECU)			(employees)	
1	Royal Dutch Shell	UK/NL	44 730	1	Siemens	D	391 000
2	British Gas	UK	24 539	2	Daimler-Benz	D	366 736
3	France Telecom	F	18 892	3	IRI	I	366 471
4	Deutsche Telekom	D	17 480	4	Deutsche Postdienst	D	362 716
5	British Telecommunications	UK	16 995	5	Unilever	UK/NL	302 000
6	Elf Aquitaine	F	12 700	6	La Poste	F	301 248
7	British Petroleum	UK	12 508	7	FIAT	I	261 500
8	ENEL	I	11 049	8	Deutsche Bahn	D	253 582
9	Roche Holding	CH	10 357	9	Volkswagen	D	251 643
10	Ciba-Geigy	CH	9 875	10	Philips Electronics	NL	238 469
11	Siemens	D	9 809	11	Deutsche Telekom	D	230 000
12	Telefonica de España	E	9 696	12	SNCF	F	221 003
13	FIAT	I	9 471	13	Nestlé	CH	209 755
14	Bayer	D	9 141	14	ABB Asea Brown Boveri	CH/S	206 490
15	Daimler-Benz	D	9 091	15	Generale des Eaux	F	204 000
16	Nestlé	CH	9 054	16	Alcatel Alsthom	F	196 500
17	Alcatel Alsthom	F	8 742	17	B.A.T. Industries	UK	190 308
18	ENI	I	8 072	18	The Post Office	UK	187 972
19	Telecom Italia	I	7 966	19	Hoechst	D	170 161
20	Veba	D	7 800	20	Lyonnaise des Eaux	F	166 574
21	Total	F	7 689	21	Robert Bosch	D	156 615
22	BASF	D	7 644	22	British Telecommunications	UK	156 000
23	Peugeot	F	7 633	23	France Telecom	F	154 548
24	Stet	I	6 962	24	Bayer	D	151 900
25	SNCF	F	6 631	25	Peugeot	F	143 900

Source: DABLE

Table 6 present Europe's 25 largest profit earners, the most profitable and the richest firms, along with Europe's 25 biggest employers. As in the rest of the world, the list of most profitable companies is dominated by companies from the pharmaceutical industry, alongside a few electrical equipment producers. Amongst the biggest employers we find a very diverse mix of companies, many of which are fully or partially government owned, and some of which may not keep their place in this

ranking in future years as they are on the list of companies to be restructured or privatised.

Below, we look at the relative performance of EU firms in each of these sectors over time.

**Table 7: Petroleum refining  
Turnover**

(million ECU)	1987		1993
Royal Dutch Shell	67 694	Royal Dutch Shell	81 290
British Petroleum	39 073	British Petroleum	44 847
ENI	21 037	Elf Aquitaine	31 668
Elf Aquitaine	18 355	ENI	29 710
Total	12 552	Total	20 462
Statoil	7 839	Petrofina	13 394
Petrofina	7 090	Repsol	10 372
Veba Oel	6 642	Statoil	9 773
Neste	5 559	Neste	9 456
RWE-DEA	3 672	RWE-DEA	6 590
Compania Española de Petroleos	2 622	Veba Oel	7 918
OMV	2 380	OMV	6 022

Source: DABLE

## Sectoral performance

### Petroleum refining

The total turnover of Europe's 12 largest petroleum companies represents 13.2 % of the total turnover of Europe's 200 largest firms, but the employment share is much lower, reflecting the fact that petroleum refining is not a labour intensive activity.

1993 was again not a very good year for petroleum refineries which saw profits tumble as a result of weak demand and oil prices. Even those companies that were able to maintain their turnover in 1992-93 saw profits squeezed by the dollar effect.

Of Europe's 12 largest petroleum refining companies, nine are in the world's top 200 ranking. The last three, RWE-DEA, Veba Oel and OMV are from Germany and Austria. Ten of these were already in the 1992 ranking of top 200 European companies, the two newcomers being RWE-DEA and OMV. The combined turnover of the top 10 companies increased by 3.4 % between 1992 and 1993, despite a fall in turnover by four of the 12 companies. The largest fall in turnover was posted by Repsol. This follows a period of fairly rapid growth in turnover, by 28.7 % between 1987 and 1992, or 5.2 % per year on average. Between 1987 and 1993, the fastest rates of turnover growth were recorded by Petrofina (+89 %), followed by Elf Aquitaine (+72.5 %), Neste (+70 %) and Total (+63 %). In contrast, the growth of the two leaders, Royal Dutch Shell and British Petroleum, was very low (+20 % and +14.8 % respectively).

### Iron and steel

The total turnover of the top 10 European metal producers increased by 36.7 % between 1987 and 1993, an 5.3 % growth in annual terms. Much of this reflected growth through acquisitions, however, as overall market demand growth was subdued, especially in the early 1990s.

Growing competition from the East European producers further squeezed the total sales of the larger western producers and partly accounts for the slow growth the European companies' turnover in the second part of the period.

The European basic metals sector is still dominated by national champions, and the recent cross-border acquisitions undertaken by a few of the major firms have done little to change this picture. Among the top 10 iron and steel producers, thus, there is nearly one per EU Member State: three are German, one is French, one is Italian, one is Belgian, one Dutch, one from Luxembourg and one Swiss. The only Member States

not represented in this list are Spain, Ireland and Denmark, along with Sweden and Finland.

Another interesting feature is the fact that, more than in most other sectors, there have been major changes at the top over the 6-year to 1993. Whereas Thyssen and Usinor-Sacilor still lead the ranking, many changes have occurred beyond the second position. Krupp Stahl's acquisition of Hoesch has brought it to third position, whereas Ilva, British Steel and Arbed now occupy the 4th, 5th and 6th place respectively. None of these ranked in the list of top 10 basic metal producers 6 years earlier.

All basic metals producers have been shedding workers in past years, and the trend continued in 1993. Thyssen Stahl, the leading German producer, cut its workforce by close to 25 % in the two years to September 1993. Usinor Sacilor also reduced its workforce through early retirements, outplacements or actual job cuts, by 7 % in 1993.

### Chemicals

In 1993, there were 15 chemical producers among Europe's 200 largest companies, which together accounted for just over 10 % of the combined turnover of these 200 firms. Among these 15 companies, four were German, three of which (Hoechst, Bayer and BASF) occupied the top three positions in 1993. The Swiss pharmaceutical producers also rank high in the list, with Ciba-Geigy in 4th position and Sandoz and Roche in 8th and 9th position respectively. The remaining companies in the list are French (Rhône Poulenc and l'Oréal), Italian (Montedison), British (ICI, SmithKline Beecham and Glaxo), Dutch (Akzo Nobel) and Norwegian (Norsk Hydro).

The total turnover generated by the 15 largest European chemical companies increased by 30 % over the six-years to 1993, an average annual rate of growth of 4.5 % in value. Turnover growth was much faster between 1987-91 after which growth around to reach a trough in 1993.

Although there have been many changes in the ranking of the top European chemical producers, 11 out of the 15 larger producers in 1987 were still among the top 15 in 1993. The four which disappeared from the top 15 ranking were Solvay, DSM, l'Air Liquide and the BOC Group. These were replaced by three pharmaceutical producers, the latter having been much less vulnerable to the downturn in the early 1990s than the basic chemicals producers.

l'Oréal, Henkel, Rhone-Poulenc and Ciba-Geigy are the four companies which posted the best performance in terms of turnover between 1987 and 1993, growing by more than 40 % in total (100 % in the case of l'Oréal), often through acquisition. The companies which showed the worst performance

**Table 8: Chemicals  
Turnover**

(million ECU)	1987		1993
BASF	18 771	Hoechst	23 809
Bayer	17 903	Bayer	21 203
Hoechst	17 813	BASF	20 976
ICI	15 759	Ciba-Geigy	13 094
Montedison	9 240	Rhone-Poulenc	12 168
Ciba-Geigy	9 162	Montedison	11 096
Rhone-Poulenc	8 094	ICI	10 817
Norsk Hydro	7 012	Sandoz	8 731
Akzo	6 646	Roche Holding	8 277
Solvay	5 156	Smithkline Beecham	7 750
Henkel	4 461	Akzo Nobel	7 600
DSM	3 845	Norsk Hydro	7 518
L'Air Liquide	3 381	Henkel	7 170
L'Oreal	2 896	Glaxo Holdings	6 832
BOC Group	2 742	L'Oreal	6 066

Source: DABLE

were Norsk Hydro, BASF and Akzo Nobel, whose turnover increased by less than 15 % in total over the six years. ICI experienced a 31 % fall in its turnover, following the separation its pharmaceutical unit, since called Zeneca.

#### Mechanical engineering

The European mechanical engineering sector is much less concentrated than its Japanese and US counterparts, such that the largest EU producers in this sector rank fairly low in Europe's Top 200 companies' ranking. Mannesmann, Europe's largest mechanical engineering producer, only ranks 80th in the list of largest world companies based on turnover.

Between 1987 and 1993, the sector had mixed fortunes, as a period of fast growth in the second half of the 1980s was followed by falling investment in fixed capital. Whereas the total sales of Europe's top 9 mechanical engineering producers increased by close to 45 % between 1987 and 1993, or 6.4 % annually, the total turnover generated by these 9 firms actually fell between 1990 and 1993. The best sales performance was posted by Mannesmann (whose turnover grew by 80 % in total over the six years to 1993). Three companies joined the list of top firms in 1993, AGIV, Tomkins and Linde. Finmeccanica, the Italian group, reported a decline in sales in 1993 due to the recession in civil aerospace and cuts in defence spending. To reduce its large debt, the group also sold off many of its subsidiaries, so that it does not appear in the 1993 top list, contrary to the situation the year before.

#### Electrical and electronic engineering

As in the chemical sector, the rapid growth of the electrical engineering producers over the eighties and early nineties has masked highly diverse performances by market segment, which had major implications on the relative ranking of firms in this sector. In Europe, thus, there have been notable changes in the rankings of the top 10 firms due to contrasted performances of companies involved in the production of electrical equipment for consumers (a segment which has been faced to growing competition on world markets and where European firms have been losing market share) and electrical equipment for industry (which includes telecommunications equipment and other electrical equipment for industry).

Siemens, which had already overtaken Philips as the European leader in this sector in 1990, has since largely confirmed its position thanks to a 25 % growth in turnover between 1990 and 1992, compared an average turnover growth of Europe's 10 largest companies, of only 9.4 %. In 1993, Siemens' turnover grew by an additional 9 %, to 42 billion ECU, about 4 % faster than the industry's second largest producer in Europe, Philips (+5.2 % growth in turnover in 1993). At the global European level, Siemens now ranks as the fifth largest company based on turnover, whereas Philips only ranks 15th.

The third and fourth largest European firms in this sector are respectively ABB and Alcatel Alsthom of France. Among the top 12 European companies, two are German, three are French, four are Swedish (some of these with shared ownership, like

**Table 9: Mechanical engineering  
Turnover**

(million ECU)	1987		1993
Mannesmann	8 028	Mannesmann	14 458
MAN	7 177	Fried.Krupp	10 591
Fried. Krupp	6 810	MAN	9 629
Alsthom	4 070	AGIV	4 656
Hoesch	3 537	Tomkins	4 244
GKN	2 699	Sulzer	3 849
Sulzer	2 694	Linde	3 708
SKF	2 678	Thyssen Industrie	3 563
Thyssen Industrie	2 155	SKF	3 214

Source: DABLE



**Table 10: Electrical and electronic engineering Turnover**

(million ECU)	1987		1993
Siemens	24 748	Siemens	41 992
Philips	22 553	Philips Electronics	27 080
Alcatel-Alsthom	18 371	ABB Asea Brown Boveri	24 180
Electrolux	9 210	Alcatel Alsthom	23 612
Thomson	8 656	Electrolux	11 020
General Electric Company	7 984	Thomson	10 196
BBC Brown Boveri	6 026	Schneider	8 515
AEG	5 620	General Electric Company	7 565
LM Ericsson	4 425	LM Ericsson	6 929
Nokia	2 760	AEG	5 694
Matra	2 477	Thorn EMI	5 328
Hawker Siddeley Group	2 469	Nokia	3 552

Source: DABLE

ABB which is Swedish/Swiss), two are from the UK and one from the Netherlands. AEG, Thorn EMI and Nokia are newcomers in the top 200 European companies' ranking.

Between 1992 and 1993, the best performer in terms of turnover was ABB, which is rapidly expanding its presence in Europe and world-wide through acquisitions. The second best performance was posted by Ericsson of Sweden, which reported booming sales of mobile phone equipment: thanks to this, the leading world producer of mobile phones in 1993 more than doubled its pre-tax profits in that year.

The semi-conductor producers in the list also reported significant increases in output and sales in 1993.

Most of the French companies reported negative growth in turnover in 1993 when measured in current ECU, with Alcatel's turnover down 0.4 % and Thomson's turnover down 1.6 % from 1992. Thomson CSF engaged in a process of production rationalisation through the reduction of the number of production sites in France, to reduce costs, while Alcatel Alsthom suffered both from increased investment expenditure weighing negatively on costs, and from the fact that it has fallen behind in the race for innovation in the mobile phone business.

#### Motor vehicles and components

The combined turnover of the largest 12 European motor vehicles and components producers amounted to 244.5 billion ECU in 1993, a 4.9 % decline (in current ECU) over 1992. Out of the 10 largest automotive producers, only two reported positive growth in turnover in 1993: Daimler-Benz and Volvo.

All others reported either a stagnation in sales (this was the case of Ford, for instance) or a decreased in turnover - sometimes exacerbated by the restructuring of activities and divestment from non-strategic product lines. The biggest drop in turnover in 1993 was reported by Fiat (-20.4 %), followed by Opel (-17.8 %).

The difficulties experienced by the companies in this sector as a result of mounting competition at world level and weak demand have already been emphasised earlier. Most of the top 12 European producers, reported losses in 1993, the biggest ones, in relative terms having been posted by Fiat, Volvo and Volkswagen. Fiat and Volkswagen are, interestingly, the two European companies which are most dependent on their domestic market for sales, such that they suffered more than others from the decline in market demand which was particularly important in Italy and Germany. BMW posted the highest rate of return on sales in 1993 (+1.8 %), followed by Robert Bosch (+1.1 %) Renault and Daimler-Benz (both at 0.6 %). In all cases, this was achieved through major internal re-engineering and labour shedding.

Daimler-Benz is now the second largest European company based on turnover, and ranks 10th world-wide, up one place from 1992 in both lists. Fiat, which was second in the European ranking in 1990, has since fallen back to 13th position. The involvement of several of the large automotive producers in other markets, such as aerospace for Daimler-Benz, however makes comparisons of relative performances based solely on turnover somewhat misleading.

**Table 11: Motor vehicles and components Turnover**

(million ECU)	1987		1993
Daimler-Benz	32 523	Daimler-Benz	50 535
Volkswagen	26 334	Volkswagen	39 599
FIAT	25 751	FIAT	29 651
Renault	21 290	Renault	25 644
Peugeot	17 031	Peugeot	21 965
Volvo	12 636	Robert Bosch	16 788
Robert Bosch	12 246	BMW	15 003
BMW	8 822	Volvo	12 234
Adam Opel	8 297	Adam Opel	11 879
Ford-Werke	8 202	Ford-Werke	10 945
Ford Motor (UK)	7 399	Ford Motor (UK)	6 830
Saab-Scania	5 655	Investor	3 454

Source: DABLE



**Table 12: Food, drink and tobacco  
Turnover**

(million ECU)	1987		1993
Unilever	23 578	Unilever	35 734
Nestlé	20 482	Nestlé	33 238
B.A.T. Industries	10 657	B.A.T. Industries	14 587
Grand Metropolitan	7 986	Ferruzzi inanziaria	12 394
Dalgety	7 048	Groupe Danone	10 589
BSN	5 355	Grand Metropolitan	8 679
Allied-Lyons	5 136	Eridania Beghin Say	7 689
Hillsdown Holdings	4 305	Allied Domecq	6 282
Jacobs Suchard	3 548	Associated British Foods	5 561
Sucres et Denrees	3 358	Hillsdown Holdings	5 366
Associated British Foods	3 267	Cadbury Schweppes	4 803
Unigate	3 113	Bass	4 750
Guinness	2 958	Tate & Lyle	4 688
Eridania Zuccherifici	2 907	Guinness	4 413
Cadbury Schweppes	2 878	United Biscuits	3 850

Source: DABLE

The decrease in turnover by Fiat and Peugeot in 1993 follows previous falls of -1.4 % and -1.6 % respectively between 1990-92. Saab Scania, which sold a big part of its car division to General Motors a couple of years ago, has since disappeared from the top 10 list.

#### Food, drink and tobacco

The total turnover of the top 15 European agri-food producers increased by 52.6 % in total between 1987 and 1993, a 7.3 % average annual increase.

Although most of the sector's production is accounted for by small and medium-sized firms, there are a number of major European giants operating in this sector which have posted both healthy growth in turnover and high profitability over the past years. As these major groups adjusted their strategies in the late 1980s to prepare for the Single European Market, there were significant changes in the list of companies which feature in the top 15 ranking.

UK companies nevertheless continue to dominate the list, with 11 companies out of 15 in Europe's top 15 list. The remaining four companies are French (2), Italian and Swiss respectively.

Unilever of the UK/Netherlands remains the unchallenged leader in this sector, closely followed by Nestlé of Switzerland. The next in line, BAT, has a turnover which is less than half that of the two European leaders in this sector.

#### Services

The above sections mainly looked at the relative performance of Europe's top manufacturing companies over the period 1987-93. Below, we briefly review the trend in turnover of Europe's key services companies, in those sectors which are most concentrated: the distribution of energy, telecommunications services, transport services and wholesale and retail trade.

The sector accounting for the largest share of turnover is the utilities sector, with 12 companies accounting for a turnover of 131.7 billion ECU. The next largest sector in terms of turnover is the telecommunications services sector, with a 1993 turnover of the top 8 companies of 118.7 billion ECU.

#### Energy

Table 13 presents the top 12 European utilities, ranked by turnover. The largest is EDF of France, with a turnover in

**Table 13: Energy  
Turnover**

(million ECU)	1987		1993
Electricité de France	19 591	Electricité de France	27 728
Electricity Council	15 789	RWE	22 895
ENEL	13 469	ENEL	16 351
RWE	13 267	British Gas	13 327
British Gas	10 589	Nederlandse Gasunie	7 517
Nederlandse Gasunie	6 468	Ruhrgas	7 419
Gaz de France	6 076	Gaz de France	7 419
Ruhrgas	4 603	CEA Industries	6 784
CEA Industries	4 233	Tractebel	6 525
Intercom	2 816	Preussen Elektrizitaet	6 412
Vereinigte Elektrizitat Westfalen	2 729	Iberdrola	5 365
Electrabel	1 928	Electrabel	4 976

Source: DABLE

**Table 14: Telecommunications  
Turnover**

(million ECU)	1987		1993
Deutsche Bundespost	25 129	Deutsche Telekom	30 462
British Telecom	14 646	France Telecom	19 145
France Telecom	13 788	British Telecom	17 842
STET	10 400	STET	16 187
SIP	7 923	Telecom Italia	12 720
PTT Suisse	4 826	Telefonica de España	8 755
Koninklijke PTT Nederland	4 513	Koninklijke PTT Nederland	7 478
Telefonica de España	3 653	Cable and Wireless	6 131

Source: DABLE

1993 of 27.7 billion ECU, followed by the German utility RWE AG. As the deregulation of this sector is not complete yet, all the companies on the list of top European utilities are still essentially national companies. Hence, it is not surprising to find the French, German, Italian and UK distributors at the top of the list.

#### Telecommunications

The liberalisation of the European telecommunications services market and the transformation of the key national players into companies capable of competing at global level has changed the relative ranking of the top 8 companies operating in this sector in Europe, without fundamentally changing the nature of their business. Between 1992 and 1993, the ranking remained unchanged, however.

Between 1990 and 1992, the combined turnover of the 8 companies in the 1992 top European companies' list increased by 8.1 %, just over 4 % per year on average. The period was characterised by the consolidation of Deutsche Telekom, and the privatisation of parts of British Telecom. In 1993, the turnover of the larger companies increased by an additional 4.6 %.

The fastest growth in turnover between 1992 and 1993 was reported by Cable & Wireless of the UK, whose sales grew by 22 % from 1992.

Deutsche Telekom also pursued an external growth strategy and comforted its leading position with a 14 % increase in sales in 1993. The two Italian telecom operators (STET and Telecom Italia) and the Spanish company Telefonica de España reported a fall in turnover of the order of 4.5-5 %, as a result of currency movements. The rationalisation of Italy's telecom utilities only started towards the end of 1993.

#### Transport services

Unsurprisingly, the list of top 10 transport companies in Europe is dominated by airlines. Among Europe's top 10 companies, six were airlines, three were railways and the remaining (P&O) is a shipping company.

Between 1987 and 1993, the total turnover of the top 10 European transport services providers increased by 51 % in total, a 7 % increase in annual terms. There were major changes at the top due to the liberalisation of European skies, the privatisation of some key operators and the reorganisation of companies in this sector along a European dimension.

The on-going rationalisation and restructuring which are under-way in this sector as market liberalisation proceeds will undoubtedly lead to further changes in the ranking of top firms in this sector over the coming years.

#### Distribution

Europe's largest distribution companies are listed in Table 17. In 1993, Metro of Germany outranked Tengelmann (also of Germany) as the largest European distributor in 1993, with a total turnover of 30.7 billion ECU.

Although cross-European concentration movements have taken place in this sector in the late 1980s and early 1990s, the size of the top players is still mainly determined by the size of their national markets. The exception is Spar International of the Netherlands, which ranks third at European level. Among the list of top 10 European distributors, four are German, four are French, one is from the UK and one is Dutch.

A comparison of the turnover generated by these top firms in 1987 and 1993 respectively shows major changes both in

**Table 15: Transport services  
Turnover**

(million ECU)	1987		1993
Deutsche Bundesbahn	11 537	Deutsche Bahn	12 948
SNCF	6 872	SNCF	11 175
British Airways	5 401	Deutsche Lufthansa	9 168
Deutsche Lufthansa	5 333	Air France	8 331
Air France	4 732	British Airways	8 224
P & O	4 137	P & O	7 169
British Railways	3 664	British Railways	4 674
Alitalia	2 685	SAS	4 306
KLM	2 389	Alitalia	4 059
Swissair	2 241	KLM	4 001

Source: DABLE



Table 16: Europe's 200 largest industrial groups, 1993

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
1	Royal Dutch Shell	UK/NL	81 290	7 426	44 731	117 000	8.6	Petroleum refining
2	Daimler-Benz	D	50 535	311	9 092	366 736	0.6	Motor vehicles & parts
3	IRI	I	45 080	-5 556	N/A	366 471	N/A	Conglomerate
4	British Petroleum	UK	44 847	789	12 509	84 500	2.0	Petroleum refining
5	Siemens	D	41 992	927	9 810	391 000	1.9	Electrical engineering
6	Volkswagen	D	39 599	-1 054	5 821	251 643	-2.6	Motor vehicles & parts
7	Unilever	UK/NL	35 734	1 663	6 216	302 000	7.5	Food, drink & tobacco
8	Nestlé	CH	33 238	1 669	9 055	209 755	6.5	Food, drink & tobacco
9	Veba	D	31 692	427	7 801	128 348	1.5	Conglomerate
10	Elf Aquitaine	F	31 669	111	12 700	94 300	0.3	Petroleum refining
11	Deutsche Telekom	D	30 462	-835	17 480	230 000	-1.0	Telecommunications
12	ENI	I	29 711	228	8 073	106 391	0.5	Petroleum refining
13	FIAT	I	29 651	-969	9 472	261 500	-2.1	Motor vehicles & parts
14	Electricité de France	F	27 728	321	3 344	118 018	0.3	Energy
15	Philips Electronics	NL	27 080	394	5 270	238 469	1.8	Electrical engineering
16	Renault	F	25 644	162	5 117	139 733	-0.5	Motor vehicles & parts
17	ABB Asea Brown Boveri	CH/S	24 180	58	3 013	206 490	0.3	Electrical engineering
18	Hoechst	D	23 809	295	5 773	170 161	1.4	Chemicals
19	Alcatel Alsthom	F	23 612	1 055	8 743	196 500	2.7	Electrical engineering
20	RWE	D	22 895	447	3 903	105 572	1.4	Conglomerate
21	Peugeot	F	21 965	-213	7 633	143 900	-1.2	Motor vehicles & parts
22	Generale des Eaux	F	21 816	484	4 775	204 000	1.5	Building/civil engineering
23	Bayer	D	21 203	686	9 142	151 900	3.3	Chemicals
24	BASF	D	20 976	443	7 644	112 020	2.1	Chemicals
25	Total	F	20 462	454	7 690	49 772	2.3	Petroleum refining
26	France Telecom	F	19 145	724	18 892	154 548	1.9	Telecommunications
27	British Telecom	UK	17 842	2 305	16 996	156 000	7.8	Telecommunications
28	Thyssen	D	17 230	-535	1 823	136 975	-4.0	Metallurgy
29	Robert Bosch	D	16 788	200	4 052	156 615	1.5	Motor vehicles & parts
30	ENEL	I	16 351	187	11 050	105 835	N/A	Energy
31	STET	I	16 187	551	6 962	139 101	1.4	Telecommunications
32	INI	E	15 917	-899	4 629	129 435	-3.2	Conglomerate
33	BMW	D	15 003	271	3 621	71 034	1.7	Motor vehicles & parts
34	B.A.T. Industries	UK	14 587	1 500	6 416	190 308	3.0	Food, drink & tobacco
35	Mannesmann	D	14 458	-178	3 210	127 695	-1.3	Mechanical engineering
36	Deutsche Postdienst	D	14 153	-899	3 498	362 716	-7.9	Services
37	Lyonnais des Eaux	F	14 130	121	2 269	166 574	0.6	Conglomerate
38	Petrofina	B	13 395	177	3 133	14 696	2.0	Petroleum refining
39	British Gas	UK	13 327	-684	24 540	79 358	-1.8	Energy
40	Ciba-Geigy	CH	13 094	1 029	9 876	87 480	5.6	Chemicals
41	British Aerospace	UK	13 019	-275	1 938	87 400	-2.1	Aerospace
42	Deutsche Bahn	D	12 948	-4 800	-957	253 582	-10.7	Transport
43	Telecom Italia	I	12 720	357	7 967	87 960	1.1	Telecommunications
44	Ferruzzi Finanziaria	I	12 394	-1 315	-919	41 392	-6.1	Food, drink & tobacco
45	Viag	D	12 271	131	2 289	80 683	1.1	Conglomerate
46	Hanson	UK	12 257	931	5 012	71 000	3.1	Conglomerate
47	Volvo	S	12 234	-381	2 981	73 641	-2.6	Motor vehicles & parts
48	Rhone-Poulenc	F	12 168	225	4 973	81 678	1.3	Chemicals
49	Ruhrkohle	D	12 103	6	895	111 150	0.0	Extraction
50	Preussag	D	11 978	121	1 635	73 319	1.3	Conglomerate
51	La Poste	F	11 967	-184	1 205	301 248	N/A	Services
52	Usinor-Sacilor	F	11 374	-920	2 278	67 984	-7.1	Metallurgy
53	Osterreichische Industrie	A	11 239	-546	1 187	64 859	N/A	Conglomerate
54	SNCF	F	11 175	-1 163	6 632	221 003	-3.1	Transport
55	Montedison	I	11 096	-742	1 067	32 774	-4.2	Chemicals
56	Electrolux	S	11 020	64	1 855	109 400	0.8	Electrical engineering
57	ICI	UK	10 817	177	5 111	87 100	1.5	Chemicals
58	BTR	UK	10 807	1 036	2 697	129 814	9.0	Conglomerate
59	Saint-Gobain	F	10 805	198	4 902	92 348	1.4	Building materials
60	Krupp-Hoesch	D	10 602	-321	865	78 376	-3.2	Metallurgy
61	Groupe Danone	F	10 589	497	4 820	56 419	4.2	Food, drink & tobacco
62	Repsol	E	10 373	541	3 563	18 765	5.3	Petroleum refining
63	Thomson	F	10 196	-458	382	99 895	-3.4	Electrical engineering
64	Statoil	N	9 774	362	2 935	14 560	3.5	Petroleum refining
65	MAN	D	9 629	113	1 727	60 837	1.2	Mechanical engineering
66	Michelin	F	9 560	-554	1 077	124 575	-4.9	Rubber products

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
67	Pechiney	F	9 519	-148	2 541	59 212	-1.4	Metal products
68	Neste	SF	9 456	168	490	12 541	2.5	Petroleum refining
69	Bouygues	F	9 241	71	1 200	71 269	0.7	Building/civil engineering
70	Deutsche Lufthansa	D	9 168	-52	1 097	58 854	-0.6	Transport
71	Telefonica de España	E	8 755	650	9 697	74 340	2.4	Telecommunications
72	Sandoz	CH	8 731	986	6 104	52 550	8.4	Chemicals
73	Bertelsmann	D	8 714	230	1 107	50 437	4.8	Printing & publishing
74	Grand Metropolitan	UK	8 679	524	4 710	87 163	4.2	Food, drink & tobacco
75	Schneider	F	8 515	61	1 548	91 458	0.6	Electrical engineering
76	Air France	F	8 331	-1 280	-93	61 759	-13.3	Transport
77	Roche Holding	CH	8 277	1 433	10 358	56 082	8.0	Chemicals
78	British Airways	UK	8 224	373	2 384	49 628	3.8	Transport
79	Matra-Hachette	F	8 153	95	700	41 904	1.0	Printing & publishing
80	Swiss PTT	CH	7 772	110	1 036	N/A	0.8	Services
81	Smithkline Beecham	UK	7 750	1 062	2 303	52 700	15.7	Chemicals
82	WPP Group	UK	7 738	29	-208	20 416	1.5	Business services
83	Eridania Beghin Say	F	7 689	203	2 361	24 198	3.1	Food, drink & tobacco
84	Aerospatiale	F	7 680	-214	366	43 913	-1.8	Aerospace
85	Degussa	D	7 664	54	843	32 094	1.4	Metallurgy
86	Akzo Nobel	NL	7 600	319	2 832	60 700	4.5	Chemicals
87	General Electric Company	UK	7 565	705	4 348	86 121	8.6	Electrical engineering
88	Norsk Hydro	N	7 518	361	2 741	32 455	3.4	Chemicals
89	Nederlandse Gasunie	NL	7 517	37	184	1 860	1.2	Energy
90	Koninklijke PTT Nederland	NL	7 478	826	5 774	94 314	7.0	Telecommunications
91	Ruhrigas	D	7 419	377	1 756	11 574	7.0	Energy
92	Gaz de France	F	7 419	160	1 073	25 755	1.3	Energy
93	Thyssen Handelsunion	D	7 250	20	295	26 748	0.7	Metallurgy
94	Henkel	D	7 170	161	1 684	40 480	3.0	Chemicals
95	P&O	UK	7 169	518	3 435	51 755	6.3	Transport
96	The Post Office	UK	7 139	250	2 894	187 972	N/A	Services
97	LM Ericsson	S	6 929	312	2 345	69 597	4.3	Electrical engineering
98	Glaxo Holdings	UK	6 832	1 673	5 796	47 104	17.5	Chemicals
99	CEA Industries	F	6 784	196	2 614	42 617	N/A	Energy
100	RWE-DEA	D	6 591	24	485	7 188	0.8	Petroleum refining
101	SGE	F	6 536	46	450	63 073	0.8	Building/civil engineering
102	Tractebel	B	6 525	245	2 150	32 704	1.8	Energy
103	Preussen Elektrizitaet	D	6 412	375	2 893	21 456	2.8	Energy
104	Allied Domecq	UK	6 282	424	3 041	71 824	5.3	Food, drink & tobacco
105	Cable and Wireless	UK	6 131	671	4 273	41 348	6.9	Telecommunications
106	L'Oreal	F	6 066	375	2 391	32 261	7.3	Chemicals
107	Solvay	B	6 046	-177	2 295	43 163	-2.7	Chemicals
108	Oemv	A	6 023	-324	934	11 743	-7.3	Petroleum refining
109	Philipp Holzmann	D	6 000	45	662	42 596	0.6	Building/civil engineering
110	Finmeccanica	I	5 963	8	1 467	52 587	0.1	Aerospace
111	Zeneca Group	UK	5 697	565	2 056	30 900	8.9	Chemicals
112	AEI	D	5 694	-577	541	58 921	-10.4	Electrical engineering
113	Associated British Foods	UK	5 561	289	2 382	49 968	7.7	Food, drink & tobacco
114	Stora Kopparbergs Bergslags	S	5 551	72	2 398	33 641	0.9	Paper & paper products
115	Eiffage	F	5 545	46	488	47 753	0.7	Building/civil engineering
116	British Steel	UK	5 481	90	4 910	41 300	1.2	Metallurgy
117	Saatchi & Saatchi	UK	5 479	9	-492	11 633	0.8	Advertising
118	Ladbroke Group	UK	5 478	33	2 777	55 089	0.6	Recreational services
119	Hillsdown Holdings	UK	5 366	121	811	43 251	4.4	Food, drink & tobacco
120	Iberdrola	E	5 365	408	6 219	15 861	1.8	Energy
121	Thorn EMI	UK	5 328	263	959	41 423	6.9	Electrical engineering
122	Havas	F	5 280	86	1 359	18 678	2.1	Advertising
123	Huels	D	5 253	-196	882	37 814	-4.6	Chemicals
124	Thomson-CSF	F	5 179	-348	2 272	48 858	-3.5	Instrument engineering
125	Saint Louis	F	5 160	109	1 158	26 943	2.0	Paper & paper products
126	KNP BT	NL	5 146	-106	1 070	27 934	-2.5	Paper & paper products
127	Pirelli	I	5 026	-34	1 415	42 132	-0.6	Rubber products
128	Alcatel Cable	F	5 022	224	1 279	26 451	4.8	Metallurgy
129	Electrabel	B	4 976	640	5 095	17 652	5.8	Energy
130	Empresa Nacional de Electricidad	E	4 970	788	4 521	15 757	6.9	Energy
131	Asea Brown Boveri	D	4 924	117	529	36 934	2.4	Electrical engineering
132	Trafalgar House	UK	4 915	-465	356	35 949	-13.4	Building/civil engineering

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
133	Holderbank Financiere Glarus	CH	4 873	166	1 919	36 143	2.3	Building materials
134	Continental	D	4 844	40	777	50 974	1.1	Rubber products
135	Cadbury Schweppes	UK	4 803	313	1 760	39 066	7.4	Food, drink & tobacco
136	Arbed	L	4 755	-117	1 470	44 130	-1.7	Metallurgy
137	National Power	UK	4 751	681	3 448	6 064	10.6	Energy
138	Bass	UK	4 750	398	4 327	81 105	5.1	Food, drink & tobacco
139	Kloeckner & Co.	D	4 742	5	354	9 312	0.2	Metallurgy
140	Tate & Lyle	UK	4 688	189	900	15 834	6.2	Food, drink & tobacco
141	Olivetti	I	4 681	-253	1 386	35 171	-3.6	Computers & office equip.
142	British Railways	UK	4 674	-139	3 606	121 052	-1.3	Transport
143	Agiv	D	4 656	39	530	47 736	1.0	Mechanical engineering
144	BICC	UK	4 637	68	438	39 151	2.3	Building/civil engineering
145	Lafarge Coppee	F	4 596	235	2 868	30 572	3.2	Building materials
146	L'Air Liquide	F	4 588	336	3 111	28 000	5.4	Chemicals
147	GTM-Entrepose	F	4 559	26	348	46 070	0.5	Building/civil engineering
148	Societe Generale de Belgique	B	4 517	215	4 049	22 038	3.0	Metallurgy
149	Rolls-Royce	UK	4 514	81	1 572	49 200	1.9	Aerospace
150	Philips	D	4 461	-209	166	24 000	-11.1	Electrical engineering
151	Guinness	UK	4 413	556	4 785	23 264	5.4	Food, drink & tobacco
152	Accor	F	4 397	64	1 814	143 740	0.9	Hotel trade
153	SAS	S	4 306	-65	950	37 330	-1.3	Transport
154	Machines Bull	F	4 267	-765	146	31 735	-25.2	Computers & office equip.
155	Tomkins	UK	4 244	235	1 174	45 496	8.7	Food, drink & tobacco
156	CGIP	F	4 225	107	1 418	34 293	2.0	Metal products
157	Deutsche Babcock	D	4 219	-3	193	39 527	-0.1	Metal products
158	Societe au Bon Marché	F	4 168	44	1 519	17 451	0.3	Luxury goods
159	Arnault et Associes	F	4 168	-11	487	17 508	-0.1	Luxury goods
160	Compania Española de Petroleos	E	4 132	90	1 150	8 655	3.0	Petroleum refining
161	Alitalia	I	4 059	-183	366	27 859	-6.2	Transport
162	RMC Group	UK	4 008	99	1 002	27 635	3.1	Building materials
163	KLM	NL	4 001	42	1 622	29 047	0.6	Transport
164	Ver. Elektrizitaet Westfalen	D	3 927	91	981	11 782	1.5	Energy
165	The BOC Group	UK	3 889	259	1 888	40 266	5.4	Chemicals
166	United Biscuits	UK	3 850	86	961	39 352	3.5	Food, drink & tobacco
167	Sulzer	CH	3 849	97	1 225	30 770	2.3	Mechanical engineering
168	Powergen	UK	3 835	451	2 510	4 782	9.8	Energy
169	Repola	SF	3 796	80	982	26 275	1.5	Paper & paper products
170	Bollere Technologies	F	3 747	-54	201	24 193	-1.9	Transport
171	Christian Dior	F	3 719	86	2 094	16 532	0.7	Chemicals
172	Linde	D	3 708	81	1 418	29 636	2.0	Mechanical engineering
173	DSM	NL	3 701	-28	1 882	20 592	-0.6	Chemicals
174	Svenska Cellulosa	S	3 678	118	2 197	24 069	2.4	Paper & paper products
175	Carnaudmetalbox	F	3 676	151	1 877	31 880	3.6	Metal products
176	Cockerill Sambre	B	3 651	-161	1 509	26 209	-3.8	Metallurgy
177	Heineken	NL	3 614	239	1 829	23 997	6.4	Food, drink & tobacco
178	LVMH	F	3 598	540	3 508	14 874	6.7	Food, drink & tobacco
179	Reed Elsevier	UK/NL	3 588	508	2 199	25 700	9.4	Printing & publishing
180	Alusuisse-Lonza Holding	CH	3 578	47	1 071	22 993	1.4	Metallurgy
181	Thyssen Industrie	D	3 563	-7	458	40 983	-0.2	Mechanical engineering
182	Nokia	SF	3 552	-37	797	25 800	-1.1	Electrical engineering
183	Sanofi	F	3 550	177	2 428	31 197	4.0	Chemicals
184	Burmah Castrol	UK	3 539	132	760	22 038	5.3	Petroleum refining
185	Aegis Group	UK	3 527	-37	-151	1 757	-5.7	Media services
186	SCAC-Delmas-Vieljeux	F	3 503	-75	277	22 201	-2.9	Transport
187	Arjo Wiggins Appleton	UK	3 499	78	1 516	18 771	2.5	Paper & paper products
188	Skanska	S	3 482	57	857	27 398	0.8	Building/civil engineering
189	British Coal	UK	3 468	-311	-911	30 880	-5.5	Mining
190	Investor	S	3 454	52	1 437	27 372	0.8	Motor vehicles & parts
191	Bosch-Siemens Hausgeraete	D	3 443	51	425	22 491	3.0	Electrical engineering
192	Swissair	CH	3 439	34	1 652	25 026	0.6	Transport
193	Polygram	NL	3 414	283	931	11 117	9.0	Electrical engineering
194	Seat	E	3 330	-1 021	-407	20 342	-28.7	Motor vehicles & parts
195	Hoogovens	NL	3 323	-79	901	20 438	-2.2	Metallurgy
196	Pilkington	UK	3 282	52	1 148	41 100	1.3	Building materials

Rank	Name	Country	Turnover (million ECU)	Profit (million ECU)	Net worth (million ECU)	Employees	Return on assets (%)	Major sector of activity
197	Bayernwerk	D	3 280	167	1 339	9 780	1.9	Energy
198	Rothmans International	UK/NL	3 242	160	894	17 538	4.3	Food, drink & tobacco
199	SKF	S	3 214	-71	992	41 394	-2.0	Mechanical engineering
200	Bremer Vulkan Verbund	D	3 175	-102	435	28 141	-2.4	Ship building

Source: DABLE

Table 17: Europe's largest distribution companies

Rank	Name	Country	1993 Turnover (million ECU)	Employees	1988 Turnover (million ECU)	Employees
1	Metro	D	30 688	13 000	N/A	N/A
2	Tengelmann	D	25 139	192 144	16 872	145 000
3	Spar International	NL	22 346	192 000	14 382	158 000
4	REWE Group	D	20 860	150 000	12 377	107 000
5	Carrefour	F	18 608	81 500	9 214	42 900
6	Leclerc	F	17 984	56 000	10 516	38 900
7	Intermarché	F	17 713	70 500	9 948	45 000
8	J Sainsbury	UK	13 808	124 841	8 656	88 283
9	Promodes	F	13 623	54 848	6 565	32 124
10	Franz Haniel & Cie	D	12 625	32 451	6 139	20 990
11	Koninklijke Ahold	NL	12 487	119 027	6 269	80 284
12	Otto-Versand	D	12 288	47 000	6 411	28 500
13	Stinnes	D	11 224	34 397	6 303	18 825
14	Tesco	UK	11 170	90 926	7 194	75 658
15	SHV	NL	10 174	54 900	5 224	27 300
16	Kaufhof	D	9 883	61 870	4 871	42 570
17	Karstadt	D	9 676	75 951	5 965	67 174
18	Pinault-Printemps Redoute	F	9 561	50 586	3 733	30 248
19	Casino Quichard Perrachon	F	9 517	45 326	5 043	39 686
20	Asko Deutsche Kaufhaus	D	9 253	64 434	4 242	31 254
21	Delhaize Freres	B	9 063	82 021	4 818	49 000
22	Marks and Spencer	UK	8 535	62 120	7 834	76 313
23	Thyssen Handelsunion	D	7 947	26 748	5 315	12 481
24	Quelle Schickedanz	D	7 821	41 200	4 838	31 500
25	Inchcape	UK	7 486	38 189	3 690	45 247
26	Argyll Group	UK	7 334	69 517	5 355	63 264
27	Edeka Zentrale	D	6 998	N/A	5 775	700
28	Asda Group	UK	6 385	70 515	4 146	50 465
29	Systeme U	F	6 211	24 000	3 553	18 200
30	Docks de France	F	5 786	32 565	3 281	21 244
31	Kingfisher	UK	5 776	72 036	4 031	57 173
32	GIB	B	5 768	47 772	3 897	24 323
33	Daigety	UK	5 729	15 417	6 789	22 820
34	Boots Company	UK	5 437	79 326	4 137	69 967
35	Office Commercial Pharmaceutique	F	5 381	5 971	2 960	6 086
36	Raab Karcher	D	5 047	25 619	3 369	10 548
37	Kloekner	D	4 793	9 312	5 731	9 923
38	Booker	UK	4 530	21 947	2 768	17 166
39	Vendex International	NL	4 528	80 200	4 362	55 000
40	Galeries Lafayette	F	4 459	33 453	2 099	16 332
41	ICA Handlarnas	S	4 437	12 745	4 847	17 000
42	Great Universal Stores	UK	4 037	30 154	4 017	32 156
43	Deutsche SB-Kauf	D	3 910	25 853	5 526	46 000
44	Kesko	SF	3 870	6 227	5 285	8 000
45	Comptoirs Modernes	F	3 571	17 124	2 011	14 672
46	Ava	D	3 504	23 970	1 058	7 769
47	Kwik Save Group	UK	3 370	22 196	1 376	8 423
48	Centros Comerciales Pryca	E	3 258	13 800	1 424	7 000
49	Hertie Waren-und Kaufhaus GmbH	D	3 222	24 931	2 564	25 400
50	W.H. Smith	UK	3 198	30 506	2 971	34 530

Source: DABLE

the average size of the groups and in their relative position. Carrefour of France for instance experienced a major growth in turnover over the period and moved to 5th position, by-passing Leclerc (also of France) which had posted a 60 % growth over the same 6-year period.

The relative concentration of the distribution sector in the Netherlands is evidenced by the fact that this country has four companies in the top 50 list, three of which are in the top 20. Belgium only has two distribution companies in this list, Delhaize Frères and GIB, ranked respectively 21st and 32d. In 1993, there was only one company from Spain and there is no Italian company in the list. The Spanish company was ICA Handlarnas and ranked 41st.

Written by: DRI Europe based on information from DABLE  
Graphs and listings by Hubertus Kal  
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coordinated by Startext.



## Industrial transition of employment - Converging trends in the EU

### INTRODUCTION

The European Union undertook major integration efforts during the eighties which have slowly affected employment trends in the Member States. Going far beyond macro-economic adjustments, labour demand has become more homogeneous in the EU as regards the sectoral composition of labour, the growing need for skilled workers, the trends towards female employment etc. Even if employment structures are still different, there seems to be convergence in the basic qualitative trends. The internationalisation of the economies and the societies in Europe is obviously affecting labour markets more seriously than diverging unemployment rates indicate.

This chapter will discuss the scope and the determinants of European labour market integration in more detail. It is based on the work which was recently undertaken by the ERECO Employment Network on behalf of DG V of the European Commission establishing a medium-term forecast of employment for the European Union<sup>1</sup>. This study applies a bottom-up approach investigating, among other aspects, the changes in the sectoral, regional, and skills dimension in the Member States. However, the focus of this chapter will not be on the medium-term future but on the major labour demand trends of the eighties and early nineties. The first part will show the macro-trends of employment characterising the general labour demand conditions. In the second part the shift in various employment dimensions as characterised by sectors, occupations, gender etc. will be discussed. The third part will assess the scope and implications of labour demand convergence.

### MACRO-TRENDS IN EMPLOYMENT AND PRODUCTIVITY

Out of 8.1 million new jobs which were created in the European Union during the "golden" eighties, 4.7 million were lost in the following recession up to 1994 (Figure 1). This was a cold shock to European labour markets which pushed unemployment rates up to the levels of the mid-eighties. In addition, the extension of the EU brought in further areas of severe underemployment. German unification started with a shakeout of 3 million workers. The Scandinavian countries went through a serious adjustment crises with rapidly increasing unemployment rates. In the middle of the nineties, the job situation in the EU again has a long way to go until full employment levels can be approached. The ERECO forecast up to 1997 expects a recovery of labour demand. However, the dynamics of job creation will not go beyond compensating for the losses which occurred during the recent recession.

Of course, the macro-changes of employment are scattered broadly among the EU Member States. During the 1984-91 period the most dynamic expansion occurred in western Germany, Spain, the Netherlands and Luxembourg where labour demand grew by approximately 2 % annually. All other Member States experienced slower growth. The 1991-94 recession affected labour demand most seriously in Italy, Spain and Portugal. These countries lost between 2.5 and 3.5 % of jobs per year. In Germany, France and the UK the number of jobs decreased by nearly 1 % per annum. Only Ireland, Greece and the Netherlands were able to expand labour demand, at rather low rates of less than 1 % however. Among the new

Table 1: Hours worked

Country	Total hours worked (million hours)			Average yearly working hours per worker		
	1982	1991	annual % change 82-91	1982	1991	annual % change 82-91
Belgique/ België	6 102	6 176	0.1	1 702	1 639	-0.4
Danmark	4 000	4 046	0.1	1 653	1 586	-0.5
BR Deutschland (1)	46 209	46 726	0.1	1 735	1 599	-0.9
Hellas	6 419	6 845	0.7	1 818	1 885	0.4
España	22 908	23 089	0.1	2 063	1 831	-1.3
France	37 272	37 480	0.1	1 702	1 667	-0.2
Ireland	2 297	2 203	-0.5	2 003	1 959	-0.2
Italia	36 361	38 278	0.6	1 731	1 748	0.1
Luxembourg	273	333	2.2	1 724	1 689	-0.2
Netherlands	8 437	8 690	0.3	1 500	1 412	-0.7
Portugal	7 708	7 305	-0.6	2 012	1 950	-0.3
United Kingdom	41 613	44 901	0.8	1 738	1 749	0.1
EU 12 (1)	219 599	226 072	0.3	1 759	1 699	-0.4

(1) Excluding former East Germany.  
Source: ERECO Employment Network



Member States, Austria had a positive employment performance. By contrast, the intensity of the job crises in Finland and Sweden was not far from the crisis in eastern Germany. Employment in these countries decreased by 4 to 4.5 % annually.

In terms of working hours, labour demand was much weaker than expressed by the number of workers. One third of the employment growth of 8.1 million during the 1984-91 period can be attributed to the expansion of part-time work and the reduction of weekly working hours. The total number of hours worked by employees and self-employed workers increased by 0.7 % while the number of workers grew by 1.2 % annually. If the trend towards reduced working hours has not changed considerably during the recession - in some countries it has even accelerated - it can be assumed that total hours worked decreased by 1.6 % annually between 1991 and 1994. Over the whole period of 1982 to 1994 the sum of hours worked decreased by 0.1 % annually while the number of workers increased by 0.3 % (Table 1).

Productivity - measured as value added in constant prices per hour worked - was boosted by an annual rate of 2.6 % in the 1982-94 period (Figure 2). Thus GDP growth was achieved by efficiency improvements rather than the extension of employment. During the second half of the eighties, productivity was largely supported by a long-lasting investment cycle contributing not only to the expansion of production capacities but to the modernisation of the capital stock with new technology. Moreover, the increase of capacity utilisation supported productivity growth. By contrast, in the recession of the early nineties, productivity growth was stimulated by cost-cutting measures, industrial restructuring which squeezed less productive capacities out of the markets, and by the introduction of new organisational concepts which directly address the efficiency of labour. Labour-saving rather than capital-augmenting measures were thus the driving forces of productivity increase.

The ranking of productivity levels has not changed significantly since 1982, even if growth rates were different between the Member States. The highest productivity growth was achieved in Ireland, Spain, and Portugal with annual rates above 3 %. Germany, the Netherlands and Denmark were

slightly below 3 % and France, Italy and the UK close to 2 %. High productivity growth can also be assumed for the next years due to increasing cost pressure from international competition, industrial restructuring and relocation of production facilities worldwide.

## EMPLOYMENT BY SECTORS

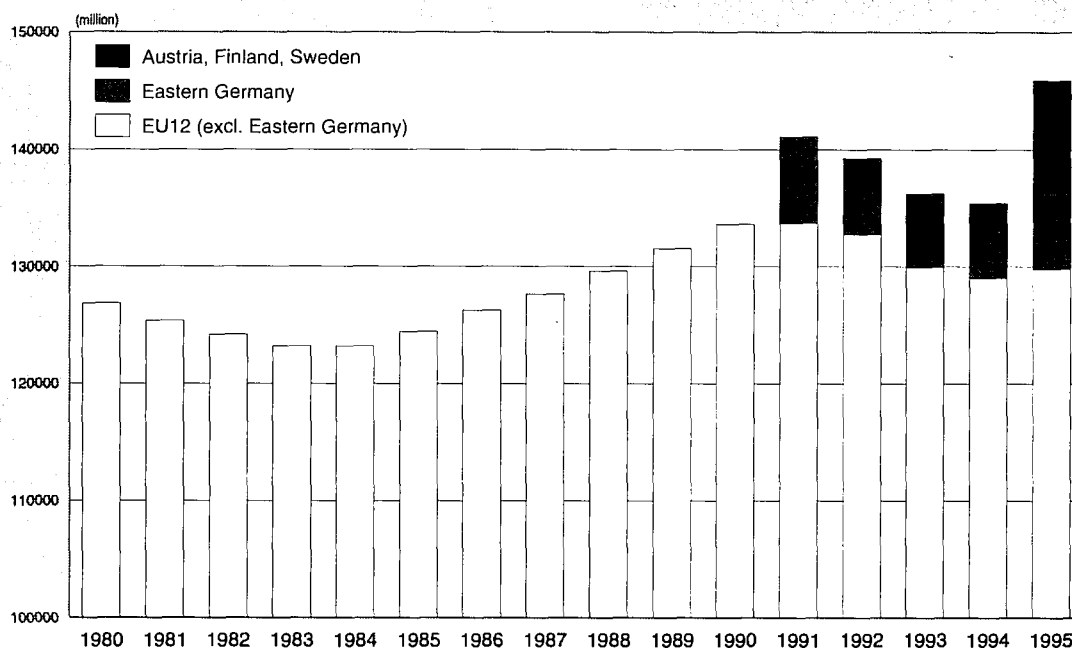
During the eighties the EU moved rapidly towards the post-industrial phase of economic development. In 1994, 55 million people were working in the private service sector (market services) as compared to 46 million in manufacturing, mining, construction, and agriculture<sup>2</sup>. In addition, 28 million were employed in public services. All together 64 % of all persons employed were working in service companies or institutions.

The dynamics of this well-known trend can be seen from Chart 3 which represents the absolute changes of employment between 1982 and 1994 by sectors for 12 EU countries, excluding eastern Germany. According to these figures, gains and losses of employment were highly concentrated on few sectors. Service sectors, like business and other private services, taken together under the heading of "Other market services" expanded most dynamically. The majority of manufacturing sectors stagnated while metal production, mining, transport equipment industries, and textiles and clothing shrunk. The biggest employment loss occurred in agriculture.

The rapid growth of service sector employment can be attributed to both private and public services. Since 1982 approximately two million jobs were created in the business services sector. This is the size of the whole chemical industry in Europe. Retail and wholesale distribution added a further 1.6 million jobs. Health and veterinary services grew by almost 1 million. Lodging and catering services contributed about 1 million new jobs. Public services including parts of health and education services, expanded by more than 3 million. The contribution of banking and insurance, transport, and communication services was much smaller.

Almost none of the manufacturing sectors was able to provide additional job opportunities. The only exceptions are rubber and plastics products, and the paper and printing industries which include publishing services. However, these manufacturing branches contributed only very little to employment

Figure 1: Employment in the European Union



Source: Eurostat, Ifo estimates

growth. Of course, the positive performance of services in relation to manufacturing is enhanced by the creation of part-time jobs in the service sectors. The pattern of change, however, is not altered if labour input is measured by hours worked.

Important technological branches like the electrical industry, chemical industry and office/data processing machinery did not provide any additional jobs. Employment in the machinery and transport equipment industries was reduced. Significant job losses occurred in textiles and clothing industries, mining, and metal production. For manufacturing as a whole the employment balance was negative with a loss of 3.7 million jobs in the 1982-94 period. Of course, this has to be attributed to recession to a large part. But even in the 1982-91 comparison a negative employment balance appears for manufacturing.

### De-industrialisation of Employment

During the recent recession the trend towards de-industrialisation probably was fostered not only due to cyclical phenomena but also due to long-lasting restructuring of the industries. The production process in manufacturing was reorganised in many fields. Peripheral functions were outsourced to service providers and production activities were relocated. Partly the increase of service sector employment therefore has to be explained by outsourcing from manufacturing and other sectors. But this is only half the story. The decline of manufacturing activities and the rise of services is also due to the limited competitiveness of classical industrial production in European locations. It is due to the retardation in the development of new technologies, the sluggish application of new organisational concepts, the growing problems of a high-price and high-quality strategy on product markets. EU companies are not only facing the overwhelming cost advantages of competitors in south-east Asia and eastern Europe. They are also facing technological competition from these countries, based on a well-educated labour force and rapid economic transition, at least in the Asian countries. Complex types of industrial production therefore can increasingly be organised in developing countries. The advantages of European workers in comparison to the labour force in these countries, based on education, training and technical know-how, are shrinking. Not only markets but production is becoming global.

This process which started during the eighties is in full swing. The creation of the Single European Market has opened new possibilities for relocation of production within the EU. The opening of eastern Europe and of China is establishing new conditions for the competition for working places worldwide. Industrial working places are threatened in particular. The services are less affected as they partly operate on local markets. Moreover, services are playing a key role in restructuring industrial production.

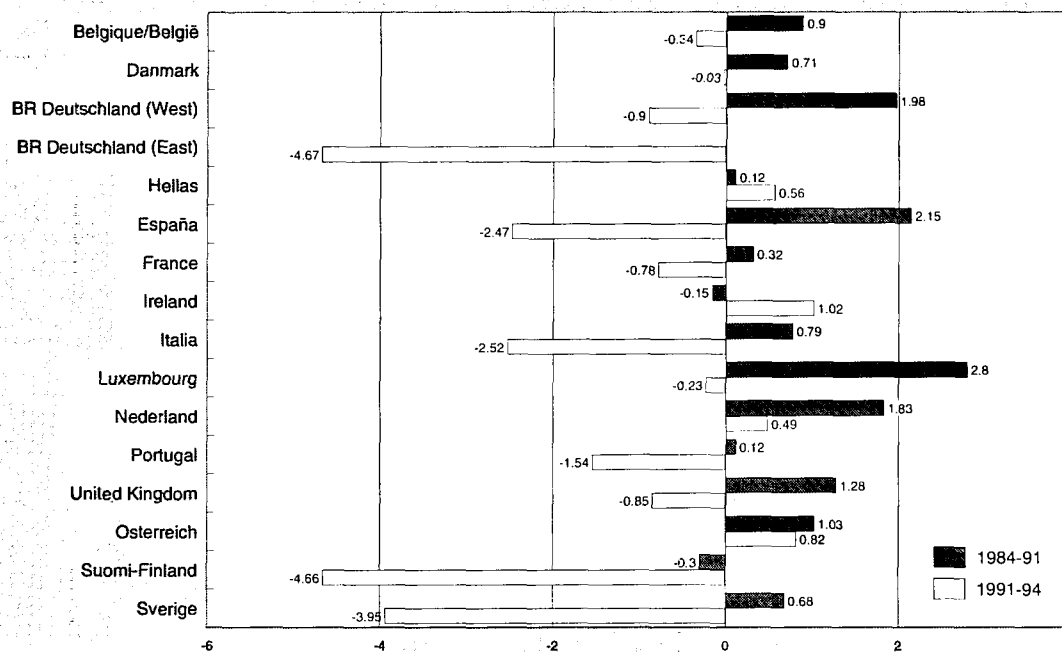
### Functional Relocation of Employment

The de-industrialisation of labour extends far beyond the sectoral dimension. The shift of employment from production-oriented functions as exercised by craft and related workers and plant and machinery operators toward service functions as done by professionals, technicians and related occupations reflects the same process occurring within sectors. New production technologies and the re-organisation of labour both aim at substituting unskilled labour by transferring simple functions to machinery and software and more complex activities to skilled workers. In addition, low-wage countries are successfully competing for a bigger share of industrial mass production, which relocates production-oriented activities.

With the globalization of industrial production, labour in Europe is increasingly specialising on skilled activities like business management, research and development, technical and legal consulting, marketing, production management, design etc. The competitive advantage appears to be significantly higher in these fields of economic activities than in the production of industrial commodities itself.

This is fostered by increasing investment in human capital on the one hand and constant wage relations between skilled and unskilled labour on the other. In combination, these two factors contribute to the relative decrease of efficiency wages for skilled workers. Taking advantage of the growing supply and the relative wage reduction of skilled labour, companies are developing new concepts of labour organisation which increasingly make use of the skills available. Exploiting the skills potential by delegating competence to lower levels in the occupational hierarchy is one of the possible strategies followed by countries like Germany which dispose of a broad

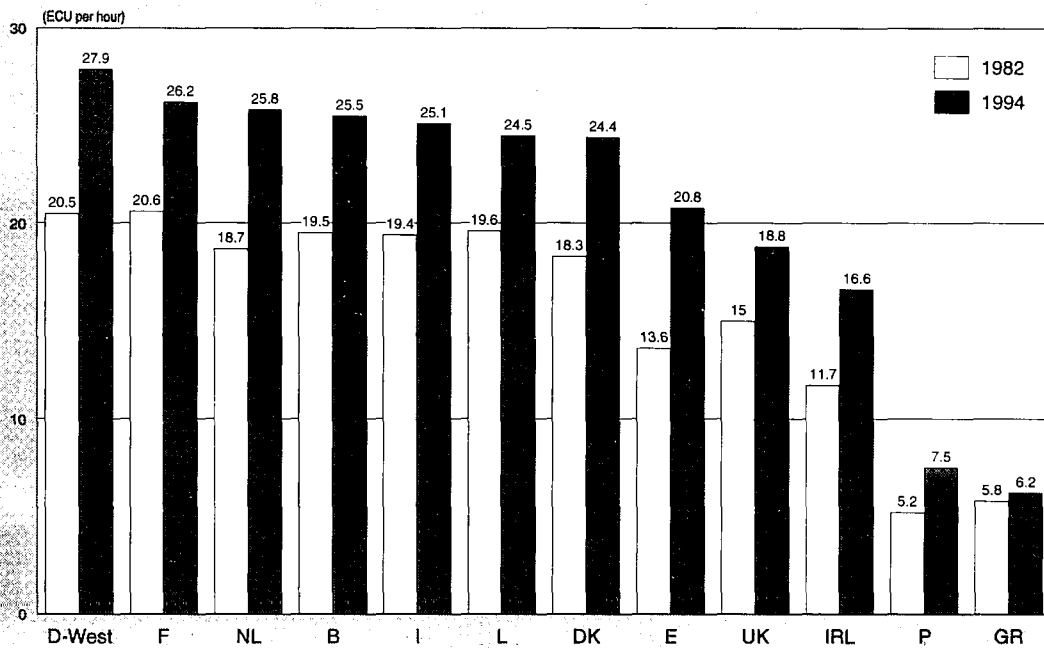
Figure 2: Annual % change of employment



Source: Eurostat, ilo estimates



**Figure 3: Productivity (1)**



(1) Value added at 1991 prices per hour worked  
Source: ERECO employment network

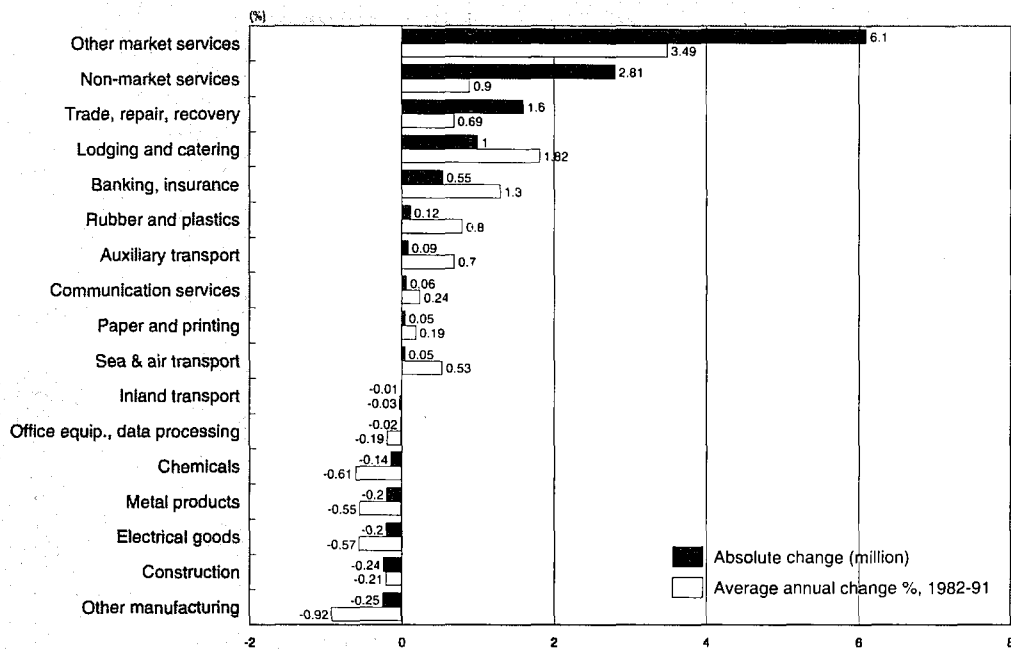
provision of skills. Other countries, like the UK, where the skills profile is much more concentrated on higher skill levels, are specialising on the production of upgraded services. This is supported by the low wage levels in relation to other industrialised countries.

These trends resulted in additional jobs in the occupational groups of professionals, managers, technicians and related occupations. In contrast, employment of plant and machinery operators, assemblers, craft workers and in elementary occupations, including agricultural workers, was declining. The national patterns of occupational change, however, are far from homogeneous. Variety rather than homogeneity best characterises the occupational structures of the EU.

**FEMALE EMPLOYMENT**

Female employment has slowly but broadly increased from a share of 38.3 % in 1982 to 40.5 % in 1991. The shifts in labour demand toward service industries and professional and service functions increasingly compensated for the existing disadvantages, even if female employment levels still lag behind those of males. Female employment is predominantly located in the occupations of clerks and service workers, while male employment is most commonly found in the occupations of craft and related trades and plant and machine operatives. The overall degree of contrast between the occupational structures of male and female employment is still striking. However, the specialisation of women in services, clerical work and

**Figure 4: Employment by sector, 1982-94 (1)**



(1) EU12 excluding Eastern Germany  
Source: ERECO employment network



increasingly in professional occupations is emerging as their major competitive advantage on labour markets.

Female employment opportunities appear to be promising in the higher level occupations while the future of male employment looks gloomy. A large number of male jobs remain in those sectors and occupations which have already declined in the past and will continue in the future.

### QUALIFICATION OF THE WORKFORCE

Available evidence has indicated that EU Member States show considerable variation in educational attainment. For instance, in the northern Member States much higher proportions of their workforce have received some form of post-compulsory education. At the EU level it is difficult to make a comparison of change over time due to lack of data, but if a comparison is made of the countries for which data are available, the evidence does point to an increase in the level of educational attainment. While those in employment at the beginning of the nineties were still more likely to have the minimum compulsory level of education or less, the number with either a second level/second stage or third level education has increased. If data are viewed in isolation for the ten Member States for which data are available, the picture of educational attainment looks favourable. Though a large number of those in employment have less than the minimum level of education, a large share have attained a post-compulsory level of attainment (either second level/second stage or third level).

Administrators, senior officials, and managers, professionals, and technicians/associate professionals - higher level occupations - comprise an occupational elite. The level of conceptual knowledge embodied within the occupations is considerably in advance of that incorporated in the task repertory of any other occupation. The success of the EU economy is ultimately dependent upon its ability to realise further improvements in the quality of its labour force. The need for such a transition is obvious. In global terms most regions of the EU represent high wage economies, the maintenance of which, during the eighties, has been dependent upon the development of high value-added product market segments successfully underwritten, to date, by innovative product design and production systems coupled with high labour productivity. The strategy has not been without risks, however. Recently,

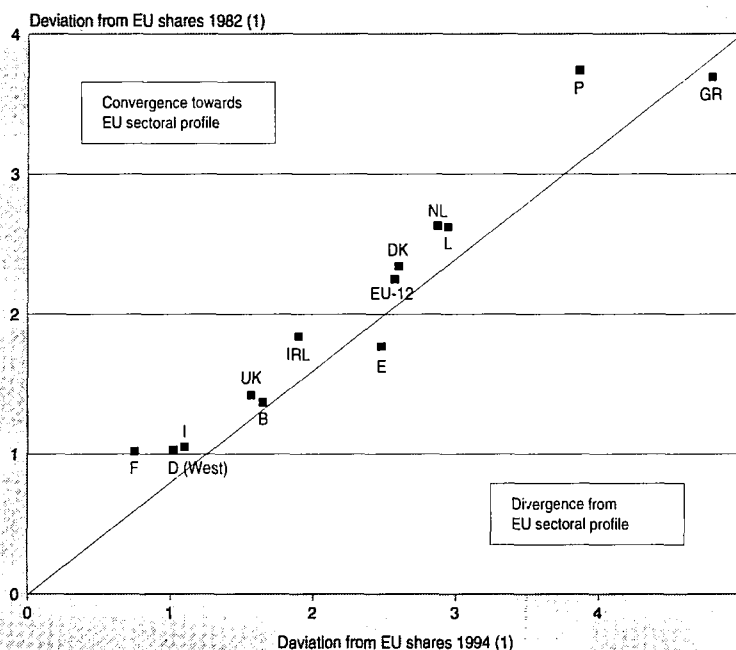
South-East Asian producers have rapidly captured a sizeable market share, in the EU and elsewhere, with a product market strategy based upon the production of high quality/high value added goods with very low labour costs. Though there are concerns about wage flexibility in the EU, few are willing to relinquish the high wage levels and the standard of living they have supported. This places an onus upon the development of a workforce able to compete in the global product and labour market. A highly educated and skilled labour force is instrumental to obtaining this goal. Regardless of arguments about high skill levels which will optimise long-run employment and output, a high wage economy is dependent upon the ability to reproduce and improve the quality of its labour force over time.

### CONVERGING TRENDS

From a theoretical point of view it remains an open question whether integration of economies leads to divergence or convergence of industrial structures. On the one hand, diverging trends can be expected if the resources owned by the individual regions remain highly specialised. Natural resources, labour-force skills, technical equipment, and other long-term determinants of regional specialisation contribute to regional competitiveness more powerfully when economies are integrated. Local producers can realise economies of scale and thus improve their position on widening markets. On the other hand, however, the distribution of resources is changing in the long run. In particular, technical know-how and skills are distributed more equally among regions. Modern production technologies are spreading and reducing regional differences. Insofar as such trends are present, industrial structures can be expected to converge. Labour division between regions is less organised along the lines of different products and resources. The "globalized" type of production networks reduces the differences in industrial structures.

This is exactly what can be observed in the European Union since 1982. As indicated in Chart 4, the sectoral employment structures of the individual Member States converged towards the common EU pattern<sup>3</sup>. The only exception is France where the sectoral employment structures have become a little more different. In all other countries sectoral employment structures converged towards the average EU profile. The large countries

Figure 5: Convergence of sectoral employment structures



(1) Standard deviation of sectoral employment shares from EU shares, calculated for 25 NACE-CLIO sectors  
Source: Eurostat, Ifo Institute



of the EU were closer to the EU average than the smaller countries already in 1982. This is, of course, the result of their greater weights. The only exception is Spain. Smaller EU countries are characterised by a greater extent of deviation but also by a greater extent of convergence.

The greatest step was taken by Greece. The average deviation of sectoral employment shares, which was 4.8 percentage points in 1982, declined by 1.1 percentage points up to 1994. The country diverging most extensively from the EU average is now at the same distance as Portugal. Spain was the other country which experienced great convergence. This is indicated by the decline of average deviation by 0.7 percentage points, or one fourth of the 1982 distance. The changes in the other EU countries were less pronounced. On average, all 12 EU Member States reduced their differences in sectoral employment structures by 12.5 % in the nine year period observed.

Much of the convergence of sectoral employment structures has to be attributed to the declining share of employment in agriculture and the growing shares of services - other market services and non-market services in particular. These were the strongest changes in employment structures which applied to many EU countries. By contrast, the differences of sectoral employment structures of manufacturing are less than those of services, and changes between 1982 and 1994 were smaller. Among the few exceptions in manufacturing is the textiles and clothing industry, the decline of which contributed to overall convergence. In services, the general expansion of employment shares of other market services was important.

The further steps towards the European Monetary Union can be expected to foster both increasing specialisation of the EU countries on specific types of production and growing integration. The structural effects, therefore, remain unclear. The elimination of exchange rate variations among EU Member States will intensify direct competition of European pro-

ducers via product quality and costs. This may lead to a higher degree of regional specialisation. Simultaneously, it will ease economic integration and the creation of European networks of production. This will result in a more homogeneous distribution of sectoral activities. The experience of the last ten years informs us that the integration component is stronger than the specialisation component. This might also apply to the future. Moreover, economic integration is strongly supported by the structural funds which can be expected to increase their activity during the following years.

1. Vogler-Ludwig, K. et al. (forthcoming): Medium-Term Forecasts of Employment by EU Districts and Sectors of Industry. Study on behalf of the Commission of the European Communities.

2. Figures excluding eastern Germany and the new Member States.

3. The indicator of convergence or divergence is based on employment structures for 25 sectors in the 12 EU Member States. The sectoral classification is taken from national accounts statistics (NACE-CLIO, as indicated in Figure 3). The indicator takes the average deviation of sectoral employment shares in one Member State from the corresponding sectoral EU shares as the measure of divergence. The reduction of the average deviations between 1982 and 1991 indicates growing similarity between the Member State and the EU average. An increase indicates growing disparity.

Written by: Ifo Institut für Wirtschaftsforschung

## The new Member States: Austria, Finland and Sweden

On January 1, 1995 three wealthy, industrious countries joined the European Union. As a result of the entry of Austria, Finland and Sweden, the Union's territory has grown by 36 per cent, its population by 6 per cent and its GDP by 7 per cent. These three new Member States agree on freer trade, tighter budget constraints, stricter environmental rules and greater openness in decision-making.

### INTRODUCTION

Whereas Sweden and Finland experienced a severe recession period from 1991 to 1993, Austria has had only one year (1993) with a negative growth rate since 1981. Of the three new member states, unemployment is the largest in Finland, at 19 %, compared to 7.9 % in Sweden and 4.4 % in Austria.

Sweden and Finland have sharply devaluated their currencies and have thereby gained export advantages, but domestic demand is only reviving slowly as the respective governments must wrestle with high unemployment and very large budget deficits. After three years of deep recession, the Swedish and Finnish economies returned to growth rates of between 2.0 %

and 2.5 % in 1994. The Swedish budget deficit amounted to more than 13 % of GDP in 1994, compared to the 6.3 % average in Western Europe. The budget deficits of Austria and Finland were estimated at 3.8 % and 7.5 %, respectively.

The entry of the three countries to the EU increases the area of the internal market by 36 %. France remains the biggest country in the EU, followed by Spain, Sweden, Germany, Finland and Italy. Austria is one of the smaller Member States, in size roughly comparable to Portugal.

GDP in the EU of fifteen countries (EU-15) is approximately 7 % higher than that of the EU-12. With the EU population increasing by 6 %, this means that the average per capita GDP is higher in the larger EU. Per capita GDP remains the highest in Luxembourg (168 % of the new EU average), followed by Denmark (140 %), Germany (126 %) and Austria (122 %). Whereas the per capita GDP of Austria and Sweden (at 114 %) are above the new EU average, Finland's per capita GDP is 12 % below. The three countries contribute 2.7 % (Sweden), 2.6 % (Austria) and 1.2 % (Finland) to the EU-15 GDP, which may be compared to Germany's share of nearly 28 %.

Table 1: Statistical changes for the EU

	Area (sq km)	Population (thousand)	1993 GDP (million ECU)
EU-12	2 400 000	348 676	5 523 200
Osterreich	84 000	79 991	155 500
Suomi-Finland	338 000	5 066	71 500
Sverige	450 000	8 719	159 200
EU-15	3 272 000	370 452	5 909 300
(% change)	36	6	7

Source: Eurostat

Table 2: Gross value added (market prices) by sector, 1990 and 1991

(%)	Agriculture, forestry, fishing		Industry (including construction)		Services, general government	
	1990	1991	1990	1991	1990	1991
Osterreich	3.3	3.4	37.5	43.9	59.3	52.7
Suomi-Finland	6.0	6.7	32.9	38.0	61.1	55.2
Sverige	2.8	3.1	32.3	40.4	64.9	56.4
EU-12	2.9	2.7	34.4	33.5	62.8	63.7

Source: Eurostat



**Table 3: Employment by main sectors of economic activity, 1991 and 1992**

(%)	Agriculture		Industry		Services	
	1991	1992	1991	1992	1991	1992
Osterreich	7.4	7.1	36.9	35.6	55.7	57.4
Suomi-Finland	8.5	8.6	29.2	27.8	62.3	63.5
Sverige	3.2	3.2	28.2	23.5	68.4	70.1
EU-12	6.2	5.8	31.8	32.8	62.0	61.4

Source: Eurostat

**Table 4: Labour costs, 1993**

(ECU per hour)

BR Deutschland	22.37
Belgique/België	18.10
Nederland	17.34
Danmark	16.91
Osterreich	16.65
Sverige	15.12
France	13.92
Italia	13.49
United Kingdom	11.1
España	9.22
Hellas	6.15
Portugal	3.59

Source: Wall Street Journal Europe (13-06-94)

**AUSTRIA**

In 1990, more than 40 % of Austria was agricultural land whereas non-forest land amounted to 32 000 sq km, 38 % of the total area. The five major cities are Vienna, Graz, Linz, Salzburg and Innsbruck. Almost 20 % of the 7 991 000 inhabitants of Austria live in Vienna.

Austria's contribution to the EU budget is likely to amount to 1.5 % of GDP (34 billion schilling), including both direct transfers to the EU and compensatory payments to Austrian farmers. Approximately one-third is paid back in the form of adjustment payments to farmers because of the immediate effects of the Common Agricultural Policy. The net external transfers will be around 0.5 % of GDP, raising the current account deficit to over 1 % of GDP in 1995.

Austrian consumers are the big winners, not only thanks to falling food prices but also because of the many service costs which will be brought down through decreasing protectionism. The Austrian National Bank joined the European Monetary System on the 1st of January, 1995, and the Exchange Rate Mechanism on the 9th of January. The schilling was already rigidly pegged to the D-mark, so these moves will have no noticeable effect.

**Table 5: Austria**

Area	84000 sq km
Population	7.9 million
Currency	Austrian Schilling
ECU exchange rates	13.6238 (1993) 13.5 (1994)
GDP 1994 (1)	160 billion ECU

(1) Estimates  
Source: OECD**Economic indicators and trends**

The recession in Germany had its effects on the Austrian economy, as Germany is Austria's biggest trading partner. However, Austria is slowly recovering; the economy expanding by 2.6 % in 1994 after a decline of 0.3 % in 1993.

The economic recovery began sooner than was originally expected, spurred by consumption, rising production in the construction industry and the stabilisation of industrial output. As a result, the recession was much milder than expected, with GDP falling by only 0.3 % in 1993. Driven by higher exports and supported by tax cuts, output growth resumed in 1994.

In 1993, exports were depressed by stagnant foreign markets and losses in competitiveness caused by an increase in the real exchange rate of the schilling. Manufacturing industry and tourism were hit particularly hard, as private investment fell the most in these two sectors. In other, more sheltered parts of the economy, activity was more resistant to the forces of recession, as profits fell less and employment stability prevented consumer spending on services from weakening significantly.

With major foreign markets in Western Europe recovering from the recession, and the negative impact of strong wage growth in the past and the real appreciation of the schilling fading, economic activity appears to be picking up, led by rising exports. Recently, foreign orders, merchandise exports and industrial output have all recovered markedly.

Real GDP growth should stabilise at around 3.0 % in 1995, driven both by domestic demand and the international economic recovery. However, this growth rate will be lower if corporate investment is delayed as a result of insufficient export performance due to the appreciation of the schilling.

Inflation, although decelerating, was above 3 % in 1993, due to higher public prices in the public sector and in services, notably in sectors where demand remained strong and competition among suppliers weak. Inflation is expected to decline towards a 2 % annual rate.

**Current account**

The current account has been more or less in balance in the past ten years, with the large trade deficit being offset by a surplus in services, dominated by tourism. This was also the

**Table 6: Austria: components of GDP, 1991**

(%)	
Private consumption	55.3
Total investment	25.6
Government consumption	18.2
Exports	40.1
Imports	39.2

Source: OECD



**Table 7: Austria: trends, 1988-1996**

	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Total GDP (million ECU)	107 400	114 800	124 700	133 200	143 200	155 000	160 000	N/A	N/A
Real GDP growth (%)	5.0	3.8	4.3	2.7	1.6	-0.3	2.6	3.0	3.1
Unemployment rate (%)	3.6	3.3	3.2	3.5	3.6	4.2	4.4	4.2	4.1
Industrial production (% change per year)	N/A	N/A	N/A	1.7	-1.1	-2.0	6.0	4.5	5.0

(1) Estimates

Source: World Tables 1994

**Table 8: Austria: changes in exports and imports of goods and services, and current account**

	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Exports (% change, 1983 prices)	5.6	2.8	-1.7	3.8	5.3	5.9
Imports (% change, 1983 prices)	6.3	2.8	0.2	5.0	5.7	6.5
Current account (% of GDP)	0.0	-0.1	-0.5	-0.8	-1.1	-1.2

(1) Estimates

Source: OECD

case in 1993, despite Austria's relatively strong exposure to economic cycles and large losses in competitiveness in 1992 and 1993.

Despite slower wage growth, disposable incomes will increase as a result of the income tax cuts and decelerating inflation. Private consumption should thus recover gradually and, as domestic demand picks up, the current account may weaken slightly, although the deficit should stay around 0.5 % of GDP.

### Employment

Employment reacted only modestly to lower output, as job cuts in industry were largely offset by gains in services. Wage moderation also contributed towards employment stability, which implied a slowdown in productivity growth. Unemployment is projected to fall only slowly, given the scope for further productivity increases and the cyclical responsiveness of the labour force.

Apart from helping to contain rising unemployment, wage moderation is also holding back inflation. Residual inflation inertia in the sheltered sectors will be reduced by intensified competition as a result of the EU membership.

**Table 9: Austria's trading partners, 1993**

(%)	Exports	Imports
BR Deutschland	38.9	41.5
Italia	7.9	9.0
Switzerland	6.4	4.1
France	4.4	4.4
Czech and Slovak republics	3.3	2.2
Hungary	3.5	1.9
USA	3.3	4.4
Japan	1.5	4.4
Central and Eastern Europe	10.4	6.7
EU-12	63.5	67.0
EFTA	8.9	6.7

Source: OECD

### Public finances

Public finances deteriorated considerably in 1993, mainly as an effect of automatic stabilisers. In 1993, the budget deficit amounted to 98 billion schilling (approximately 4.6 % of GDP). The 1994 budget forecast a market improvement compared to 1993 and the deficit was estimated to fall to 83 billion schilling (3.8 % of GDP) in 1994. Austria has one of the lowest deficit to GDP ratios of the EU countries. Nevertheless, the budget deficit is likely to increase as a result of the considerable contributions to the EU budget.

The public debt was roughly 1 200 billion schilling at the end of 1994. Despite sharply falling interest rates, the proportion of foreign-currency denominated debt could increase further since interest rates in the countries to which Austria is the most indebted, such as Japan, Switzerland and the US, continue to be significantly lower.

### Monetary policy

After the collapse of the Bretton Woods System, the Austrian National Bank adopted the hard-currency policy. According to this policy, the schilling/D-mark exchange rate is quasi-fixed. Instead of direct control over the money supply (the task of the Deutsche Bundesbank), the intermediate aim of Austria's monetary policy is the exchange rate. The freedom to set interest rates independently of Germany has to a large degree been forfeited, but there remains some room for independent interest rate moves. Since this policy gained credibility, the interest rate differentials between Austria and Germany have diminished significantly. When fundamental indicators in the Austrian economy are performing better than those in Germany, the Austrian money-market rates may even undercut German ones for a long time without affecting the exchange rate. The current situation shows that with lower inflation and brighter budget deficit prospects, Austrian interest rates may remain substantially below German rates. The long-term stability of the Austrian monetary policy will continue. EU membership will not alter the policy of the Austrian National Bank and continuity is guaranteed.

### Fiscal policy

Austrian fiscal policy has been mildly expansionary, which led to a further rise in the budget deficit during 1993. Revenue



**Table 10: Austria: exports and imports of goods and services**

(million ECU)	1987	1988	1989	1990	1991	1992
Exports in current prices	36 200	40 300	45 600	50 200	53 400	56 700
Imports in current prices	35 700	39 700	44 600	48 600	52 200	54 800
Exports in 1987 prices	36 200	39 500	43 600	47 100	49 800	51 100
Imports in 1987 prices	35 700	39 100	42 400	45 700	48 600	50 000

Source: World Tables 1994

losses from a general income tax cut and the abolition of two different business taxes were only partly offset by increases in corporate and payroll tax rates. The decline in the budget deficit in 1994 was mainly due to receipts from asset sales and a bringing down of reserves. The Austrian government's fiscal policy, as well as the elaborate system of subsidies that shelters such sectors as construction, need to be changed.

### International trade

Germany, with a 40 % share of Austrian exports, is the most important trading partner by far. The reforming countries of Central and Eastern Europe account for 10 %, the highest proportion of any OECD country. Austria's most important Eastern European trading partners are Hungary and the Czech and Slovak Republics. Austria's trade balance with respect to its Eastern European partners is positive as these countries account for around 7 % of the Austrian imports. Since the opening up of the eastern European economies, trade with these countries has grown rapidly

Exchange-rate induced terms-of-trade gains and the fall in domestic demand for goods of high import content have had a positive influence on the current account. However, in 1993, this was more than offset by lower net receipts from tourism, resulting yielding a small current account deficit.

### Important sectors and companies

Austrian industry is dominated by small- to medium-sized enterprises (SMEs): only 110 domestic shares are currently listed on the Vienna Stock Exchange. The banking sector accounts for 25 % and the energy sector for 17 % of the total market capitalisation of roughly 330 billion schilling.

Austria has one of Europe's least transparent economic structures; the country is among the richest in Europe, yet it has no companies the names of which are widely known, beyond its borders, except among specialised audiences. In 1994, only six Austrian companies made the Financial Times list of Europe's Top 500 companies, and all but one of these six companies come from the very large public sector, which illustrates that the country's economic strength rests on the large number of SMEs. Many of these businesses are highly sophisticated and specialised.

The largest company, Bank Austria, was created through the merger of Österreichische Länderbank and Zentralsparkasse und Kommerzbank. The latter is the city of Vienna's savings institution and dominates the savings market. The two largest Austrian companies remain controlled by the public: Bank Austria is owned by the city of Vienna, and Creditanstalt by the federal government, but full privatisation is expected. For years the country's subsidised, and often inefficient, state-owned industries have been sheltered from international competition. The government has been forced to join the growing club of privatisers.

Austrian banks are working hard to put themselves in a position to act as intermediaries in the transformation process of Eastern Europe. They too, however, face dramatic changes as a result of the greatly needed but desperately slow process of restructuring the country's overbanked and overbranched financial system as well as the government's privatisation programme. In the top of the list for rationalisation is the savings bank sector, especially GiroCredit. The result of rationalisation activities has been increasing concentration among the larger savings bank groups and growing competition between them and the commercial banks.

Both OeMV and EVN are partially privatised. OeMV, an integrated oil and chemical producer, is expanding its petrol station network in Central and Eastern Europe. The only one in the private sector of the six largest companies by market capitalisation is Wienerberger Baustoffindustrie, a building materials group which has grown rapidly through acquisitions to become the European leader in bricks and roof tiles.

### Competitive power of Austria

Vienna is considered to be a potential hub of a growing Central European economy and an important conduit between the East and the West, not the least in the area of financial services. The competitive advantage of Austria, apart from its central location in Europe and favourable standing with its neighbours, lies in the country's highly developed infrastructure. Furthermore, Austria is one of Europe's leading nations in such aspects as availability of skilled labour and senior managers, worker motivation and overall security.

**Table 11: Austria: six largest companies by market capitalisation, 1994**

(million ECU)	Market capitalisation	Ranking 1993	Ranking 1994	Sector
Bank Austria	4 219.6	124	133	Commercial banks and other banks
Creditanstalt-Bankverein	2 087.6	206	274	Commercial banks and other banks
OeMV	2 074.8	337	276	Oil-Internationals
VA Technologie	1 275.7	N/A	396	Machinery
Wienerberger	1 118.8	427	444	Construction
EVNJ	1 034.9	N/A	476	Electric utilities, water works and supply

Source: Financial Times FT500, January 1995

Despite some optimism in some service sectors (most notably tourism), there is widespread scepticism about the future international competitiveness of the manufacturing sector. Austria has technological and structural disadvantages compared to other OECD countries. However, these are not fully supported by Austria's high per capita GDP. During the 1980-1990 period, the Austrian economy was characterised by improving cost competitiveness. As mentioned previously, however, large losses in competitiveness were experienced in 1992 and 1993. In the 1980-1990 period, the annual increase in productivity in the manufacturing sector was 4.8 %, whereas relative unit labour costs rose by 0.9 % per year, compared to increases of 3.2 % and 1.5 %, respectively, for the EU as a whole.

## FINLAND

More than half of the area of Finland is covered by forests, whereas lakes make up 9.5 % of the area (32 000 sq km) and cultivated land amounts to 8.0 % (27 000 sq km). The largest cities in Finland are Helsinki, Espoo, Tampere and Turku, and approximately 20 % of the Finnish population are inhabitants of one of these.

Finland is recovering from the most severe recession that any industrialised country has suffered through since the second world war, and it is doing so relatively fast and without being heavily indebted. The Helsinki stock market, enjoying a bonanza of foreign buying, was Europe's top performer in 1994. Finland will be a net contributor to the EU budget, but consumers should benefit from lower food prices as trade barriers fall, whereas Finland's highly subsidised farmers will face a painful adjustment to the EU's lower prices. The country is signing up for the EMS, but intends to float the Finnish Markka for the time being.

**Table 12: Finland**

Area	338000 sq km
Population	5.04 million
Currency	Finnish Markka
ECU exchange rates	6.69628 (1993)
	6.02 (1994)
GDP 1994 (1)	84 billion ECU

(1) Estimates  
Source: OECD

## Economic indicators and trends

In the 1990-1993 period, the Finnish economy was hit by the coinciding international recession, the collapse of trade with the neighbouring Soviet Union, a credit boom that collapsed, and the burden of a large and expensive welfare system.

In 1994, however, exports led the Finnish economy into recovery. For the first time in three years the upward trend in

exports is being sustained, not only by strong price competitiveness, but also by a genuine pick-up in the markets. The decline in domestic demand, which depressed economic activity in 1992 and 1993, has come to an end and both investment and consumption were higher in 1994.

## Current account

The deficit in the current account began to decrease in 1990 and turned into a surplus in 1994. With a current account surplus, the debt may increasingly be financed on the domestic market. Moreover, a stronger Finnish currency will reduce the markka value of foreign-currency debt. Finland's net foreign debt rose to 59 % of GDP in 1993. However, it is expected to decrease during 1994 and 1995, leading to a net foreign debt estimated at 41 % of GDP in 1995.

## Employment

Despite several promising signals, the bright outlook continues to be clouded by high unemployment. The unemployment rate increased from 3.4 % in 1990 to 18.3 % in 1994, putting Finland alongside Spain and Ireland at the top of the European jobless league. Whereas demand for labour is gradually regaining strength (in sectors most important from the employment point of view, i.e. services and construction, the trend in employment is stable and may take an upward turn in 1995), unemployment will persist as the most important social problem over the next few years.

## Public finances

The difficulties in public finance will be alleviated slightly as the economy recovers and expenditure of a cyclical nature decreases. The budget deficit was officially projected to decline from nearly 10 % in 1993 to about 7.5 % in 1994. The fall in public investment will be reversed thanks to stimulatory measures. Public expenditure will thus increase, despite the small decrease in public consumption. The pick-up in activity is expected to improve government finances in 1994 and in 1995.

The public debt has risen fast, from 15 % of GDP in 1990 to around 70 % in 1994. In 1994, the government's net borrowing did not rise as much, and amounted to about 14 % of GDP. The debt is expected to increase only slightly in 1995.

## Monetary policy

Monetary policy appears to have entered a phase of stabilisation. Although short term interest rates may hold some further downward potential, it is expected to have any major impact on economic activity. The inflation is expected to remain very low. The only major source of upward pressure is the value-added tax that was introduced in 1994. Whilst the central bank has occasionally intervened to prevent the appreciation of the markka from being too rapid, monetary policy continues to be geared towards assuring that consumer price rises (excluding changes in indirect taxes and officially administered prices) do not exceed the announced target level of 2 % by 1995.

**Table 13: Finland: components of GDP**

(%)	1991	1993	1994 (1)
Private consumption	56.0	52.4	54.4
Total investment	20.5	18.1	14.9
Government consumption	24.2	22.9	22.3
Exports	22.3	31.8	35.5
Imports	22.9	25.2	27.1

(1) Estimates  
Source: OECD



**Table 14: Finland: trends, 1988-1996**

	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Total GDP (million ECU)	89 500	105 300	108 700	98 100	81 900	71 500	84 000	91 600	N/A
Real GDP growth (%)	7.2	5.7	-0.2	-0.7	-3.6	-2.0	3.5	4.8	3.9
Unemployment rate (%)	4.5	3.4	3.4	7.6	13.1	17.9	18.3	16.3	14.6

(1) Estimates

Source: World Tables 1994, Kansallis Economic Review

**Table 15: Finland: changes in exports and imports of goods and services, and current account**

	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Exports (% change, 1983 prices)	-6.6	10.0	16.6	10.8	7.0	5.1
Imports (% change, 1983 prices)	-11.7	1.1	0.3	5.1	9.1	7.4
Current account (% of GDP)	-5.5	-4.6	-1.1	2.4	2.8	2.9

(1) Estimates

Source: OECD

### Fiscal policy

The 1994-1995 period will highlight the role of the fiscal policy in redressing unemployment. The main focus of fiscal policy remains budget consolidation, with the objective of reducing real central government expenditure to its 1991 level by 1995.

### International trade

In 1993, the EU and EFTA countries accounted for almost 65 % of Finnish imports and for about 64 % of exports. Germany was Finland's single largest trading partner, representing 13.1 % of exports and 16.3 % of imports, followed by Sweden. Major Extra-EU trading partners include the US and the Commonwealth of Independent States (CIS). Trade with the USA was more substantial than with the CIS, although 8.1 % of Finnish imports originated therefrom. At its peak in the mid-1980s, the Soviet Union accounted for 26 % of Finland's trade. Today, the CIS is Finland's fifth largest trading partner.

The volume of exports rose at a record rate of 16.6 % in 1993. The exports were not boosted by economic expansion in traditional export markets but by price competitiveness (stimulated by the depreciation of the markka) and by inroads into new markets. Exports to the Far East, the developing countries and Russia nearly doubled. The favourable impact of recovering exports to Russia began to be felt towards the end of 1993, mainly in the foodstuffs, textile and clothing industries. Exports directed to the EU and EFTA increased

by slightly below 10 %. However, the recovery in Finland's traditional export markets will be the most important factor in determining the prospects for Finnish exports in the next few years.

As domestic demand picks up, the growth in imports will accelerate and the rapid growth in industrial production will stimulate imports of producer goods. Furthermore, the gradual recovery in investment and consumption will also be immediately reflected in imports.

### Important sectors and companies

The economy continues to exhibit distinct dual trends. From 1992, industrial production increased, whereas most services and construction decreased. Despite overall industrial production growth, the developments were not uniform among the various sectors of the industry. In 1993 and 1994, production in the forest, metal and engineering industries increased substantially, stimulated by exports, whilst the output in other industries on average remained at the 1992 level.

Agricultural production increased by nearly 8 % in 1993. Employment in Finnish agriculture accounts for only 7 % of the working population and 2.5 % of GDP. The number of farms is expected to fall to 70 000 within ten years from 120 000 today, whereas the average farm size will rise from 20 to 30 hectares.

Wood products account for 36 % of Finnish exports and their success has done much to promote the country's export-driven economic revival over the last two years. The four largest listed forest industry groups are Repola, Kymmene, Enso-Gutzeit and Metsä-Serla. These groups are expected to expand through acquisitions rather than investments in existing plants. For example, Enso-Gutzeit has recently agreed to buy a 35 % stake in Veitsiluo to, the country's fifth largest pulp and paper group. Whether Finnish groups seek to expand at home or abroad is not clear, 26 % of the forest industry's production capacity is already based abroad. Most of this capacity is located close to the big markets and sources of recycled material in Europe.

The largest Finnish company is Nokia, which over the past three years has transformed itself from a sprawling conglomerate into a dynamic telecommunications company. Nokia is the world's second largest supplier of mobile telephones after Motorola of the US. The company now represents more than

**Table 16: Finland's trading partners, 1993**

(%)	Exports	Imports
BR Deutschland	13.1	16.3
Sverige	11.1	10.2
United Kingdom	10.5	8.8
USA	7.9	7.3
CIS	4.8	8.1
Japan	1.6	5.8
EU-12	46.9	46.4
EFTA	17.0	18.3

Source: OECD

25 % of the value of the Helsinki Stock Exchange. Foreign investors hold more than 50 % of the shares in Nokia.

Production in the service industries declined by nearly 3 % in 1993. However, private services are expected to grow. Telecommunications and transportation will also increase further along with the growth in industrial production.

The Finnish privatisation programme has been a cautious one. As the government in most cases retains more than 50 % of the shares of former state-owned companies, the process is more appropriately characterised as one of broadening of ownership. Over the past 12 months, stakes have been sold in Outokumpu (the mining and metals group), Rautaruukki (steel), Valmet (paper machinery manufacturing), Kemira (the chemicals group) and Veitsiluoto (pulp and paper). Altogether there are some 12 industry groups on the government's privatisation list, including Neste (oil and petrochemicals), Enso-Gutzeit (the pulp and paper group), Finnair (the national airline) and Imatran Voima (energy).

### Competitive power of Finland

Finland offers a high level of technological competence and a high level of education. This is illustrated by the fact that, in the world competitiveness survey for 1994 of the World Economic Forum, Finland headed the list in education and was second in production technologies ranking.

In the forest industry, Finland also offers special know-how. The investment programmes of the late 1980s are only now giving the industry a real competitive advantage.

Moreover, Finland has a stable, well-functioning society. In the world competitiveness survey, Finland ranked fourth in overall security, just behind Singapore, Japan and Austria. After its devaluation in the first half of the 1990s, which raised Finland's price competitiveness, the value of the markka has risen since 1994. Despite the stronger markka, price competitiveness remained good. Price competitiveness is also sustained by the moderate wage agreements of recent years.

### SWEDEN

Of the total area of Sweden, 8.7 % is covered by lakes, whereas cultivated land and woodland make up 6.7 % and more than 50 %, respectively. The three major cities are Stockholm, Göteborg and Malmö, in the metropolitan areas of which more than 30 % of the total Swedish population lives.

The traditional focus of Swedish social democracy has been the welfare system. Over the past 20 years, Sweden's economy as a whole has been losing competitive and productive power. Although a recovery from the three-year recession during the early 1990s at last took hold, the combined effects of the slump and the costs of the country's big public sector left the state with a large budget deficit, the fastest growing public debt in the industrialised world and more than 13 % (if one excludes government training schemes) of the workforce unemployed. Nevertheless, just as Austria and Finland, Sweden will also be a net contributor to the EU budget. However,

Sweden entered the EU on the condition of a budget compromise consisting of a net contribution of only 50 million ECU in 1995, 150 million ECU in 1996, that will rise to 750 million ECU only in the year 2000.

### Economic indicators and trends

Sweden's current economic recovery, after three years of recession, has been driven by the success of its export industry. With the domestic economy still struggling to emerge from the recession, it is the exporting companies that have stimulated growth in the Swedish economy in 1994. The export boom has especially been fuelled by the devaluation of the Swedish krona and the recovery in international markets.

The overall Swedish performance is more steady than spectacular, and the big gains on the Stockholm exchange of 1993 were not matched in 1994. The current recovery of private consumption is expected to strengthen in response to rising household income and a declining household saving ratio in 1995 as consumer confidence improves.

Presently, three issues dominate the Swedish economy: the budget deficit, the resulting increase of the public debt and the unprecedented levels of unemployment.

Growing exports as well as a moderate recovery in the domestic economy are expected in 1995, which has led the government to forecast a gross national product growth of 3.4 % for this year. The Swedish finance ministry foresees stable private consumption despite the reduction in household income due to tax increases and spending cuts, and a fall in the "open" employment, further below 8 %.

### Current account

Although the growth rate of exports is likely to come down from recent levels, export performance is set to remain good. And even though the recovery in domestic demand may be accompanied by rapid growth in imports, the current account could move into a surplus of nearly 2.3 % of GDP in 1995, compared with a deficit of 3.1 % in 1992 and a surplus of 1.1 % in 1994.

### Employment

In 1994, the total unemployment was 346 000 or 7.9 % of the workforce. The increase in economic activity may create new jobs in 1995. The unemployment fell modestly in 1994, influenced by employment movements were and changes in the labour supply. Much of the fall in unemployment, however, was due to a rise in the number of people in government training schemes. When those in government training schemes are added to the total unemployment figure, it rises to about 13 % of the workforce. In the past two decades, net job creation has almost entirely been in the public sector. This is a structural weakness in the Swedish economy.

### Public finances

In 1994, the budget deficit equalled 201 billion kronor, or 13.3 % of GDP. Public spending has grown and accounts for some 70 % of GNP, the highest level among the industrialised countries. Some structural reduction in the budget deficit is foreseen for 1995 and, as the result of cyclical improvements, the general government deficit may fall to 10 % of GDP. However, unless the budget deficit is quickly brought under control and borrowing is stabilised, the danger of continued high interest rates, resulting in a return to recession, will remain.

Borrowing in order to finance the budget deficit has pushed up the public debt. In 1994, it amounted to 81 % of GDP. Through a series of tax increases and spending cuts, the Swedish government is now trying to stop the further growth of the debt.

Table 17: Sweden

Area	449964 sq km
Population	8.75 million
Currency	Swedish Krona
ECU exchange rates	9.12151 (1993) 9.04 (1994)
GDP 1994 (1)	167 billion ECU

(1) Estimates  
Source: OECD

**Table 18: Sweden: components of GDP**

(%)	1991	1993	1994 (1)
Private consumption	53.3	54.7	54.0
Total investment	17.9	13.7	14.2
Government consumption	27.3	27.7	27.0
Exports	27.9	32.7	35.7
Imports	26.4	28.9	30.8

(1) Estimates  
Source: OECD

**Table 19: Sweden: trends, 1988-1996**

	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Total GDP (million ECU)	153 600	173 000	180 100	192 200	190 700	159 200	167 000	N/A	M/A
Real GDP growth (%)	3.9	2.4	1.4	-1.2	-1.9	-2.1	2.3	2.3	2.5
Unemployment rate (%)	1.6	1.4	1.5	2.7	5.3	8.2	7.9	7.7	7.5
Industrial production (% change per year)	2.9	1.0	-0.6	-5.6	-4.0	2.5	8.3	6.9	7.3

(1) Estimates  
Source: World Tables 1994

## Monetary policy

EU monetary convergence criteria will probably force the

**Table 20: Sweden: changes in exports and imports of goods and services, and current account**

	1991	1992	1993	1994 (1)	1995 (1)	1996 (1)
Exports (% change, 1983 prices)	-2.4	2.2	7.2	12.8	8.5	7.0
Imports (% change, 1983 prices)	-5.0	1.3	-0.4	10.0	6.7	6.0
Current account (% of GDP)	-1.4	-3.1	-0.9	1.1	2.3	3.4

(1) Estimates  
Source: OECD

**Table 21: Sweden's trading partners, 1993**

(%)	Exports	Imports
BR Deutschland	14.4	17.9
United Kingdom	10.2	9.4
Norway	8.2	6.5
USA	8.4	9.1
Finlan	6.6	7.3
Japan	4.6	6.2
EU-12	2.5	5.0
EFTA	53.3	55.2
	16.1	16.0

Source: OECD

Since the autumn of 1993, the Swedish central bank has been cautious in relaxing the stance of monetary policy in order not to jeopardise its medium-term inflation target of 2%. Although short-term interest rates may come down, long-term interest rates remain high given the rapid accumulation of the public debt.

government to be more disciplined in reducing the country's large budget deficit and fast growing debt. These expected tougher government actions are likely to bring down interest rates, which will stimulate investment and help create new jobs. A climate of greater investor confidence in Sweden should bring about both increased domestic investment and a rise in much-needed foreign investment in the country.

## Fiscal policy

The revised 1994 Swedish budget that was presented in April 1994 increased the target for medium-term deficit reduction from 80 billion kronor to 100 billion kronor (equivalent to around 7.0% of GDP) with the consolidation process being implemented faster than previously envisaged. However, specific proposals for improving public finances in the coming five years will be presented in the course of 1995. Market sentiment is very sensitive to the pace of fiscal consolidation, implying that policy credibility could be lost if the required reduction of the budget deficit is postponed. This underlines the importance of making the medium-term fiscal strategy more credible.

## International trade

Europe is by far the largest market for the Swedish multinational companies. In 1993, the EU accounted for more than

**Table 22: Sweden: exports and imports of goods and services**

(million ECU)	1987	1988	1989	1990	1991	1992
Exports in current prices	45 500	49 700	55 600	54 100	54 000	53 300
Imports in current prices	42 800	47 100	54 600	53 400	51 000	50 000
Exports in 1987 prices	45 500	46 800	48 200	49 100	47 900	49 000
Imports in 1987 prices	42 800	44 900	48 300	48 600	46 200	46 800

Source: World Tables 1994

**Table 23: Sweden: ten largest companies by market capitalisation, 1994**

(million ECU)	Market capitalisation	Ranking 1993	Ranking 1994	Sector
Astra	12 302.6	32	29	Drugs
Ericsson LM	9 808.0	37	52	Communications equipment
Volvo	6 843.2	136	83	Automobiles
Asea	5 458.1	47	34	Electrical equipment
Pharmacia	3 812.2	82	142	Drugs
Sandvik	3 386.6	145	162	Machine tools
Investor	3 020.4	254	186	Investment companies
Electrolux	2 946.8	253	190	Household durables and appliances
Stora	2 896.4	221	195	Forest+E379ry products
Skandinaviska Enskilda Banken	2 693.4	199	208	Commercial banks and other banks

Source: Financial Times FT500, January 1995

**Table 24: Sweden's industrial revival**

(% change per year)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (1)
Industrial productivity	1.6	1.9	1.7	1.4	3.1	1.6	0.9	6.7	9.1	3.6	2.9
Unit labour costs	9.0	6.2	4.5	5.2	7.2	8.5	7.6	-3.6	-6.7	0.1	2.6
Industrial production	2.0	1.2	2.4	2.9	1.0	-0.6	-5.6	-4.0	2.5	8.3	6.9

(1) Estimates

Source: National Institute of Economic Research, Central Bank, OECD

50 % of both exports and imports. The single most important trading partner is Germany (14.4 % of exports, 17.9 % of imports) followed by the UK, Norway, Denmark and Finland. The US, accounting for 8.4 % of Swedish exports and 9.1 % of Swedish imports, is Sweden's major Extra-EU trading partner.

### Important sectors and companies

The pulp and paper sector is Sweden's largest net export earner, and the EU is by far the largest market for the overall forest industry. About 30 % of the industry's existing capacity is located outside Sweden, but within EU borders. During the late 1980s and early 1990s, Swedish forest industry groups invested heavily in the UK, Germany and France in order to settle near their main markets. In the present expansion phase, there are signs that a greater proportion of investments is concentrated in Sweden itself.

Sweden's pulp and paper groups enjoyed a 1994 that was much better than they expected. Profits grew as rising prices and strong demand drove up capacity utilisation and sales. The weak krona, cost reductions and lower debt burdens also contributed to the upturn. As an EU member state, the Swedish

forest industry will have a direct influence on the EU policy in the continuing environmental debate, an issue of considerable commercial importance to the companies in this sector. However, EU membership will carry a cost for the forest industry groups: to help fund the estimated 20 billion kronor (2.2 billion ECU) yearly cost of Swedish EU membership, a series of new corporate, energy and environment taxes has been introduced.

Sweden's regiment of big companies has largely survived the domestic recession of the early 1990s and the international slump to preserve its impressive record on the European and international stage. Sweden's representation in the European Top 500 companies by market capitalisation has risen to 24 in 1994, against 21 in 1993, with seven new entries or re-entries outweighing four departures, two of which were accounted for by a take-over (Nobel Industries bought by Akzo of the Netherlands) and a break-up (Pharmacia breaking free from Procordia). Moreover, the country can claim another half company in the Swiss-Swedish engineering giant ABB Asea Brown Boveri which is the 34th largest company on the FT 500.

The growth in exports has been reflected in improved rankings for companies such as Electrolux, the home appliance maker, Atlas Copco and SKF, two stalwarts of Sweden's cyclical engineering sector, and the forest industry groups Stora, AssiDomän and MoDo, the latter two newcomers on the FT 500 for 1994. Stora was Europe's biggest pulp and paper group in 1994. Residential construction saw another year of sharp decline in 1994, but capacity pressures in export sectors should lead to a recovery in business investment.

Excluding the privatised AssiDomän, perhaps the most eye-catching Swedish performer was Hennes & Mauritz, the clothing retailer. With its profitability (nearly 50 per cent return on capital in 1993) it became a star of the Stockholm stock exchange.

Tourism is one of Sweden's fastest growing sectors and, although the sector is a relatively young one, ranks as the country's third largest industry, generating a yearly turnover of an estimated 98 billion kronor of which 21.4 % comes from foreign tourists.

The investment-exodus of the late 1980s has led to an alarming shift in industrial output. Increasingly, Swedish multinationals export basic components to units in EU member states where more sophisticated phases of production are completed. Exports still account for about 50 % of Sweden's industrial production, but the proportion of basic industries, such as steel or pulp and paper, has increased while engineering industry's share has waned. This has devastated many small and medium-sized companies that survived as suppliers and helps explain the plunge of industrial production to about 18 % of GNP from 27 % in the early 1980s.

### Competitive power of Sweden

Sweden dominates the corporate scene in the Nordic countries. However, Denmark and Norway both enjoyed economic growth of more than 4 per cent in 1994 and have not been held back by large budget deficits as Sweden has. According to the world competitiveness survey for 1994 of the World Economic Forum, Sweden headed the list for total expenditure on R&D as a percentage of GDP and was second in management (business efficiency, management development).

Two important factors have transformed the competitiveness of Swedish industry. The first is the devaluation of the Swedish krona in the 1990s, which restored the ability of manufacturers to compete in the European market. The second change is a significant rise in industry's productivity over the past few years. In the long term, the second factor is more important as the krona may rise in value, and the effects of increased productivity are expected to last.

## CONSEQUENCES OF THE ENTRY OF AUSTRIA, FINLAND AND SWEDEN

Apart from the effects on the three new Member States, four categories of consequences for the EU can be distinguished: economic, social, legislative and other consequences.

### Consequences for the three new Member States

The direct consequences for Austria, Finland and Sweden are limited because the countries have already adopted EU rules and legislation to a great extent. On January 1, 1994, the European Economic Area (EEA) Agreement came into force, effectively expanding the single market into five countries of the European Free Trade Association (EFTA): Austria, Finland, Ireland, Norway and Sweden.

The EEA is quite similar to the EU internal market with its four freedoms (freedom of movement of goods, capital, persons and services), but there are some important exceptions. Processed and unprocessed agricultural products are largely outside the scope of the EEA. Trade in such products continued

to be subject to national market arrangements. Moreover, as the EEA does not involve a customs union, border controls and the disadvantage of being a third country with respect to the EU increased the prices of Austrian, Finnish, and Swedish exports and reduced their competitiveness. Furthermore, although the three former EFTA countries enjoyed most of the advantages of the single market, they had no real influence on the rules and regulations which underpin it, which was a great disadvantage.

For Austria, Finland and Sweden, the EEA Agreement was only a temporary arrangement as they foresaw joining the EU in January 1995, subject to the outcome of national referenda.

EU membership will make labour more mobile and, sectors of the economy that were traditionally protected more exposed to competition and thus more efficient. EU membership will also reduce technical trade barriers such as different standards and test certificates. But most important of all, the countries will have better chances of attracting foreign direct investment. For example, Austria could become an EU centre for production and services because of the strong historic ties to the transition economies of Central and Eastern Europe. EU entry is expected to translate into roughly 3.8 billion ECU in additional output in Austria (i.e. 2-3 % of the GNP) within six years. Sweden expects EU membership to add 0.8 percentage points to annual economic growth between 1995-2004. The net economic benefits of joining the EU for Finland is estimated to equal 4.2 % of GNP, whilst national consumption is expected to increase by 5.5 %.

### Economic consequences in the EU

The enlargement will affect the EU's trade policy. Austria, Finland and Sweden will join the voices that argue for free trade and budget discipline, partly because they are all going to be net contributors to the EU budget. Therefore, a more liberal regime is expected. The Nordic countries are also expected to support the UK, Denmark, the Netherlands and Germany with regard to their desire of tighter control on state aid.

### Social consequences in the EU

The new Member States will bring more votes for environmental protection, for open and democratic decision-making and for high social standards. Austria, Finland and Sweden support the principle of subsidiarity, the principle of decentralising decision-making from Brussels where appropriate. Expansion, therefore, seems to be an achievement for defenders of arguments in favour of wider, rather than deeper, integration. However, Austria, Finland and Sweden are determined to strengthen the EU's social policy.

### Legislative consequences in the EU

Being EU members, and thereby able to influence policy and regulations on market conditions and standards, is of great importance for various sectors vital to the three countries, such as Sweden's wood and telecommunications industries.

The paper and pulp and forest industries are important for both Finland and Sweden. Therefore, Swedish and Finnish multinationals will try to influence EU directives, particularly where, as in the case of waste paper recycling, there is a direct impact on the amount of virgin fibre going into the paper system.

Austria entered the EU on the condition that it receive important concessions until the year 2001, at the earliest, with respect to the control of the flow of heavy trucks passing through the Austrian Alps. Furthermore, Austria will probably exert considerable influence on the Common Agricultural Policy (CAP) henceforth. Influencing the formulation of this policy is important to Austria as the food processing industry, Austria's largest industry, and the small farms will be sig-



nificantly affected by the CAP. The CAP is also of importance for Finland, as food-related industries account for about 10 % of Finnish production.

### **Other consequences**

The enlargement will imply less inward and more outward expansion, especially towards the East. Austria, Finland and Sweden support early EU membership for the Central and Eastern European countries. Enlargement might begin with the Czech Republic, Poland and Hungary, followed by the Slovak Republic, Bulgaria and Romania, and the Baltic states.

Enlargement further implies institutional reform. Striking deals will inevitably become more difficult as the Union grows. This means that more effort must be made to streamline the process, to reduce the bureaucracy, whilst at the same time providing maximum flexibility for the decentralisation of decision-making. The current trend appears to be towards a minimum set of rules and obligations, with no Member State having the right to stop others able and willing to move at a faster pace.

Written by: Netherlands Economic Institute



## Media services

*The communications and audio-visual sector produces a modest turnover, compared to industrial segments of the economy, or telecommunications. It is however a very important field for Europe, because of its visibility among citizens, and also because it constitutes the reference market for multimedia services, on which much hope is conceived as a future driving force of the community's economy.*

*It is also a complex area, since it includes segments as varied as, the press and book publishing, cinema theatrical exhibition, television, cable and satellite programming, and other audio-visual domestic entertainment, broadcast or edited, such as radio home video and video games.*

*Moreover, the economic state of each sector is very contrasted per national market: total spending in one area depends largely on the state of appropriate equipment infrastructures (this is particularly obvious for cable or satellite, for which penetration rates are very different, say in the Netherlands, from southern European countries) and also on cultural factors (such as the tradition of heavy press consumption per capita in the UK).*

### THE MARKET IN 1993

#### Press and publishing

In terms of sheer turnover, the press is still the single biggest segment of the communications sector. In 1993, the total press and book publishing activity for the five bigger countries in Europe exceeded 70 billions ECU. Its revenues are derived in comparable proportions from two main sources: sales to the public and advertising.

As the older branch of the communications sector, the publishing business has undergone several waves of mergers and acquisitions, and is now very concentrated around a few national players.

#### Television

Since the beginning of the eighties, the main evolutions in the television field were spurred by the rise of the private, commercial sector which caused increasing financial difficulties for public broadcasters (mainly because governments refuse to increase licence fees). For instance, German public broadcasters have recently declared major deficits and staff reductions: at ARD, 1.4 billion DM by 1996 with the loss of 800 jobs; at ZDF, 94 million DM and 400 jobs (Source: TV World October 1994).

There is also a trend towards weakening of the audience base for the generalist, terrestrial channels, mainly due to the development of the "thematic" chains. They remain however the preferred medium for mass audiences. In that regard, they are insured the best share of the television advertising market, even in the context of a declining audience.

In the last part of the decade, another important phenomenon arose: this is the mutation in transmission media, from ter-

restrial to cable for part of Northern Europe, and now, even more rapidly, to direct satellite broadcasting.

The number of satellite only channels went from none in 1980 to almost as many as there are terrestrial channels in the mid-nineties.

There are now over 35 millions European households receiving television through cable and satellite. This amounts to a penetration rate of about 28 % of TV homes.

In that regard, Europe is still behind the US, which counts a cable subscription rate of over 60 % among TV households, but the reach of new television transmission systems is no longer a marginal, secondary market.

Cable and satellite reception infrastructures is one of the fields for which the national and regional situation is the most contrasted in Europe: the percentage of homes receiving non-terrestrial television amounts to over 40 % in Northern Europe, while it is still under the 5 % lever in southern Europe.

The satellite transmission market for television services in Europe is clearly dominated by one of the only private operators: The SES, (Astra satellites) based in Luxembourg. Astra reaches over 47 million homes in all of Europe and the EFTA countries.

Germany is clearly the biggest market for consumer-based traditional and new media alike: it has the largest installed base and highest penetration rates for cable and satellite equipment. Belgium has the highest cable penetration rate in Europe, followed by Germany and the Netherlands.

For pay TV services however, it is France (with Canal+) and the UK (with BSkyB), among the "big" countries, which are the most developed.

The total revenues derived from television are going to be coming increasingly from pay services, mostly subscription based. The potential for growth of pay television is still high in Europe. Global television-derived advertising revenues continue to grow at a mature pace.

The pay-TV market is dominated by three media groups, each of them selling a package of channels, centred around a premium movie service. They all have an international scope.

#### Other audio-visual services

##### Cinema

National box office results largely depend on the film exhibition industry. This industry has undergone in Europe two major trends in the last decades: modernisation of exhibition infrastructures, with the development of multiplex theatres, and concentration of the business around large corporate structures.

##### Home video

Home video has grown considerably in Europe, with penetration rates reaching high levels. This medium now concerns

**Table 1: Revenues of press and publishing sector, 1993**

(billion ECU)	D	E	F	I	UK
Press total	14.30	5.54	8.94	5.66	15.98
- Sales	6.36	2.80	5.10	2.07	9.54
- Advertising	7.98	2.74	3.83	2.53	6.43
Publishing total	8.15	2.72	3.27	2.61	3.23
Press and publishing total	22.45	8.26	12.21	8.30	19.21

Source: BIPE Conseil

**Table 2: Main players in the press and publishing sector**

Country	Press	Publishing
BR Deutschland	Axel Springer Burda Grüner & Jahr Heinrich Bauer WAZ	Bertelsmann Fleissner Holtzbrinck Piper
España	El Correo Godo Prensa Española Prensa Iberica Prisa	Editorial Everest Editorial Planeta Grupo Anaya Plaza y Janes
France	C.E.P. Communication Hachette Hersant Prisma Presse Hachette	Albin Michel Flammarion Gallimard Groupe de la Cité
Italia	Mondadori RCS Editori Mursia Rizzoli	Einaudi Mondadori
Nederland	Reed-Elsevier VNU Wolters-Kluwer Malherbe Group	Reed-Elsevier VNU Wolters-Kluwer
United Kingdom	Reed-Elsevier Pearson Thomson Corp. United Newspapers Blackwell	Reed-Elsevier Pearson Dun & Bradstreet Thomson Publishing

Source: BIPE Conseil

over 90 million households in Europe. But the program consumption (purchasing and renting of pre-recorded tapes) is far from having reached the American level, even for the same equipment penetration rate. Nevertheless, the economic weight of the home video commercial activity Europe is now already larger than that of the cinema.

#### Radio market

Radio has been successful in retaining audiences and advertisers in an increasingly competitive and technologically complex media environment. This is particularly true in France and Germany, where radio advertising markets are rather striving.

Radio advertising in Europe is experiencing double digit growth in 1993 for the best stations. The CLT has a major

share of European commercial radio activity, and is expanding its base of radio stations throughout the Community.

Concerning technology advances in the sector, it is worthwhile to mention the existence of pre-operational digital audio broadcasting in the UK, Germany and France.

#### EUROPEAN MEDIA AND THE GLOBAL MARKET

In spite of the different measures taken by community and national regulation bodies, the trade deficit between the US and Europe in the audio-visual sector, or at least the program trade (including the film industry, television broadcasting and home video) is increasing: the deficit grew from 2.38 billion ECU in 1990 to an estimated 2.91 billion ECU in 1995.

This deficit now represents over 5 % of the total media services market value in Europe. Measured in absolute terms, it is

**Table 3: National television markets in 1993: players and household base for terrestrial TV**

Country	Players	TV households (million)
Belgique/België	RTBF	4.0
	BRT	
	RTL TVI	
BR Deutschland	VTM	32.0
	ARD	
	ZDF	
	RTL+	
	SAT 1	
España	Pro 7	11.3
	RTVE (1 and 2)	
	Autonomic channels	
	Antenna 3	
France	Tele 5	20.5
	TF1	
	F2/F3	
	Arte/La Cinquième	
	M6	
	(Canal +: unencrypted segments)	
Italia	RAI1	20.3
	RAI2	
	RAI3	
	Rete 4	
	Canale 5	
Nederland	Italia 1	6.1
	NOS	
United Kingdom	RTL4	22.0
	BBC1	
	BBC2	
	ITV channels and Channel 4	

Source: BIPE Conseil

not likely to decrease with the advent of new technologies, such as digital compression, which will multiply the number of channels. But European production progresses as well in this context, if not in the same proportions as do the amount of imports.

There are only a few European multimedia groups of international scope (see Table 11). A number of them are already present on the television market.

## FORECASTS BY SEGMENT

### Press and publishing

The medium term outlook is very grim for advertising revenues in the press: they are going to be lower in 1997 than in 1993 in most countries considered, especially in Southern Europe

and in France, changing at average annual rates going from -4 % to less than +1 %. As for the book publishing area, forecasts go from over -3 % to less than +2 % change yearly. Sales of press and publishing products to the public are more likely to maintain themselves than advertising revenues for which forecasts are negative in every country except the United Kingdom.

### Television

Evolutions of the television market much depend on whether free, terrestrial television or pay television is considered: growth perspectives are about 10 times higher in the latter field within a medium term timeframe, leaving more room for new channels than in the saturated traditional fields. Overall however, revenue growth for the sector will remain healthy.

### Other audio-visual services

#### Cinema

Thanks to substantial restructuring of the sector in several European countries ( the United Kingdom, Spain...) theatrical exhibition revenues will maintain themselves. Being a mature activity, they won't grow and theatrical exhibition will increasingly play a showcase role for the other audio-visual markets ( home video, cable and satellite rights..).

#### Home video

The global trend in European home video is towards a 20 % increase within the 5 year period, averaging nearly 5 % growth a year. Revenues are increasingly coming from sales, while they were dominated by rentals up until 1992.

## TRENDS AND NEW TECHNOLOGIES ON THE MEDIA MARKETS

### Segmentation of new services

The new "media services" in development can be divided into a few families of services defined by technical and access criteria:

- Multimedia publishing (editorial content published on CD-ROM or CDI);
- New services using analog technologies (pay per view, interactive television, teletex type services); interactive television is an upgrade to analogue TV or for digital TV, typically to permit viewer participation in quiz shows, or for home shopping;
- On demand television services (using cable, ADSL...) such as video on demand, made possible by digital television broadcasting;
- Telematic, on line computer information services.

### The new media markets

The new media markets are developing with the introduction of computer, telecommunications techniques and players into the field of traditional leisure industries such as publishing and television. These services can be based on three types of terminal: television, computer or specific, dedicated terminal.

**Table 4: Evolution of the number of television channels in Europe**

(number of TV channels)	1980	1985	1990	1995 (1)
Terrestrial	55	65	91	100
Satellite	0	11	39	80
Total	55	76	130	180

(1) Estimate

Source: BIPE Conseil



**Table 5: Household base for TV services other than free terrestrial television, 1994**

(million households)	Pay TV subscribers	Cable subscribers	Direct TV household subscribers
B	0.20	3.50	0.02
D	0.75	13.00	6.00
E	0.80	0.15	0.10
F	3.70	1.60	0.12
I	0.50	N/A	N/A
NL	0.60	5.40	0.20
UK	2.50	0.60	2.60

Source: BIPE Conseil

**Table 6: Economic weight of the TV market per segment, 1993**

(billion ECU)	D	E	F	I	UK
"Free" TV	4.36	2.43	7.60	5.33	4.77
- Household (licence fees)	2.06	0.00	5.28	2.00	1.45
- Advertising	0.18	2.43	2.32	3.33	3.32
Pay TV and cable subscription	0.64	0.46	1.27	0.07	0.96
Total	5.00	2.90	8.87	5.40	5.74

Source: BIPE Conseil

**Table 7: European Pay-TV activity**

	Canal+	BSkyB	Filmnet
International presence	B, D, E, F Africa, Poland, Polynesia. Chile (project)	UK, IRL	B, DK, FIN, NL, N, S
Satellite Encryption	Telecom 2A Syster	Astra Videocrypt	Astra Videocrypt

Source: BIPE Conseil

**Table 8: Cinema (theatrical exhibition), 1993**

	D	E	F	I	UK	EU-12
Number of screens	3 630	1 800	4 400	3 020	1 757	16 621
Box office turnover (million ECU)	401	250	600	421	380	2 400

Source: BIPE Conseil

**Table 9: Home video, 1993**

	D	E	F	I	UK	EU-12
Installed base of VCR (million)	25	6	15	9	17	90
Spending on home video (million ECU)	460	260	590	390	1 700	5 000

Source: BIPE Conseil

**Table 10: Radio advertising markets, 1993**

(million ECU)	Turnover
B	600
D	580
E	1 300
F	540
I	160
NL	500
UK	220

Source: IP

**Perspectives for new television services in Europe**

*Pay Per View*

The potential in Europe for increased consumption and spending for pay television services is high (the average American home spends several times what the average European home on pay television). Moreover, the advent of digital technology will enable operators to enrich their pay TV offer, to diversify their marketing techniques (tier paying, multiplexing of channels, pay per view or pay per play...) and to lower their transmission costs.

The commercial potential of pay per view is real, but, as the American experience proves, relatively limited in a multiple channel environment. One big stumbling block is the avail-

ability of movie rights, which is often limited by the grip in this field of existing broadcasters and pay television services. This analysis is also true for Video On Demand. This implies alliances between the program service operators (cable operators, pay services operators) and the program providers (American Majors, European movie right holders like the Kirch group).

Another problem with pay per view is the response time. The less time a customer has to wait after ordering programme, the better the utilisation rate, according to US results. This will depend upon how many channels the cable operator has reserved for pay per view. Also availability of exclusive special event programming like boxing fights boosts utilisation. Films are more difficult because studios will not concede a pay per view release window ahead of video release.

Experiments as well as commercial pay-per-view services are already in place in several European countries: The Multivision pay-per-view service was launched in France 1994 by the consortium formed around Telcarte (France Telecom, represented by VTCOM, Lyonnaise des Eaux, CLT and TF1). In the Netherlands, Philips, PTT Netherlands allied with the American Graff pay per view has launched a service in 1994.

*Digital television services*

Digital TV enables the consumer, among other things, to reap the benefits of compression by receiving a large number of television channels and using interactive services such as video on demand or interactive information data bases. To date, the biggest issue in digital television is the set top box or rather

**Table 11: Multimedia: major players in telecommunications, television and cable**

	Telecommunications	Cable	Major multimedia groups	Major private TV	Major shareholders
B/L	Belgacom	Electrabel	Suez, GBL CLT	RTL VTM Canal+	CLT(GBL) VNU Canal+
D	Deutsche Telekom	Deutsche Telekom	Bertelsmann Axel Springer	RTL SAT 1 Première	CLT(GBL), Bertelsmann Kirch, Springer Canal+, Bertelsmann
E	Telefonica	-	Prisa	Tele 5 Antenna 3 Canal+	Fininvest, CLT (GBL), Kirch, Once - Canal+, Prisa
F	France Telecom	France Telecom COMDEV CGV Lyonnaise Com	Matra Hachette Havas Chargeurs	TF1 Canal+ M6	Bouygues Havas, Générale des Eaux CLT (GBL), Lyonnaise-Dumez
I	SIP	-	Fininvest Audiofina	Canale 5 Italia 1 Rete 4	Fininvest Fininvest Fininvest
NL	PTT Telecom	VECAI PTT Telecom	Elsevier VNU	RTL	CLT(GBL), VNU
UK	BT	122 franchises	Pearson Granada Carlton	BSkyB ITV	NewsCorp, Chargeurs, Pearson -

Source: BIPE Conseil



**Table 12: Forecasts for the press and publishing sector, 1993-98**

(% growth of revenue over five years)	D	E	F	I	UK
Press total	1.5	-19.0	-12.0	-22.0	4.0
- Sales (households)	5.8	-3.0	-3.3	-10.0	2.6
- Advertising	-1.5	-34.0	-15.9	-34.0	6.0
Publishing total	25.0	-5.0	-5.0	-7.0	8.0
Press and publishing total	8.0	-13.0	-11.0	-17.0	4.7

Source: BIPE Consell

**Table 13: Forecasts for the television sector, 1993-98**

(% growth of revenue over five years)	D	E	F	I	UK
"Free" TV	12.0	5.5	3.0	-3.0	5.0
- Household (licence fees)	16.0	N/A	8.5	25.0	-2.0
- Advertising	9.0	5.5	1.3	-22.0	8.5
Pay TV and cable subscription	218.0	40.0	44.0	1 000.0	84.0

Source: BIPE Consell

**Table 14: Forecasts for the sector of other audiovisual services, 1993-98**

(% growth of revenue over five years)	D	E	F	I	UK
Cinema	-2.0	7.0	3.0	0.0	7.0
Home video	20.0	18.0	25.0	23.0	18.0

Source: BIPE Consell

the commercial functionalities of the set top box. The European Digital Video Broadcasting Group has defined specifications for digital satellite and cable which have become ETSI norms and ITU recommendations. DVB brings together manufacturers, broadcasters, transmission providers and others to consider requirements for new TV systems. There is therefore agreement on transmission / reception standards. The debate on proprietary and open systems relates only to conditional access systems for pay TV. A key objective of the DVB discussions was to define technical approaches which would per-

mit a single integrated receiver / decoder to receive encrypted services from more than one broadcaster. Two approaches were defined, i.e. Simulcrypt and the Common Interface. These approaches are not mutually exclusive and could be implemented together in the same decoder.

Another crucial element in the success of future digital services is definitely the user interface, navigation system available for the subscriber of a multi channel, multi-service offer (also restrictively named "Electronic TV Guide".) Several European players in the broadcasting, telecommunications and computer fields are working on the development of such software.

Digital television will be introduced in Europe by satellite and cable by end-1995 ahead of terrestrial delivery, since the DVB group is still defining the specification for terrestrial. One likely candidate to the pioneer position in this field is Canal+, allied with Bertelsmann in the Canal Satellite service, which is planning a digital satellite broadcast of several channels and services beginning in 1995-1996. BSkyB, has also announced the launching of digital satellite broadcasting services. The American groups Viacom (MTV, etc...), which already has a digital broadcast feed, and Turner should also be in the race.

This new area promises to be competitive, and European players seek partnership in order to better resist possible non-European entities, which can be more advanced in the design of digital television services.

**Table 15: Examples of multimedia domestic services**

Reference market	Domestic services
Press and publishing	CD-ROM On-line information services
Audiovisual services	
- Analog	Pay per view Teletex type information services
- Digital	Digital television: increased number of channels Video on demand Interactive teletext Video games

Source: BIPE Consell





**Table 16: Main operators planning digital television services**

Canal+  
BSkyB  
Matra Hachette  
Bertelsmann  
American service providers:  
- Turner  
- Viacom  
- Time Warner  
Cable operators and telecom companies:  
- Deutsche Telekom  
- Lyonnaise des Eaux  
- France Telecom

Source: BIPE Conseil

#### Wide screen 16:9 TV

High Definition Television (HDTV), the new standard of television reception, promises to be the major development of the twenty-first century. Widescreen (16:9 format) and improved definition television receivers have recently entered the market: in 1994, total European sales of 16:9 widescreen TV sets reached 150 000 units (100 000 in France only, as 16:9 broadcasting started there first).

#### Video on demand

A lot of the commercial or technical problems to real "on demand" services are not solved yet, as shown in the American experiments (in Orlando, for instance). Real video on demand services will not be implemented commercially and on a wide scale in Europe before 1998. Their launching will be prepared by multi channel, multi services packages, and pay per view services...

The countries best prepared to digital services are those where the cable and satellite penetration is high (Germany, Belgium, the Netherlands) and where there is already a real multi-channel environment. The presence of a strong alternative program provider (as Canal+ in France and BSKyB in the UK) is also an asset.

So far, only a few video on demand trials have been announced: one, instigated by British Telecom, should be using ADSL and an Oracle media server, and the Deutsche Bundespost is also planning trials in Germany.

#### On-line information services and data bases

It has been much heralded that the advent of digital technologies will blur the line between traditional broadcast media and the computer and telecommunications industries. This predicament has now become true, as shown by the birth of a new category of media, that we can globally call "on-line services". These services distribute to the consumer's home information, entertainment, educational and professional services. They are also a meant to convey personal communications.

There are three main categories of on-line information services to the home:

- Broadcast, TV based, interactive teletext (through terrestrial or satellite distribution): produced and distributed in partnership with broadcasters (France 2 France3, Pro7 with Burda, Swiss Television, RAI, etc...). This type of activity, possible within an analog environment, is picking up quickly after having been long neglected. Teletext services are widespread in countries where the majority of TV receivers are equipped with a teletext decoder (like the Netherlands, and Belgium). They are likely to be further developed in a digital environment, where the television set can be an outlet for services much like those currently proposed by Teletel in France, or by the American on-line services.
- on-line dedicated terminal-based services (Teletel). The Minitel technology is likely to be replaced in the long term by standard platforms.
- on-line, computer based services (Compuserve, Bulletin Board Services). They are growing fast in the US. In Europe, their success in the consumer market will depend on the computer and modem penetration rates. These services are gaining ground in Europe. They first appeared as subsidiaries of the American services, simply duplicated for the European market instead of being custom-made for the European national and multilingual audiences. But recently, European actors are emerging to compete with Compuserve, America On Line and Microsoft Network on their own market: the European consortium formed by Matra, Burda and the CLT is launching Europe On Line, and in France, the video game and on line service company Infogrames is planning to introduce Infonie, another computer based service.

Written by: BIPE Conseil



## Impact of the globalisation of markets on financial instruments available to the European capital goods industry

The European capital goods sector is of crucial importance, accounting for a third of total industry value-added and a similar share of total extra-EU exports.

The sector is made up of a wide range of different products, technologies and markets. Despite this diversity, a number of key threads run through these industries: interdependent amongst themselves, generally capital intensive and highly cyclical, they have a significant role to play in infrastructure development and are vital to the Union's workforce and economy.

### The growing concerns for EU capital goods competitiveness in a global market

An increasingly global demand and supply structure has led to an intensification of world competition for European producers, both on home ground and on export markets.

For this reason, large capital goods groups, as well as SME's, the latter traditionally more dependent on domestic markets or at best on intra-European export markets, will have an increasing need to respond to the global challenge if they are to survive in the long term. The same is true of some of

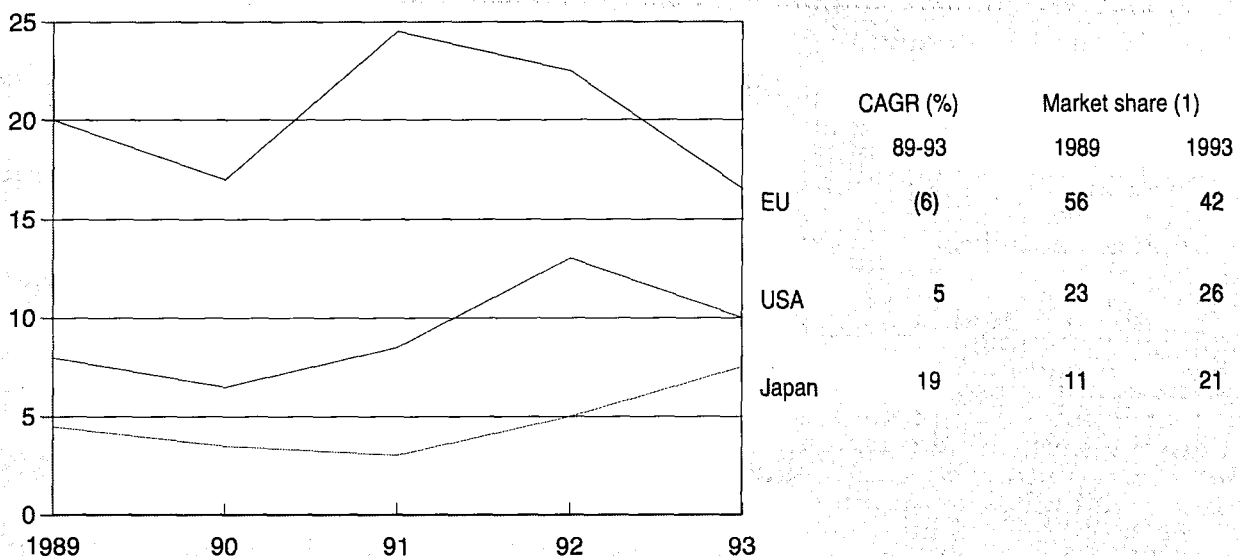
the smaller or less developed European export economies, which do not currently have adequate export support structures for their national capital goods producers and exporters.

In recent times, however, there have been concerns over a decline in the trade balance in certain European sectors of capital goods and hence, the future competitive position of European exporters. In particular, a decrease in competitiveness has been noted with respect to the rapidly growing Asian and Pacific rim economies and producers. As underlined in the EU White Paper on growth, competitiveness and employment, this is a matter of special urgency since the clear key to the future is to push European export capabilities in the fastest growing markets outside the Union.

### Financing - an increasingly major tool in the global expansion and competitiveness of a capital goods firm

Greater communication levels, globalisation and competition have meant that success is depending less and less on pure product and price strategies, and more and more on the related services which provide the right fit between capital goods and their markets.

Figure 1: Evolution of officially supported credit > 1 year



(1) Percent of total OECD supported credit > 1 year  
Source: OECD

**Table 1: Maximum level of insurance coverage (1)**

(%)	Political risk		Commercial risk	
	Buyer credit	Supplier credit	Buyer credit	Supplier credit
B	95	95	90	90
D	90	90	90	85
E	98	90	85	92
F	95	90	95	90
I	95	90	95	90
NL	95	95	95	95
UK	100	100	100	100
US	100	100	100	100
JPN	100	100	100	100

(1) Percentage of total credit accorded

Source: "La CEE et les crédits à l'exportation", LEK interviews

One of the most important of these services is that of financing which plays an increasingly crucial role in the outcome of a capital goods sale or project. In 1993, Officially supported export credits accorded to European capital goods exporters represented some ECU 16 billion.

**Indications that EU loss of competitiveness in capital goods exports may be linked partly to financing difficulties**

In recent times, however, there have been worrying indications that the decrease in capital goods competitiveness may be

**Table 2: Suppliers of export credit insurance**

ECA (Export Credit Agency)	B	D	E	F	I	NL	UK	US	JPN
	OND	HERMES	CESCE	COFACE	SACE	NCM	ECGD	EXIMBANK	EID
<b>SHORT TERM</b>									
ECA is sole provider of political risk cover	YES (1)	YES	YES	YES	YES (1)	YES	NO	YES	YES
ECA has dominant position in commercial risk	NO	YES	YES	YES	NO	NO	NO	NO (2)	YES
<b>MEDIUM and LONG TERM</b>									
ECA is sole provider of political and commercial cover	YES	YES	YES	YES	YES	YES	YES	YES	YES
ECA involved in OECD interest rate stabilisation	NO (Copro-mex)	NO (KfW)	NO (ICO)	NO (BFCE)	NO (Medio-credito)	NO (not applicable)	YES	YES	YES
<b>MAJOR PRIVATE INSURERS (3)</b>									
	Namur-Gerling	Gerling	Mapfre	Namur-Gerling	SIAC	Gerling	NCM	FCIA	
	Cobac-Sfac	Allgemeine		Gipac	SIC	Cobac NL	TI	NCM-Maryland	
	NCM	Kredit		UNI-STRAT	Vis-contea-Coface		Namur-Gerling	UNISTRAT	
					Gerling		Lond. Bridge (Coface)		
							Lloyd's		

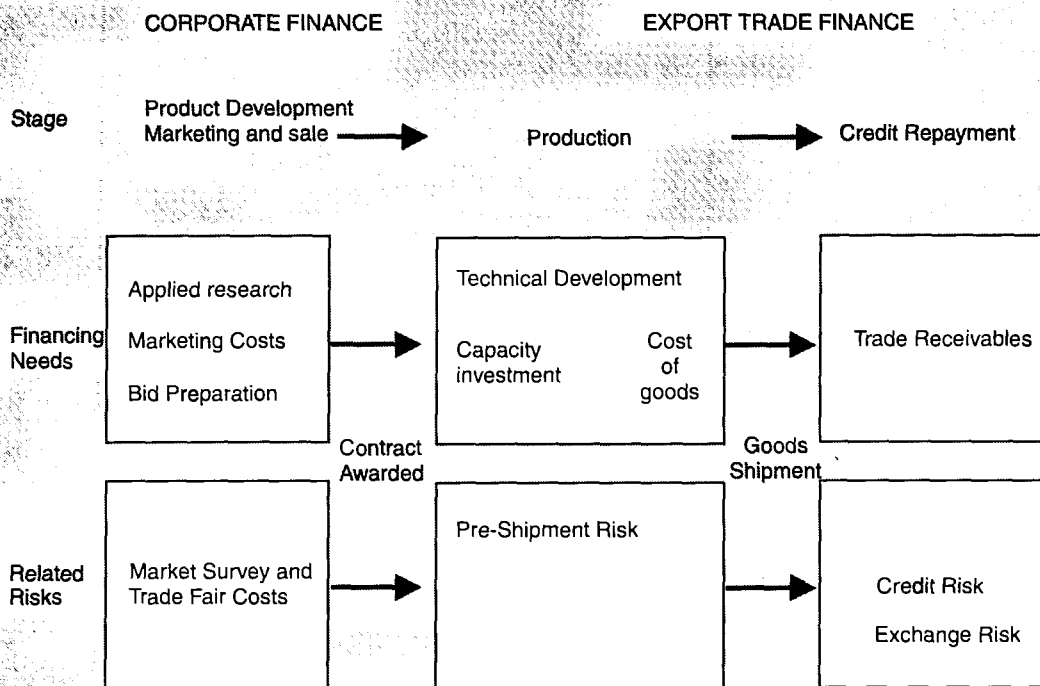
(1) Though some players have the authorisation to cover political risk

(2) Though Eximbank links with major player (FCIA) are very strong

(3) Mainly offering short term coverage in OECD countries

Source: LEK

Figure 2: Product cycle financing chronology



Source: LEK

linked in part to the unavailability of appropriate financial instruments to support the global expansion of EU capital goods producers. In this respect, it is interesting to examine OECD statistics on the evolution of Officially Supported Export Credit operations between 1989-93. Figure 1 below shows that the EU share of total credits awarded (credit periods over 1 year) has reduced in favour of the USA and Japan.

The problems of financing can be seen not just in relation to the most global of capital goods industries, the largest capital goods contracts and the most important players. Smaller European capital goods firms experience special difficulties in answering the global challenge, one of the key problems being limited levels of awareness of and access to adequate financing and insurance, particularly as many of the fastest growing capital goods markets are in countries where payment is slower and risk levels high.

Two key issues arise out of the above observations:

- What is the effectiveness of financial instruments currently available to European capital goods exporters?
- How is globalisation affecting the evolution of demand and supply for export finance in the European capital goods sector and how will this impact our future competitiveness?

**Basic structure of export finance for capital goods exporters**

The export finance role commences at the point of contract finalisation and covers capital goods manufacturers' credit and insurance needs during the production and post-shipment phases. The pre-contract stage of financing needs remains principally the domain of the corporate financier and is usually provided by the regular domestic bank of the capital goods exporter on the basis of a long-term relationship. This is illustrated in Figure 2.

Large capital goods groups and exporters of "heavier" goods, principally use buyer or supplier credits, resorting to less developed, and often costlier, instruments such as forfeiting when traditional forms are unavailable. Capital goods SMEs tend to have shorter term, more limited financial needs (at

least in absolute terms) and experience greater difficulty in covering their requirements, with frequent recourse to costly overdrafts and letters of credit.

For medium and long term financing of exports, the OECD Consensus and Helsinki Rules have helped provide a harmonising framework, though insurance and short term finance are not covered.

In the case of credit insurance, despite European moves towards harmonisation and initial discussions at an OECD level, a level playing field is far from being established. For example, there are significant variations in maximum levels of insurance coverage available both within Europe and between the EU and its extra-EU competitors, in particular, the US and Japan. This can be seen in Table 1.

There are also substantial differences in the overall supply structure of credit insurance. This is summarised in Table 2.

**Current handicap for European capital goods exporters: availability, quality and cost of financial instruments**

An analysis of the availability, quality and cost of export financial instruments currently available to capital goods exporters within the Union around a series of key factors indicates that European firms do not always benefit from appropriate export finance and risk hedging systems or at least are penalised compared to certain extra-EU exporters. This is particularly true for certain exporters (smaller firms, certain EU countries) and certain domains of export finance such as insurance. The main issues are listed in Table 3.

**Challenges for the future: effects of increasing complexity and globalisation of the capital goods market on EU export finance demand and supply**

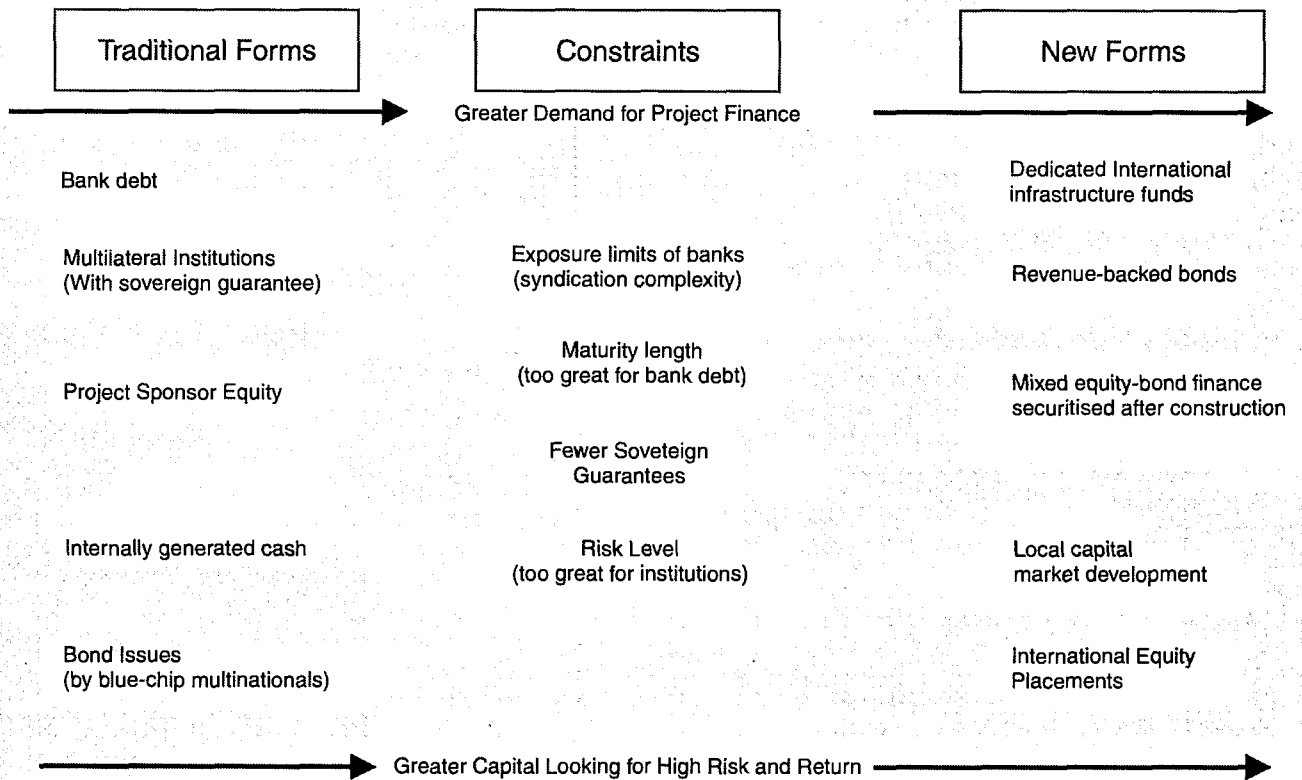
Over and above the current situation, there are a number of challenges for the future: the increasing globalisation and complexity of the marketplace are pushing European capital goods exporters to more sophisticated solutions in the bidding process. This in itself is leading to more and more complex re-

**Table 3: Main issues concerning financing and risk hedging**

Financing	Issue
- Interest rate: OECD consensus	Unavailability or limited availability in certain EU countries
- Interest rate: non-supported	Lower interest in US / Japan Important where consensus does not apply, e.g. short-term finance often used by smaller players
Risk hedging	Issue
- Exchange risk	Additional cost of hedging dollar-denominated contracts in sectors such as aerospace
- Credit insurance:	
- In most EU countries, maximum cover of goods is less than 100% of loan	Cost of residual risk to most EU capital exporters (unlike US counterparts)
- Most EU insurers offer specific goods risk insurance, not unconditional guarantee	Raises risk to be carried by EU capital exporters (unlike US counterparts) Limits possibility of financing through loan securitisation (e.g. aerospace sector)
- Quality of ECA service	Insufficient in certain EU countries (e.g. speed of response in claims delivery)
- Premium rates	Wide range in EU - affects overall cost of financing Triad competitors may be cheaper, but difficult to evaluate

Source: LEK

**Figure 3: The evolution of project finance sources**



Source: LEK

**Table 4: Summary of main export credit issues for EU capital goods exporters**

	Principal issues	Relative importance to companies interviewed	Current actions / scope for EU action
<b>Export financing</b>			
- OECD consensus rates	Unavailability or limited availability in certain EU countries	Crucial in certain countries	Outside scope
- Market rates	Lower interest rates in US / Japan	Important where consensus does not apply (e.g. short term finance / 15% downpayment) SMEs probably more affected (greater recourse to short term credit)	Outside scope
<b>Credit insurance</b>			
- Exchange risk	Additional cost of hedging dollar denominated contracts	Critical for certain capital goods sectors such as aerospace	Outside scope
- Maximum % of insurance cover available	Cost of residual risk for many EU exporters	Critical	EU draft directive in discussion; also OECD working party"
- Nature of insurance provided	Most EU insurers offer specific risk insurance (US and Japan provide unconditional guarantee)	Critical	EU draft directive in discussion; also OECD working party"
- Quality of ECA service	Speed of response and certainty of coverage	Crucial in some EU countries	EU draft directive covers some of these issues
- Premium rates	Speed of delivery of final product and claims Wide range in the EU	Often mentioned but difficult to prove / evaluate effect	EU draft directive in discussion; also OECD working party"
- Limits on insurance of foreign content	Triad competitors appear to be cheaper Loopholes often exploited to reduce EU directive limits further	Growing importance with EU multi-sourcing	Possible review of loopholes to prevent advantages to Triad competitors
- Local content	OECD financing/insurance limited to 15%, but some extra-EU competitors may exploit loopholes	Less important than other issues? Difficult to prove	Scope for EU action unclear
- Project finance	Need to develop EU project finance possibilities	Important issue for the future	Unclear. Possible liaison with OECD to extend payment terms

Source: LEK

quirements for financial engineering, the impact of which can be seen in two major effects:

- Increase in funding requirements for large, long-term projects
- Greater risk exposure in fast-growing developing capital goods markets

### Increase in funding requirements for large, long-term projects

An increasing number of large infrastructure and other projects, where construction and financing time frames are protracted, is having a significant impact on the nature of demand for EU capital goods exports and the type of deal structures involved. Large capital goods often form a direct and integral part of infrastructure projects (e.g. railroad equipment for high speed train lines, turbines for power plants, electric cables for telecommunications networks). In addition, exporters of smaller capital goods benefit indirectly but substantially as subcontractors to the needs of larger capital goods and other players involved in these projects.

Many of the more recent infrastructure projects represent substantial sums involved, as in the case of the massive Hub River power project in Pakistan, valued at \$1.5 billion. The project took eight years in the negotiation and financing, and very nearly did not come to fruition owing to the tremendous complexity of the deal, the number of players and the levels of risk involved.

### Greater risk exposure in fast-growing capital goods markets

The saturation of certain EU capital goods markets has meant that manufacturers are looking not just to extra-EU countries but to developing regions for the greatest potential. The railway equipment market is an illustration of a European capital goods market which is relatively mature (except in certain segments such as high speed or urban trains), but shows enormous potential in markets such as India and China.

An illustration of the exposure of EU capital goods exports to high risk regions is provided in the accounts of the main Export Credit Agencies (ECAs). For example, the medium and long term insurance coverage of Coface - of which in

excess of 90 % relates to capital goods/infrastructure-type exports - is spread as follows: 31 % Africa, 31 % Asia, 18 % Middle East, 5 % Central and Eastern Europe, 9 % S. and N. America, 6 % Western Europe. In the case of Hermes, more than 50 % of its capital goods long-term coverage was accorded to non-developed or developing countries in 1993.

The effects of increasing market globalisation and competition and the development of long-term projects in high risk regions will have a key influence on the evolution of export financing needs. Two areas of particular challenge for European capital goods exporters of the future were identified in the course of this analysis:

- Increasing role of project finance
- Issues around multi-sourcing

### Project finance

The increase in long term infrastructure projects in higher risk regions, together with the reduction in sovereign guarantees (partly a result of increasing privatisation), has led to an increasing and evolving role for project finance in export credit for capital goods. New types of financing approach (e.g. Build Operate Transfer or BOT) and new high risk/high return funding sources are continually being developed.

European banks and ECA's are increasing their involvement in project finance though practical experience varies from one member state to another. In particular given the aggressive approach of certain extra-EU competitors in this area, this is likely to be a key issue for capital goods exporters seeking to develop in the emerging export markets of the future.

### Multi-sourcing

Market globalisation and stiff competition are increasingly leading exporters to bid in multi-national consortia or de-localise production in search of greater efficiency. European geographical fragmentation and lack of harmonisation in ECA insurance schemes prevent EU exporters, however, from obtaining adequate and cost-effective pan-European financing for the foreign content of contracts. This will increasingly affect the competitiveness of European Union capital goods competitors when bidding against US or Japanese companies which are covered by a single entity.

The growing importance of offset agreements and local content in major contracts - particularly in sectors such as the aeronautical or rail construction industry - is also having an impact on financing needs and creating problems of financing and insurance coverage.

### Financing of EU capital goods exports: cost of inaction for future competitiveness

The competitiveness of European capital goods clearly depends on a number of factors, which range from product quality, to value-added services to price and other elements. There is a need to ensure however that, at the very least, a level playing field exists for EU actors in the increasingly key area of export finance. While these export finance issues exist for European capital goods companies, the stakes remain high precisely because the global capital goods market is evolving rapidly and competitor countries and companies are responding to the export finance challenge:

- Rapid changes in the nature of demand mean that the successful companies of the future are those which are able to adapt now, with adequate support from new forms of financial engineering;
- For those European companies which are not able to adapt (whether SMEs or other firms), there is unlikely to be a second chance;
- Strong competitor countries such as the US are currently taking action to improve their export finance system for

American companies; In the US case, particular emphasis has been made by the Clinton administration on expanding exports into "Big Emerging Markets" and helping SMEs;

- Competitors from newly emerging Asian economies already pose a real problem for the future and these countries will increasingly develop sophisticated financial systems.

For this reason, inaction or insufficiently rapid progress, is likely to create a major and potentially irrevocable handicap for European capital goods industries, with all this implies in terms of loss of market share, loss of markets and loss of jobs for small and large companies alike, as well as the indirect impact on the sectors which these companies serve.

However, despite some clear action steps that have been taken at a national, European and OECD level, there is clearly still some way to go. In Table 4 below, the main outstanding issues for European capital goods exporters are reviewed in the light of their relative importance to companies interviewed (Column three). The final right hand column specifies current actions and scope for future action in each of these areas, since clearly not all these issues lie within the bounds of EU influence.

### Conclusion

At the European level, there is therefore a need:

- To work towards an efficient and globally competitive export finance structure for all European capital goods exporters

However, as stated above, not all the outstanding issues in export finance for capital goods exporters lie within the bounds of EU influence, for example, those relating to interest rates and exchange costs.

Many of the outstanding issues on which the EU has potential influence relate to insurance of export credit risks. These issues affect different EU member exporters differently (e.g. percentage levels of coverage, quality of service).

Insurance harmonisation is, therefore, a goal, but only if it enables EU capital goods exporters to remain competitive at an extra-EU and worldwide level. One implication of this is the need for co-ordination between current OECD initiatives and potential EU moves to harmonisation.

- To work towards improved access to efficient export finance systems for EU capital goods exporters with particular needs, such as SMEs

The EU should play a central role in the enhancement of export finance structures for smaller European capital goods players, which dominate certain sectors of the industry and represent a substantial part of the workforce.

This may include assistance towards improved communication on availability of export credit instruments, on commercial/political risk management and on availability of insurance for SME's. It should involve discussion with both SME representative bodies, trade associations and financial institutions on specific needs and improved access to appropriate and cost-effective export finance.

In acting towards the above goals, the EU will be taking one step further in the development of its industrial policy by preparing capital goods exporters for the challenges of the global marketplace.

Written by: LEK



## Traffic Management and the use of Information Technology

### INTRODUCTION

The industry sector covered by the International Union of Public Transport (Union Internationale des Transports Publics - UITP) includes all aspects of personal transport and mobility in urban and regional (inter-urban) contexts namely:

- The management of Collective Transport and intermodal facilities.
- The Public Transport investment including passenger terminal & rolling stock.
- The derived services such as:
  - Infrastructure management (e.g. rail track management)
  - Management of value added services (e.g. multi-operator cards & passes)
  - Transport demand management (all modes)
  - Traffic flow management which require a combination of information technology and telecommunications (in one word: "Telematics")

The present chapter of PANORAMA OF EUROPEAN INDUSTRY covers specifically the recent developments in the traffic management. It includes Road Transport "Telematics". The European Road Transport Telematics Implementation Co ordination Organisation (ERTICO) which includes the public authorities, the infrastructure operators, car manufacturers and public and private operators. ERTICO aims at developing a consensus between public and private sectors on common specifications and standards. UITP participates as a founding partner in ERTICO.

### 1 - TOWARDS IMPLEMENTATION OF PAN-EUROPEAN NETWORKS

The Treaty on the European Union signed in Maastricht (Article 129 C, paragraph 2) that came into force on 1 November 1993 has expanded Community powers. It sets up the necessary new institutional framework to allow for the development of Trans-European Networks including in the field of surface transport.

At several consecutive European summits, the heads of state and governments have been stressing the need for the completion of a Trans-European Road Network (TERN) before the year 2010 in order to facilitate European growth, enhance the competitiveness of the economy and develop the labour market.

The Commission's White Paper entitled "Growth, Competitiveness Employment and the Challenges: Ways Forward into the 21st Century" presented to the European Council in December 1993, presents the trans-European network completion as a tool for relaunching economic growth.

All modes of transport are concerned: surface transport, shipping and air transport. This programme is estimated to cost a total of 400 billion ECU by 2010.

The accelerated implementation of an advanced surface transport infrastructure in Europe is nevertheless difficult to reconcile with the need to consolidate national public finances required for monetary Union. This is why the private sector needs to be involved more widely, particularly through public-private partnership schemes, in the financial engineering and management of such networks.

### 1.1 - MAIN ROAD CORRIDORS

In its decision of 29 October 1993, the Council of Ministers has, fixed the outline of the Trans-European Road Network to become the official network of the European Union. This includes:

- The construction or upgrading of the missing links.
- The development of traffic management systems.

Concerning its completion, the construction of 12.000 km of motorways is expected to be initiated by 2002 at the latest. These new sections will either complete the network, replace existing low quality roads or run in parallel with existing but congested roads. It also aims at integrating peripheral regions.

In order to assure a pan-European dimension to the Trans European Road Network, links to third countries are considered of major importance. As a first step, appropriate links to the former EFTA countries are considered, but connections to Central and Eastern European countries also have to be defined. Within the Directorate General for Transport, an "Action Group" called Network and Mobility (NEMO) was created to revise the initial TERN outline by extending the network to include Austria, Finland, Sweden and also Norway and Switzerland, and connecting it to Central and Eastern Europe.

Criteria used for the definition of the initial outline of the Trans European Road Network include technical indicators such as:

- Quantitative assessment of a major transeuropean route (Density of total traffic, density of heavy traffic, connection of economic centres and metropolitan areas)
- Quantitative assessment of the route's importance to international traffic (cross-border links, connection with third countries, density of goods and tourist international traffic, anticipation of demand trends)
- Qualitative assessment of the route (continuity of network - missing links and time saving, continuity of services and standards - safety and comfort)
- Regional accessibility and integration of peripheral regions (Connection of regional capitals, area accessibility in terms of time and distance, access to major urban centres)

**Table 1: Major road links per country.(major road links are mostly motor ways but not in all cases-e.g. Ireland)**

	Area (1000 km <sup>2</sup> )	Population (millions)	Road links		Densities		2004	
			Existing (km)	2004 (km)	Present By area (km)	By population (km)	By area (km)	By population (km)
Austria	83.9	7.9	1 504	1 634	18	190	19	207
Belgique/België	30.5	9.9	1 516	1 922	50	153	63	193
Danmark	43.1	5.1	688	937	16	135	22	184
Finland	337.1	5.0	2 515	3 039	7	503	9	608
France	544.0	56.2	8 085	12 100	15	144	22	215
BR Deutschland	357.0	79.1	8 600	10 000	24	109	28	126
Hellas	132.0	10.0	1 254	3 517	10	125	27	352
Ireland	70.3	3.5	709	1 776	10	203	25	507
Italia	301.3	57.5	6 000	7 776	20	104	26	135
Luxembourg	2.6	0.4	70	90	27	175	35	225
Nederland	41.2	14.9	1 575	1 645	38	106	40	110
Portugal	92.1	10.3	674	2 272	7	65	25	221
España	504.8	38.9	6 100	10 295	12	157	20	265
Sweden	450.0	8.6	2 777	4 103	6	323	9	477
United Kingdom	244.1	57.2	2 720	3 915	11	48	16	68
<b>Total/Average EU</b>	<b>3234.0</b>	<b>364.5</b>	<b>44 787</b>	<b>64 985</b>	<b>14</b>	<b>123</b>	<b>20</b>	<b>178</b>
Norway	323.9	4.3	4 760	4 760	15	1 107	15	1 107
Switzerland	41.3	6.8	1 280	1 665	31	188	40	245
<b>Total/Average EFTA</b>	<b>365.2</b>	<b>11.1</b>	<b>6 040</b>	<b>6 425</b>	<b>17</b>	<b>544</b>	<b>18</b>	<b>579</b>
<b>Total EU and EFTA</b>	<b>3 599.2</b>	<b>375.6</b>	<b>50 827</b>	<b>71 410</b>	<b>14</b>	<b>135</b>	<b>20</b>	<b>190</b>

Source: DG VII NEMO1

- Access improvement to the TEN's for other transport modes (Improvement of links on main land and sea routes, connection with main islands, accessibility to main airports, ports, railway stations and terminals etc.)

Table 1 gives per country the road links compared to population densities.

A separate group within the Commission has developed routes across other countries to access Greece and identify the connections to Central and Eastern Europe.

The June 1995 version of the Trans European Road Network, is represented in the following map.

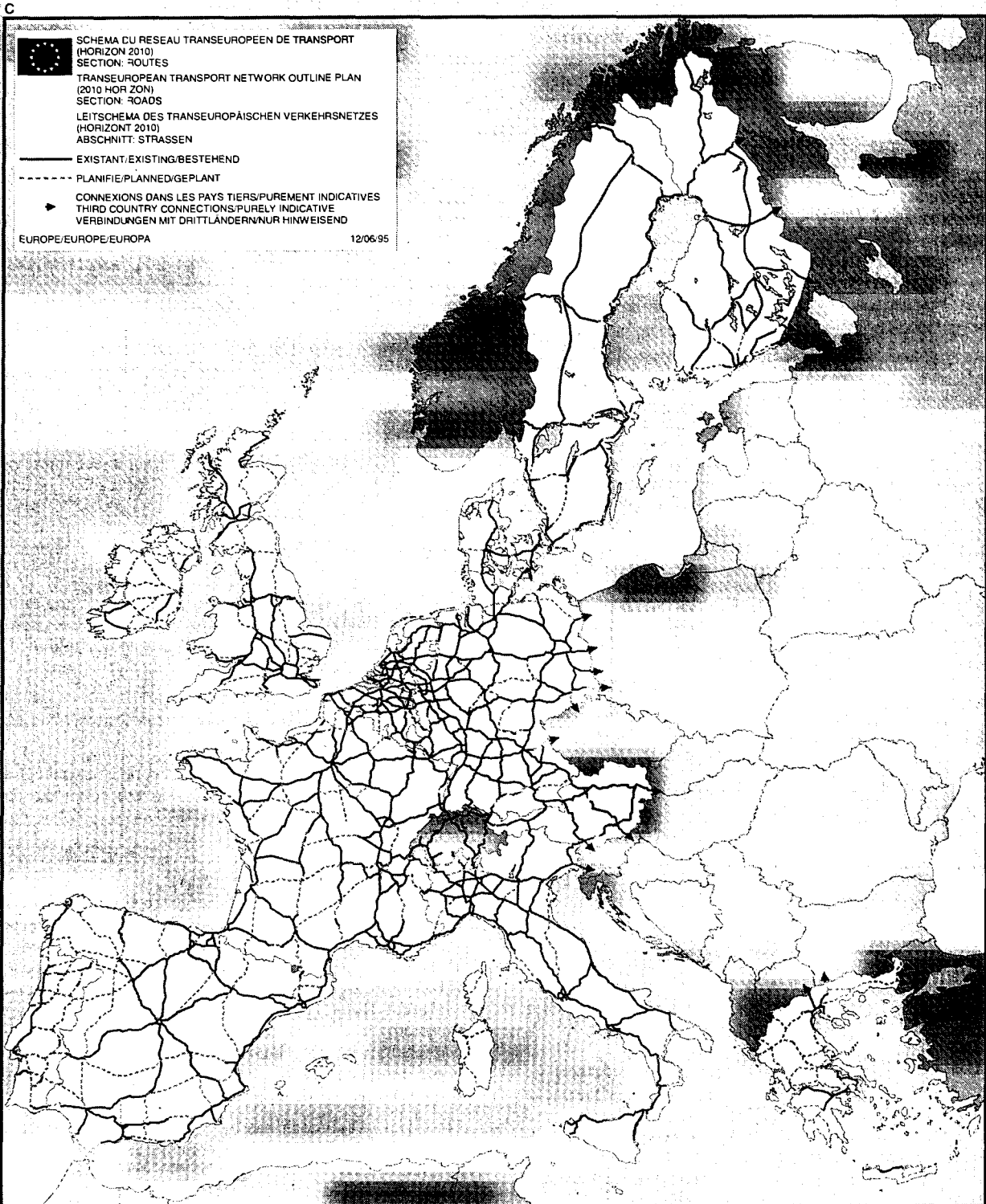
The outline of the proposed Trans-European Road Network for the Europe of the fifteen provides for the establishment

**Table 2: additional major links per country**

Country	Area (1000km <sup>2</sup> )	Population (Millions)	Existing	Links Planned	Total
Austria	83.9	7.9	1504	130	1634
Belgium	30.5	9.9	1516	406	1922
Denmark	43.1	5.1	688	249	937
Finland	337.1	5.0	2515	524	3039
France	544.0	56.2	8085	4015	12100
Germany	357.0	79.1	8600	1400	10000
Greece	132.0	10.0	1254	2263	3517
Ireland	70.3	3.5	709	1067	1776
Italy	301.3	57.5	6000	1776	7776
Luxembourg	2.6	0.4	70	20	90
Netherlands	41.2	14.9	1575	70	1645
Portugal	92.1	10.3	674	1598	2272
Spain	504.8	38.9	6100	4159	10259
Sweden	450.0	8.6	2777	1326	4103
United Kingdom	244.1	57.2	2720	1195	3915
<b>Total EU</b>	<b>3234.0</b>	<b>364.5</b>	<b>44787</b>	<b>20198</b>	<b>64985</b>
Norway	323.9	4.3	4760	0	4760
Switzerland	41.3	6.8	1280	385	1665
<b>Total non EU</b>	<b>365.2</b>	<b>11.1</b>	<b>6040</b>	<b>385</b>	<b>6425</b>
<b>TOTAL EU +non EU</b>	<b>3599.2</b>	<b>375.6</b>	<b>50827</b>	<b>20583</b>	<b>71410</b>

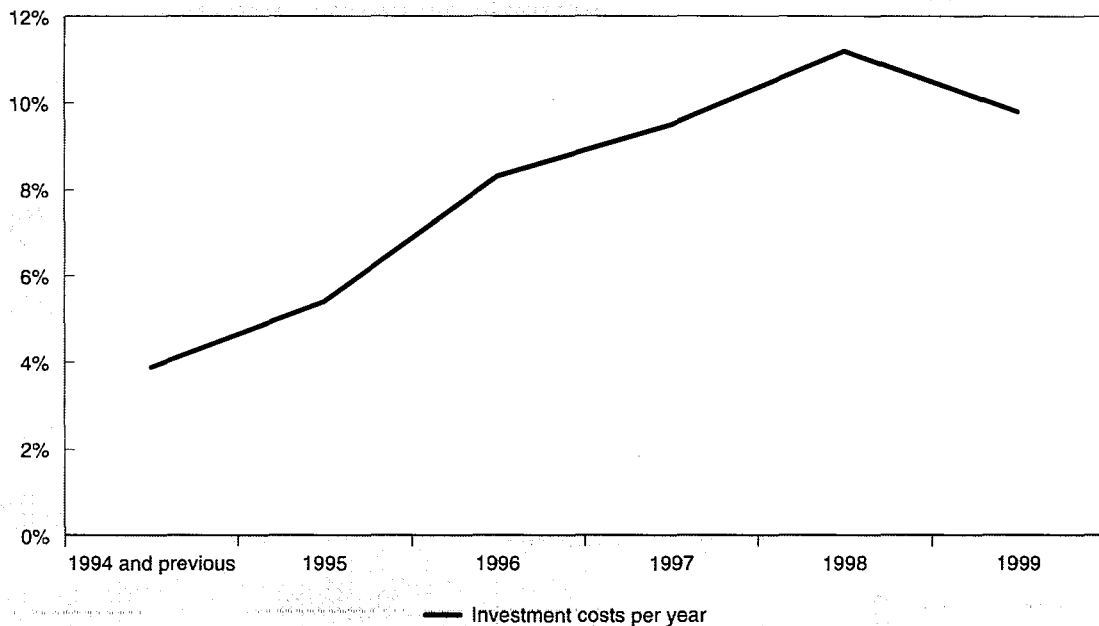
Source: DG VII NEMO1





Source: ERTICO TELTEN Report

Figure 1: Disbursement for the 14 priority projects until 1999 (in % of 91 billion ECU)



Source: DGVII

and operation of some 65,000km of "technically advanced links"(mostly motorways), which will ultimately constitute 90% of the system. Today 70% of the network is already operational. In approximately ten years an additional 20,000 km of motorways and high quality roads are expected to be operational. More than 40% of these additional roads will be built in peripheral countries of the Community.

The motorways will be built on new alignments or by upgrading existing links. Some existing sections handling heavy traffic and some urban by-pass roads will be widened. Some expressways and upgraded roads will complete this motorway network.

Table 2 presents per country the total length of the existing and planned links of the revised TERN in comparison to each country's surface and population.

The Trans-European Road Network connects the major European Urban Centres and helps to serve all the regions of the Union. The main corridors of international traffic will constitute one third of the network while the other two thirds are regional or national and are to be considered as alternative roads to the main corridors. Map n°2 shows the main corridors of international traffic.

## 1.2 - THE MAIN RAILWAY CORRIDORS

The Treaty of Maastricht prepares not only the ground for the development of a Trans-European Road Network, but allows also the elaboration of railway networks and in particular the High Speed Network. In this field a proposal for high speed network was prepared by the Community of European Railways (CER) and submitted to the European Commission by the end of 1989. The Council of Ministers created a high level Working Party for "High speeds", chaired by the EC and including governments, railway companies, industry and other parties. This group drew up a "European master plan of high speed links". This plan was approved by the Council of Ministers on 17 December 1990. The High level working Group has continued working since then. Studies have been carried out to elaborate on the cost effectiveness of the different links, their feasibility and their physical and social compatibility with the Community environment. A second report is under elaboration in 1994. This second report will contain

the results of studies undertaken on the socio-economic impact of the network on the Community, the approach to be adopted regarding environmental constraints and possible interaction with other modes. The High level Working Group pleads also for a pan-European harmonisation of the characteristics of the high speed rail links.

Similar to the Trans-European Road Network, the currently emerging European high speed rail network includes new lines built specially with high speed traffic in mind, upgraded lines adapted to speeds of up to 250 km/h and connecting lines worked at lower speeds.

It is incorporated in the Trans-European Railway Network as shown in map n°3.

The total cost of the high speed network is estimated at approximately 200 billion ECU. Within this total, the cost of the key links is set at 70 billion ECU

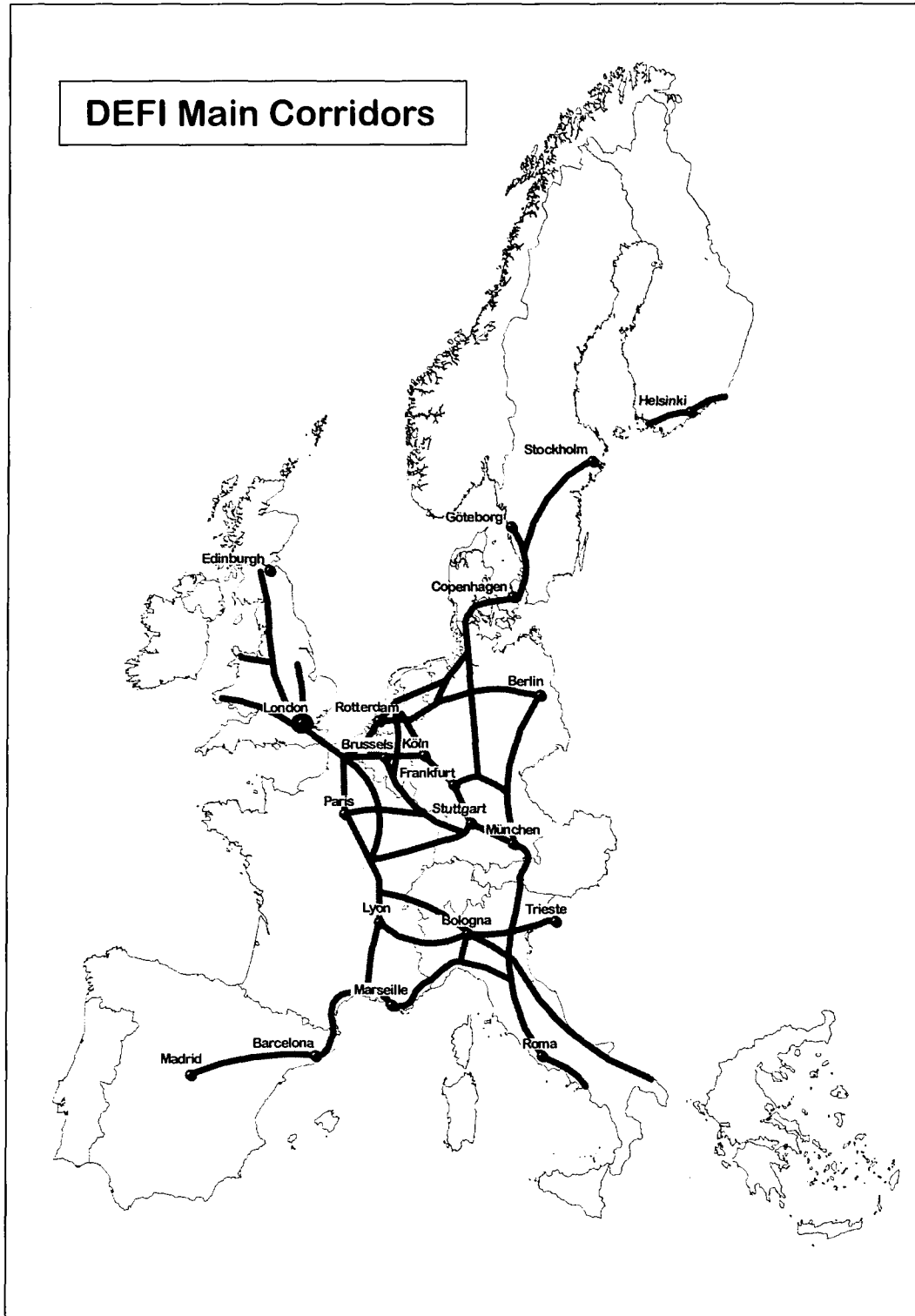
## 1.3 - FINANCING THE TRANS-EUROPEAN INFRASTRUCTURE

Following the decision of the European Council in December 1993, a group of personal representatives of the Heads of State or Government was established to assist in implementing efficiently, consistently and speedily the trans-European networks in transport (all modes) and energy. The European Investment Bank (EIB) participated in the group's work especially in relation to the financing aspects. The Group was chaired by Mr. Henning Christophersen, vice-president of the European Commission, and is therefore more commonly known as the "Christophersen Group".

The specific approach has been to identify and assist in accelerating specific projects of common interest considered to contribute in a valuable way to the implementation of the trans-European networks.

Projects were selected on the following main criteria:

- common interest for the trans-European networks, such as cross-border sections;
- large scale, bearing in mind the type of the project and the relative size of the Member States directly concerned;
- economic viability and scope for private involvement;



Source: CEC DGVII



**Table 3: The 14 priority projects proposed by the Christophersen Group (end 1994)**

Priority Project	Investments Total cost(MECU)	Status 1995-1999(MECU)	
1. HST/combined transport Berlin-Verona (Brenner Axis)	20 830	4 190	ready
2. HST Paris-Brussels-Köln-Amsterdam-London	15 754	9 466	constr.
3. HST South (Montpellier-Madrid-Vitoria-Dax)	12 870	4 380	prom
4. HST East (Paris Strasbourg-Saarbrücken-Appenweiler)	4 460	3 016	prom
5. Betuwe line (rail combined)Rotterdam-Köln	3 291	2 200	prom
6. HST/combined transport Lyon-Torn	13 550	3 760	constr.
7. Motorway Patras-Thessaloniki +Via Egnatia	6 367	5 065	design
8. Motorway Lisboa-Valladolid	1 072	717	design
9. Cork-Dublin-Belfast-Stranraer(rail/combined)	238	145	ready
10. Malpensa airport	1 047	828	ready
11. Öresund link (road/rail) Denmark-Sweden	3 066	2 727	ready
12. Nordic Triangle	4 400	1 167	constr.
13. Ireland-UK-Benelux road link	2 680	1 540	prom
14. West Coast Main Line	880	733	prom
<b>TOTAL (approx in billion ECU)</b>	<b>91</b>	<b>40</b>	

*prom = promotional phase, design = in design phase, ready = ready for construction, constr. = already (partially) under construction.*  
 Source: DG VII

- contribution to Union objectives such as economic and social cohesion;
- respect of other Union policies, notably on environmental protection;
- maturity.

The Group has identified for each project obstacles to implementation, and assessed their importance and provided recommendations to overcome these obstacles. Some "horizontal" measures (applicable to the majority of the projects) to be taken at the State level and at the Union level have also been put forward.

In an interim report, the Christophersen Group presented to the Corfu European Council a preliminary set of 34 infrastructure and five traffic management projects as being of priority nature. The European Council in Corfu endorsed the priority nature of 11 mature projects, addressing mainly the high-speed rail network in Europe and the missing links in the peripheral countries.

According to the Christophersen Group, transport is the sector where most difficulties arise in achieving the objectives. This is due to the scale of investments, the often modest financial profitability of projects (although for most of them the economic profitability can be significantly higher), and to the very considerable variations in Member States' regulatory framework and traditional approaches to infrastructure development. Consequently, the Group considers that their approach

of identifying priority projects and promoting them will prove useful, especially in this sector.

After Corfu the Group continued working and included some projects proposed by the newly joining countries and projects concerning the connections to third countries.

The Group concluded that in all 14 transport projects are of priority and at an advanced stage of development and decided to submit the amended list to the Essen summit of the European Council.

In addition to the priority projects for physical infrastructure, the Group stressed the important role of traffic management systems, saying that networks without management will fail to serve their purpose. Moreover, the Group emphasised the mutually beneficial influence of the Information Society and other economic sectors such as transport that can help consolidate the strategic position of European industry and in particular transport telematics.

The Group also stressed the specific importance of those physical infrastructure projects which incorporate traffic management using wherever telematics applications and invited the Commission to proceed with an action plan.

The total investment for the 14 priority projects for the period until 1999, including the existing investments in 1994 and earlier for the projects already being implemented has been estimated to grow up to 45 BECU representing 49% of the total investment of 91 BECU.

**Table 4: Trans-European Transport Network  
 Estimated Community Contribution  
 Until 1999**

TOPIC	TOTAL COST ESTIMATE (BECU)	UP TO 1999 (BECU)	POSSIBLE EC CONTRIBUTION (BECU)
14 priority projects	91	40	1.8
Other important projects	51	27	0.5
Traffic management services	34	10	0.4
Interoperability	40	15	0.15
<b>TOTAL</b>	<b>216</b>	<b>92</b>	<b>2.85</b>

Source: DG VII



The following chart represents the estimated evolution of the yearly total investment for the 14 priority projects as a percentage of the total investment of 91 BECU.

## 2 - TOWARDS IMPLEMENTATION OF EU-WIDE TELEMATICS

### 2.1 - THE ISSUES

The EU wants to guarantee Trans European Road Network users fast and safe travel associated with a high and consistent quality of service on the motorways. The intention is to upgrade the whole Trans European Road Network to the highest technical level in order to achieve this.

Taking into account the ever increasing traffic problems on the major road axes, and in particular on urban by-passes, the Trans European Road Network is a prime focus for the development of a modern transport telematics infrastructure and services for traffic management and the communication of all kinds of information to the users.

The guidelines for the development of trans-European transport networks (proposed in April 1994 by the European Commission and currently under discussion among the institutions of the European Community) places the road network within the multi-modal context (i.e. in relation to the conventional

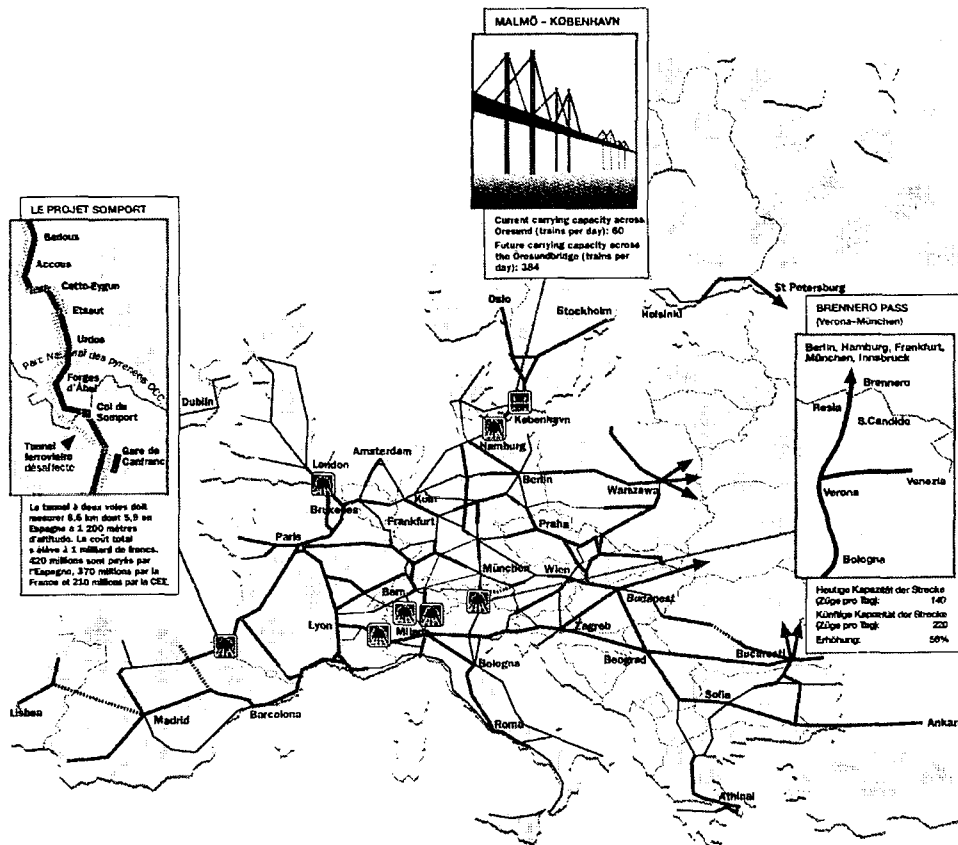
and high speed rail networks, combined transport, inland waterways, sea and air travel.).

Road transport telematics aims at playing an important role in the improvement of road safety, the search for a better balance between rail and road transport and the implementation of a sustainable transport policy (user specifications for infrastructure and facilities harmonised and continuous) as far as possible. Although the trans-European Road Network is already partly inter-operable, there is still need for improvement: certain common specifications on the typology of inter-urban roads, sign posting, road marking, traffic management systems and the services offered need still to be adapted and/or gradually implemented to meet user needs.

Traffic management requires a consistent and convergent approach and includes:

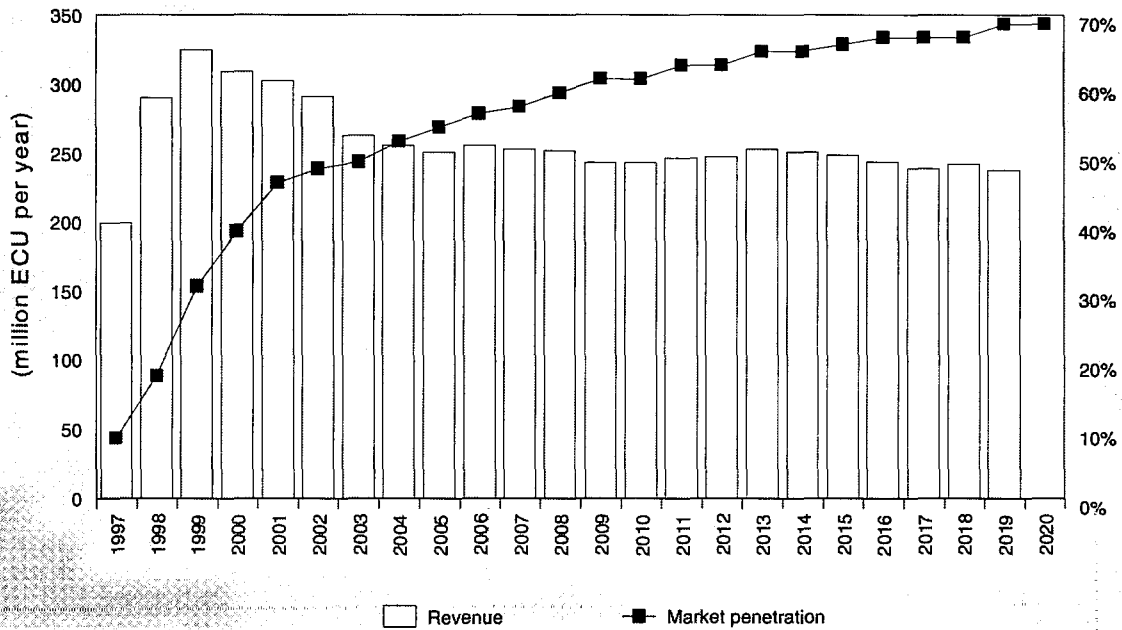
- Monitoring of the network:
- Monitoring of traffic, detection of incidents, surveillance of exceptional events, weather conditions, presence of hazardous loads, etc.
- Data gathering:
- Collection and processing of traffic data
- Traffic control:

Map n° 3: Trans-European Railway Network



Source: UIC

Figure 2: RDS-TMC radio (voice only)



Source: ERTICO TELTEN Report

- Flow of traffic, speed limit regulations, surveillance of bridges & tunnels, access control to congested zones, etc.
- Traffic information for the user:
- Information on traffic flows, real time information on road events, travel planning, general information, etc.
- Added value services:
- Such as dynamic guidance, selection of the best route, automatic toll payment without stopping, etc.

## 2.2 - TELEMATIC SYSTEMS

Since 1989, Community Research and Development programmes such as DRIVE, PROMETHEUS, ATT, etc. have been developing new techniques and technologies in the domain of traffic management. The feasibility and applicability of these developments have already been demonstrated in large scale pilot experiments with a view to formulating a European traffic management policy.

It is the intention of the EU to build on the results of these R & D programmes and to continue work in this field under the fourth Research and Development framework programme during 1995 - 1998, directly connected to the common transport policy and to focus on full-scale demonstration projects.

Development of telematic systems is now sufficiently well advanced for a start to be made with concerted full scale deployment on the Trans-European Road Network including the following systems/technologies:

- *Pre-travel information systems.*

Accessible at home, in the office or in the car; such systems, which should include all modes of transport, would enable users to prepare their journeys in Europe in a more rational way. Exchange of road information beyond borders is still exceptional, and users are often poorly informed about traffic and the state of roads during international travels. Interconnecting the national and regional information centres of the different European countries is essential. Therefore, a true network of road information centres need to be established.

- *Dynamic route information and route guidance systems;*

These systems provide visual traffic information on a screen or through variable message signs. Some in-vehicle units even

have the capability of guiding the driver to a given address, selecting the shortest route in distance or in time, scenic routes or other possibilities.

- *The Radio Data System - Traffic Message Channel (RDS-TMC) system.*

This system, an enhancement of the existing RDS, is based on digitally coded transmission of information messages which can be decoded on board the user's vehicle in his own language, independent of the country he is in.

It is already capable of providing a quality information service on a European scale. This system appears to be the first application for the provision of traffic management services using in-vehicle units.

With the DEF1 project, the European Union is aiming to establish a quick and concerted development strategy of RDS-TMC on a basic network of several thousand kilometres, to be progressively expanded in a later phase. Map n° 4 shows the main corridors envisaged for early RDS-TMC application.

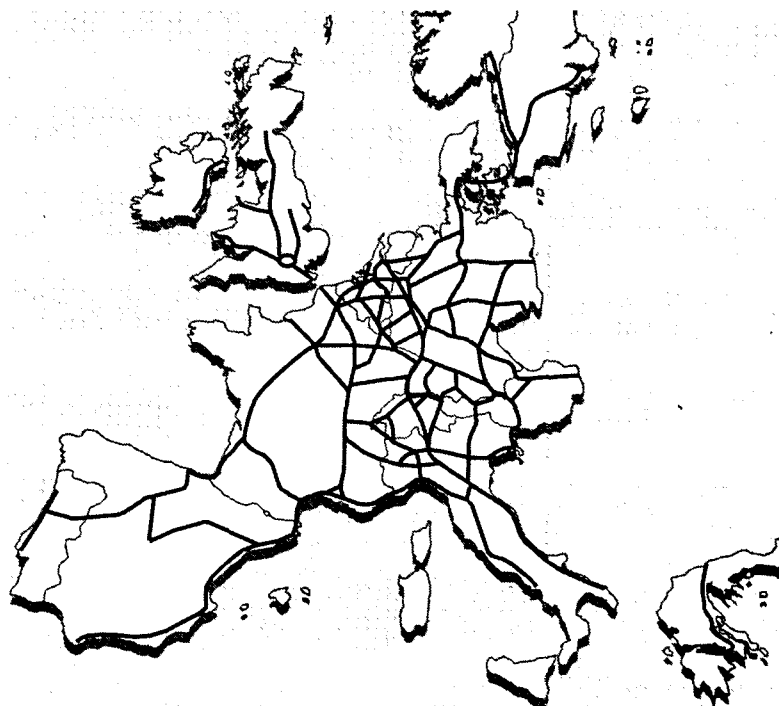
- *Satellite based positioning and guidance.*

Such a uniform system, based initially on the Global Positioning System (GPS) satellite configuration to be extended in a later phase to the European Global Navigation Satellite System (GNSS) configuration using International Maritime Satellite organisation (INMARSAT) III satellites, will accelerate the deployment of driver guidance systems, fleet and heavy goods vehicle management systems and monitoring systems for emergency vehicles, hazardous goods transport, buses, taxis, etc.

- *Automatic toll systems.*

New generation automatic non-stop debiting systems allowing for the payment of tolls or charges for the use of certain infrastructures, without imposing any constraint on speed or lane choice are already available from the shelf. These systems will encourage the development of alternative forms of financing and of the coverage of the costs of using the infrastructure and its facilities through user tolls. They will also make it possible to manage traffic during peak periods by adjusting the tolls for specific times of the day and for specific days.





Source: CEC DGVII

### 2.3 - THE HIGH LEVEL GROUP ON THE INFORMATION SOCIETY

The "Recommendations to the European Council concerning Europe and the Global Information Society" prepared by the High Level Group on the Information Society<sup>1</sup> - 26 May 1994, better known as "the Bangemann Report", sets out an operational programme and measures to be taken for the promotion of the development of the infrastructure in the information domain.

This includes, amongst others:

- Measures accelerating the liberalisation of the Telecom sector;
- Creating, as a primary objective the interoperability of services and applications following the successful example of GSM digital mobile telephony, market players could establish Memoranda of Understanding (MoU) to set the specifications requirements for specific application objectives. This type of mechanism would adequately respond to market needs. These requirements would then provide input to the competent standardisation body;
- Standardisation bodies could then respond with a reviewed European standardisation process in order to increase its speed and responsiveness to market needs;
- Support the openness of the European market and assure its counterpart in markets and networks of other regions of the world. Adequate steps should be taken to guarantee equal access;
- Intellectual Property Rights (IPR) protection must have a high priority;
- Individual privacy must be guaranteed. - Without the legal security of a Union-wide approach, lack of consumer con-

fidence will certainly undermine the rapid development of the information society;

- Financing of the Information Society should be entrusted to the market forces and the private sector.

The report also sets out ten application domains amongst which Transport takes an important part. It considers the establishment on a European scale of telematic solutions for advanced road traffic management systems and other transport services ( driver information, route guidance, fleet management, road pricing, etc. )

The High Level Group advises the European, national and regional administrations, user groups and traffic operators to set up a Steering Committee in order to define a common open system architecture for advanced telematic services with common user interfaces.

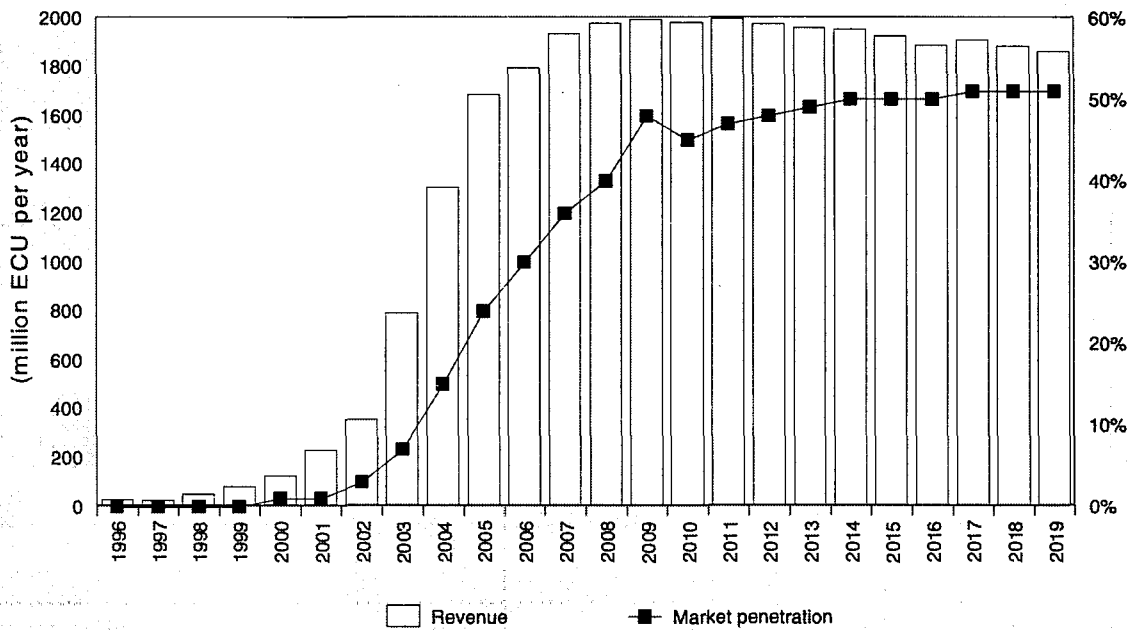
This would be to the benefit of drivers, local communities (especially in heavily congested areas) and industry by reducing traffic, increasing road safety, lowering environmental costs, and energy and time savings.

The aim of the High Level Group would be to implement by 1996 telematic systems for road traffic management in 10 metropolitan areas and 2.000 km of motorway. 30 metropolitan areas and the Trans European Motorway Network should be covered by the year 2000.

### 2.4 - CONFERENCES & TECHNICAL EXHIBITIONS

From 30 November 1994 until 3 December 1994, at the initiative of the European Commission and in co-operation with ITS America and VERTIS Japan, the first world congress on applications of Transport Telematics was organised by ER-TICO in Paris. It assembled nearly 2500 participants from the five continents. 400 papers were presented in more than 100 sessions. The proceedings represent 7 volumes totaling

Figure 3: Dual mode route guidance systems based on RDS-TMC



Source: ERTICO TELTEN Report

3500 pages. In parallel with the congress an exhibition covering a total space of 3000 m2 of which 800 m2 were taken by the European Commission for showing the results of the ATT Research and Development programme run by DG XIII C6. The rest was devoted to car and telematic manufacturers, operators and governments showing not only future developments but also a growing reality proven by 20 demonstration cars.

During the G7 conference in Brussels on 25 and 26 February 1995, the EU organised an Information Society showcase exhibition. The exhibition showed the latest state of the art in all Information Technology applications. It had an tremendous impact on the media (Radio, TV, Press) and showed to the public the latest developments.

These conferences and exhibitions allowed to show some already "off the shelf" available products:

- *In-car navigation and Information Systems:* Digital road maps stored on CD-ROM were shown inside the car, scrolling automatically as the vehicle moves. The current vehicle position is obtained by GPS and shown on the map.
- *Advanced Urban Traffic Control Systems:* A modern traffic control centre using IT and telecommunication to provide better control of traffic signals, rapid detection of traffic incidents, better information to drivers and improved reliability for bus services, as operational in Southampton, was demonstrated.
- *Dynamic route guidance for vehicles:* Mobile communications can be used to help vehicles to navigate around congestion. Moreover, the vehicle itself can be used as a traffic probe.
- *GSM based Mobile Services:* Every road user will be able to tailor his GSM terminal to his individual needs, such as for emergency and breakdown services, vehicle theft protection, making parking reservations during the journey, and route guidance.
- *Motorway Traffic Information:* Drivers can now have up-to-the-minute information about traffic speeds on motorways. Speed detectors placed on bridges over motorways radio back current traffic speeds to the control centre, which broadcasts them to the subscribers. Users see either on a

PC or a portable unit a map of the motorway showing where the traffic is slow.

- *Advanced Public Transport Systems:* Vehicle positioning systems and mobile radio communications on buses can provide information to traffic controllers on bus location and whether they are on time or ahead of or behind schedule.
- *Navigation and language independent traffic messages.* Showing a navigation system that offers visual and voice route guidance plus the Radio Data System Traffic Message Channel (RDS-TMC)

### 2.5 - A TIMETABLE FOR IMPLEMENTING EU WIDE TRAFFIC MANAGEMENT

The Telematics on the Trans-European Road Network (TELTEN) project, performed by ERTICO with a grant from DG VII (transport), has undertaken to produce a scenario for deploying traffic management using wherever necessary telematic applications on the Trans European Road Network. Deployment should be in accordance with rational and logical criteria. The TERN concept itself dictates the primary criteria, namely:

- Ensure interoperability of systems (the capability of devices to communicate and interact with each other under two aspects: system to system and user to system)
- Ensure continuity of services (in time and in space).

Application of the subsidiarity principle means that different systems will co-exist in time and it is also obvious that not all drivers will regularly use the telematic tools at their disposal.

Three deployment steps have been identified:

- Step 1: Provide a base infrastructure and some forms of actions and services in localised areas (providing solutions to traffic and safety problems where they are most acute) while ensuring interoperability of solutions through common standards (the minimum base that will lay the ground for future expansion). The risk of creating a patchwork is outbalanced by the opportunity to initiate the process.
- Step 2: Provide a base infrastructure and a base set of services on a "core network" of the TERN (the part of the



**Table 5: Telematic systems deployment by country**

Country	Step 2 kilometres	Step 3 kilometres
Belgique/België	450	1 320
BR Deutschland	2 040	11 730
Danmark	450	860
España	1 100	9 660
France	2 540	12 110
Hellas	0	3 380
Ireland	170	1 220
Italia	2 150	8 010
Luxembourg	0	90
Nederland	310	1 640
Osterreich	90	1 634
Portugal	320	1 370
Soumi-Finland	0	3 039
Sverige	0	1 403
United Kingdom	1 390	4 110
<b>EU (15)</b>	<b>11 010</b>	<b>64 276</b>

Source: ERTICO TELTEN Report

TERN where traffic management can be most effective for traffic reasons), ensuring interoperability of solutions and continuity of services.

- Step 3: Provide all traffic management measures and services on the whole TERN.

Step 1 is already under way

Steps 2 and 3 will be undertaken gradually between now and 2010. The length of the motorway sections involved is given in Table 6.

## 2.6 - MARKET POTENTIAL

The estimated cost for the implementation of the telematics infrastructure is 13 billion ECU, building up as follows: (Table 4)

The total market for **in-vehicle equipment** is expected to be around **18 Billion ECU** cumulative from 1997 until 2010. Consumer demand will grow even further as traffic density rises and the quality of services improves, therefore providing greater market opportunity.

The most likely developments for early implementation are:

- RDS-TMC information as an additional feature in car radios might spread rapidly and achieve a high rate of penetration, but with limited revenues and margins.
- Dynamic Route Information systems may find a limited market but they fill only a small gap between RDS-TMC radios and systems including guidance and therefore will probably only occupy (regional) niches.
- Automatic non stop tolling systems will be wide spread from 1997 especially in countries with no history of motorway tolling

Forecasts are given as an example for two main groups of products:

- "RDS-TMC radio" which is a relatively cheap and simple product, supplying regionally specified traffic information by voice that is available at any time.
- "Dynamic Route Information" providing visual traffic information on a screen, with or without route guidance function.

Car radios with integral TMC will be sold from 1996. The initial extra price for the TMC decoder is approximately 100 ECU (for the first 1 million units). Price decreases by 25% if cumulated outcome doubles and the market is oligopolistic or if there is a large number of competitors causing cost reductions to be passed on quickly in price decreases. The annual hypothetical market potential is seen as almost equal to the "hypothetical market potential" (1.3 x new car registrations), with a very slight increase in the first years because of abnormal sales due to the novelty of the product. Diffusion is steep, and the penetration rate rises to 62% in 2010 and 70% in 2020 (i.e. 1.3 x 18 million and 19 million new car registrations respectively). Revenues remain in a moderate range of 200 to 300 MECU a year. They grow fast, but also peak early because of price decreases and intense competition. In 2010 they will total 243 MECU with cumulative sales of around 3.8 billion ECU. Revenues are not to be seen completely as additional revenues to the electronics industry, because substitution is likely with other car-radio features such as quadrophonic speakers, CD-players etc. (Many consumers have definite ideas what a product should cost and therefore will replace other features by RDS-TMC).

- RDS-TMC car radios should become a success, in the mid-range providing most drivers with improved information, but additional market potential for the industry is very restricted. If only one third of revenue represents substitution for other features, the additional cumulative market would be 2.2 billion ECU from 1997 until 2010.

The introduction of systems of this kind will be in 1995/96. The initial price will be high (about 2,000 ECU for the first 50,000 units) which will be the main barrier against adoption. Diffusion will therefore start among the segment of very frequent business travellers and of drivers of prestige cars. An additional barrier is that drivers may perceive loss of autonomy. The system has no direct connection with routine purchases of car radios, resulting in a lower frequency of decisions providing an opportunity to purchase the system. Hypothetical market potential is equal to purchases of new cars, because consumer decisions tend to relate to purchases of new cars and system replacement will not be frequent. There is a strong dependence on factory installation in cars (high costs for later installation). Despite decreasing prices, the system remains unattractive for second cars, cars used only in urban areas or rural areas; therefore, market penetration will not exceed a certain level.

Until 2002 diffusion is slow. Sales are likely to pick up rapidly as prices decline and factory side installation spreads to lower classes of cars. Penetration increases to 45% to 50% of the market (of 18 million new car registrations) between 2010 and 2015. So, in this scenario the system is successful, but with late diffusion. After 10 years revenues will reach almost 2 billion ECU per year and then will remain at this level.

**Table 6: Distribution of costs for implementation of telematics infrastructure**

	Kilometres	Estimated cost	Cumulative cost
Step 1	7 000	2 billion ECU	2 billion ECU
Step 2	11 000	3 billion ECU	5 billion ECU
Step 3	64 000	8 billion ECU	13 billion ECU

Source: ERTICO TELTEN Report



### 3 - THE "CITIZEN'S NETWORK" FOR LINKING THE TERN TO URBAN TRANSPORT

The Motorway Working Group has also recommended the establishment of a European strategy for optimising mobility on major trans-European axes bearing in mind both the regional dimension and integration of other modes. It has recognised the need to consider not only interurban axes but also urban roads and alternative transport. The white paper on common transport policy also stressed the importance of developing a "citizen's network" that would ensure rapid and convenient travel not just on the Trans-European Road Network as defined above, but also on the feeder and distribution systems that serve them.

Taken into account the fact that telematic solutions in increasing the capacity of road networks will always be more limited than the increase of traffic, fundamental measures based on demand management strategies will need to be applied.

However, before such measures can be taken, and in order to maintain the citizen's mobility at least at the existing level, actions need to be undertaken in order to make available the only alternative: an inter modal Collective Transport system including easy intermodality between the private car and Collective Transport networks. This comprises:

- Improved passenger terminals,
- Rail links,
- Park&Ride facilities,

Nowadays some Public Transport operators are already taking initiatives to integrate in their network operation other modes such as: taxis (Dutch Railways - NS), rental electric cars & electric scooters (La Rochelle, Strasbourg), car rentals (Zürich), etc.

The Commission has also announced for 1995 a green paper on the Citizens network which will stress the importance of effective public transportation as part of a strategy to keep our cities viable and concentrate on measures to overcome barriers to an increased attractiveness of public transport. A green paper on external costs will inform on the cost of pollution, accidents and land use not borne by the road users and recommending the increase of road transport costs to limit congestion and ensure a fair balance between private and collective transport costs.

For the European Union to undertake a programme to apply modern telematics to the interurban motorway network, without addressing the critical problem of onward travel to the user's final destination - that may often count for the majority of time spent travelling, even for longer journeys - would only partially cover the problem.

It is obvious that the complementary nature of collective transport, generally leading directly to the city centre (and/or the commercial and business centres), to private car transport needs to be considered. The problem is similar for air transport conveying passengers to an airport outside the city.

Therefore, it is necessary as a matter of high priority to undertake further research to identify the means of tackling the problems of city connections.

The problems to be addressed are:

- The development of user-friendly fare collection systems and the adherence to integrated payment systems
- The use and evolution of AVM systems
- The development of vehicle location systems (satellite based or not)
- The promotion of Passenger information systems and the integration of inter modal (public transport and private car) information in order to encourage modal shift

The encouragement and disburden of inter modal interchanges

This involves not only the development of improved traffic control systems (as already foreseen on the Trans European Road Network), but also the integration of collective transport within the system, and in particular to ensure the most efficient use of road space in urban environments.

Consequently, for the EC to launch an action to cover the problem of the citizen's network for urban penetration as a complement to the successful TERN actions, could be a way of tackling this problem.

### 4 - CONCLUSIONS

1. The E.U. approach concerning the development of the pan-European transport networks is estimated at an overall cost of 400 billion ECU till the year 2010

2. The development of the Trans-European Road Network, includes the construction and/or modernisation of approximately 65.000 Km of motor ways and the implementation of Telematic systems for traffic management. E.U. wide telematic systems for road traffic management include principally:

- Dynamic route information and route guidance systems
- Radio Data System - Traffic Message Channel (RDS-TMC)
- Automatic toll systems

3. The development of the Trans-European Railway Network including mainly the creation of a high speed trans-European network is estimated at a cost of 200 billion ECU

4. The link between the envisaged Trans-European Networks which are essentially inter-urban networks and the urban transport allowing for the penetration in the urban centres is an indispensable complement in order to maintain European cities viable.

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Written by Pierre Laconte Secretary General UITP and Vice Chairman of ERTICO

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# World information output in engineering sciences and technology

### INTRODUCTION

Scientometric approaches have long become a standard tool for handling a family of input and output R&D indicators. On the other hand, all industrialized countries are devoting increasing amounts of resources, both public and private, to improving their competitive position. While manpower and financial expenditures are the classical measures of research inputs, the count of publications, citations, patents and manifold related techniques provide an insight in various aspects of performance and efficiency. Approaches linking inputs to R&D (measured as resources allocated) with measures of outputs from R&D purport to indicate the contribution of R&D to economic growth and to economic and social entities. Publication-derived indices may be used to assess inventive activity in general and not at all only in the fundamental research, they are able to assess entire disciplines or research fields, and allow for cross-country and cross-disciplinary comparisons.

There is a substantial body of public literature and internal reports in these respects, containing a broad range of methodical approaches and findings. A part of the scientometric, or sometimes rather technometric analyses tackle the applied research, its performing establishments, the industrial research strongpoints, or the areas of science and technology which are inherently bound to successful industrial activities. Even technological capability as a very broad concept can be monitored by a wide variety of potential R&D indicators. Engineering scientific and technological research is apparently one of the key resources of new ideas for industry, its position is traditionally strong and level often excellent throughout the European continent, but little factography is generally known about its true international size, trends and profiles in output terms. There is also a growing awareness of the need to examine the interconnections between different research and socio-economic characteristics of national systems in order to explain the observed lasting differences in innovative and growth performance.

### THE DATABASE

The following assessment is a result of long-term systematic searches in *The Engineering Index* database for the years 1986-1994, a total of 1.5 million bibliographic items. The *Index* is published by The Engineering Information Inc. in New York. The literature covered is found in about 4500 journals, 2000 conferences per year (starting in 1989), publications of societies and organizations, technical reports, directories and monographs. *Compendex* and *Compendex Plus* are the machine-readable versions of the *Index*, which is now available also as CD-ROM products. The database, covering as many as 200 thousand records annually, is the best recognized world compilation of engineering and technological literature. In the area of engineering S&T and applied research, this database is perhaps ten times more comprehensive than the *Science*

*Citation Index*, currently the much too globally implemented tool for performance indicators in science and technology policy. International socio-economic figures were extracted and introduced in the model matrixes from the latest edition of *The World Bank Atlas*, published by the International Bank for Reconstruction and Development.

### MAIN RESULTS

36 fairly self-explaining scatter diagrams, discriminant scatterplots, dendrograms, bar diagrams and time series are presented in four series: **Socio-economic relationships and country groupings**: Standard double-logarithmic regression model and 95% confidence limits are applied to examine the publication scores of EU countries against the population size, national or individual wealth. While positive and highly correlated associations (Figs.1-4) confirm basic scientometric and econometric models, the seemingly negative effect of both the absolute and relative engineering publication activity on the countries growth rates in GNP per capita (Figs.5.6) would require some interpretation. In the pairs of Figures 7a and 7b to 10a and 10b, both the discriminant function analysis and the joining (tree clustering) methods help to group the EU countries by their engineering S&T publication effort, again versus a set of major demographic and socio-economic indicators. **Cumulative distributions** for major engineering S&T fields provide very simple comparisons on the global (Figs.11-16), regional (Figs.17) and EU (Fig.18) scales (as in other cases, limited size of this chapter did not permit to elaborate for individual European or world countries). **Growth trends** for major engineering S&T fields in the whole world, five leading regions and the EU (Figs.19-26) are structured similarly. **Treatment criteria**, allowing to distinguish (with overlaps) whether the performed activities belong to theoretical research, experimental research, or applications (other categories are: general, numerical & statistics, management, economy, history), are shown for the whole world cumulatively (Fig.27) and in trends (Fig.28), in regional distributions (Fig.29a) and markedly different regional profiles (Fig.29b). The last discriminant diagrams (Fig.30a) and similarity tree diagrams (Fig.30b) for the complete set of Central & East European countries (respective surveys are available for all EU and 27 non-European countries) indicate the proximity/distance in the countries engineering S&T research orientation - a vital information for international collaboration, joint projects, educational exchange, or even the brain-drain.



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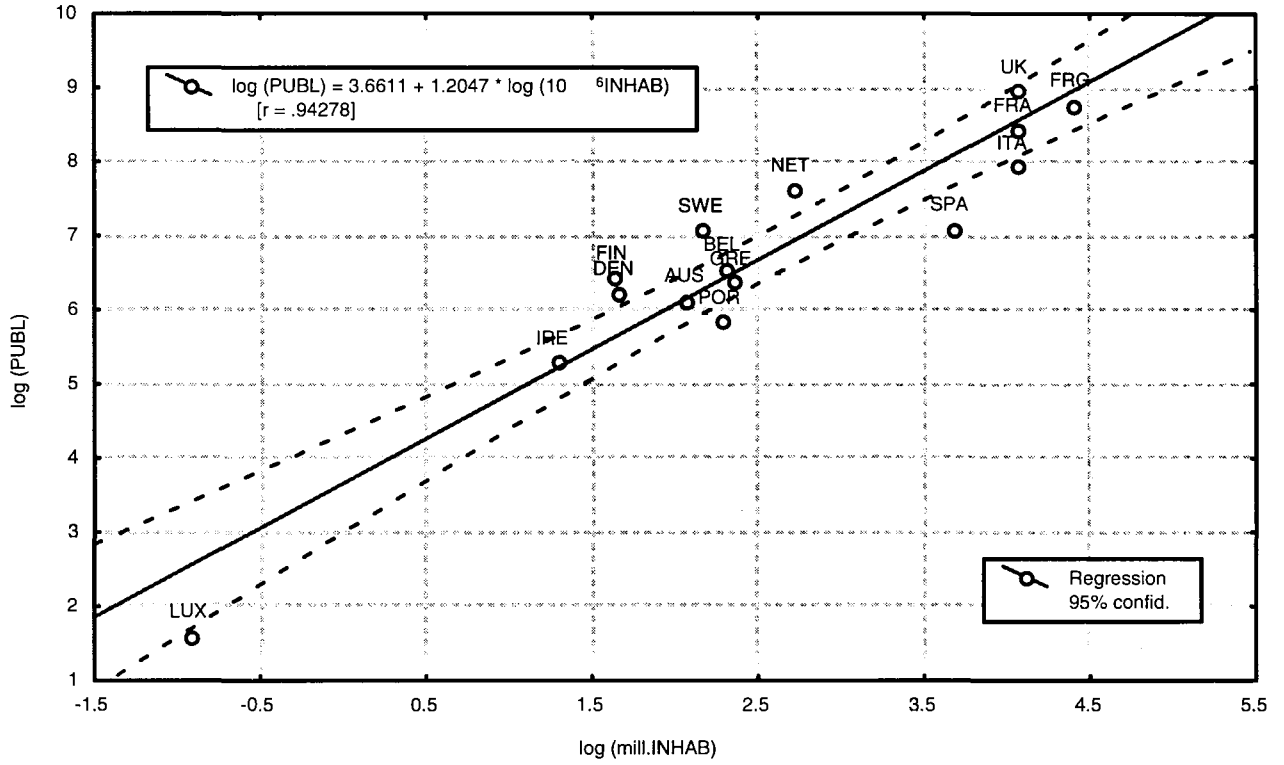
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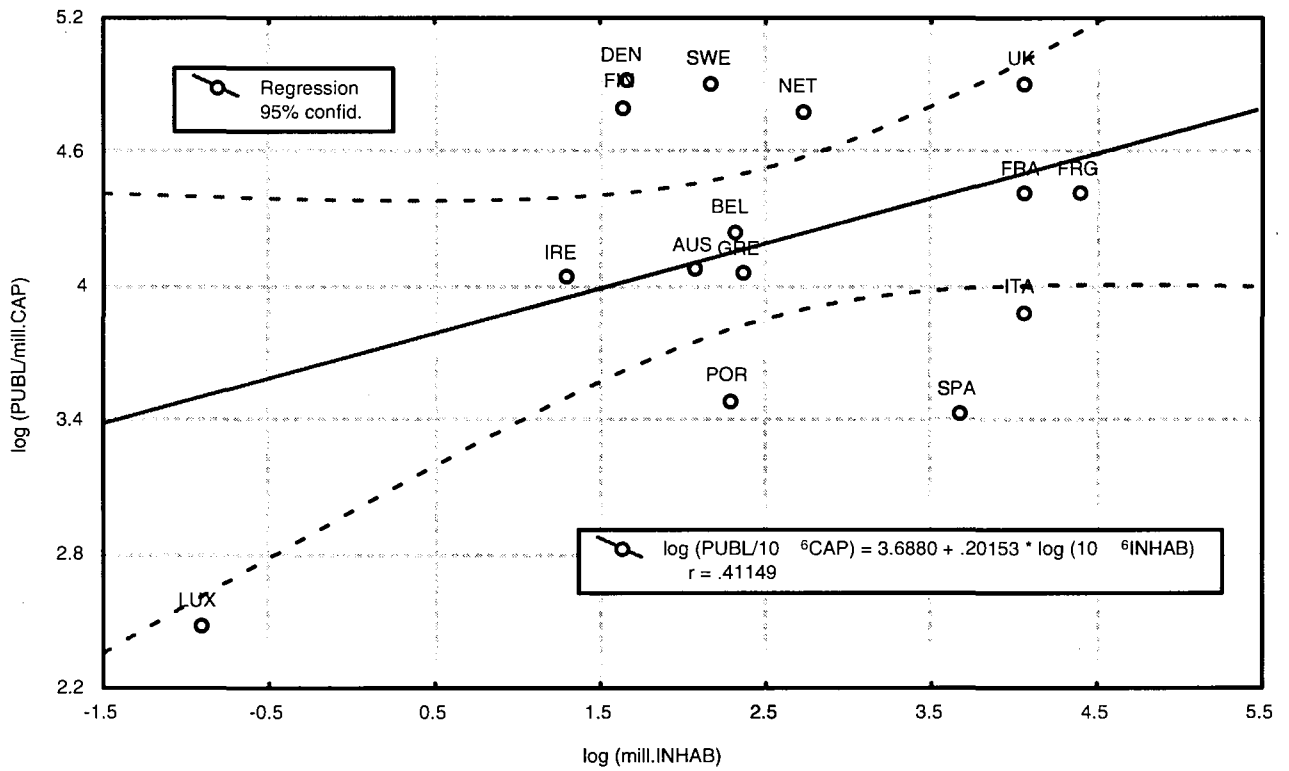
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

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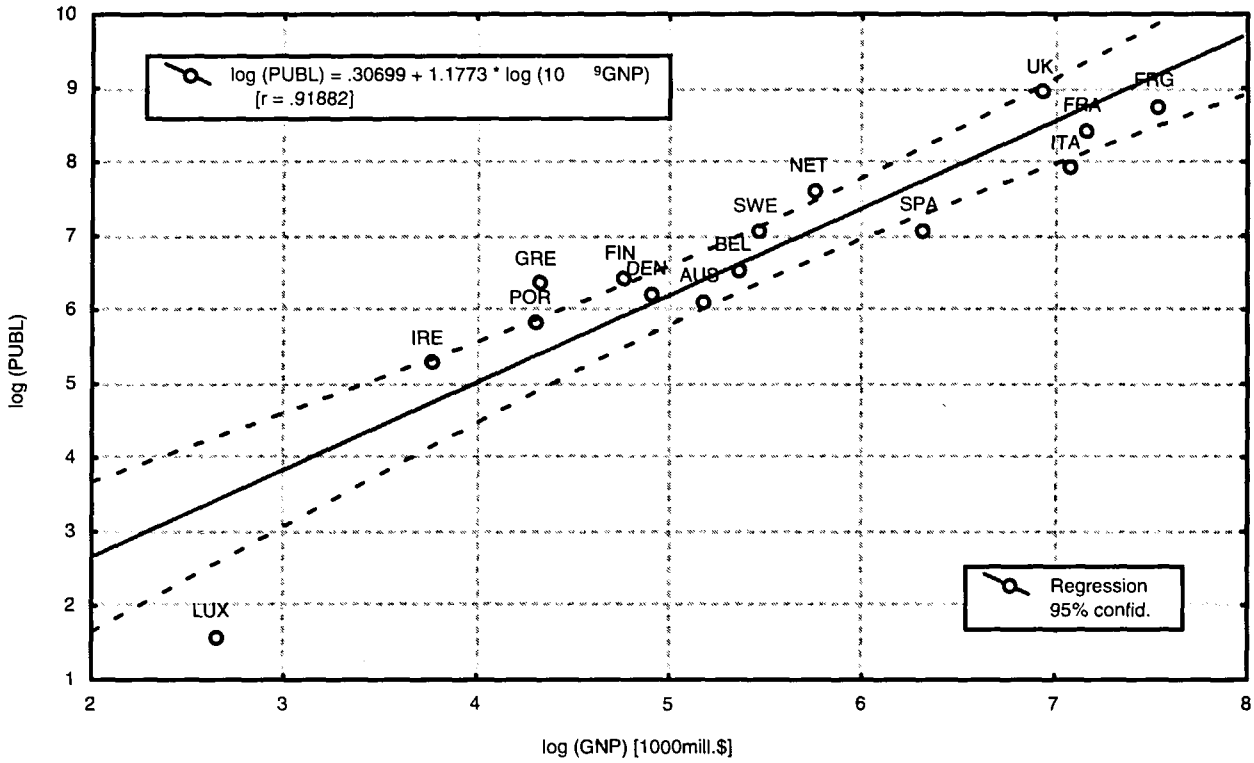


Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995



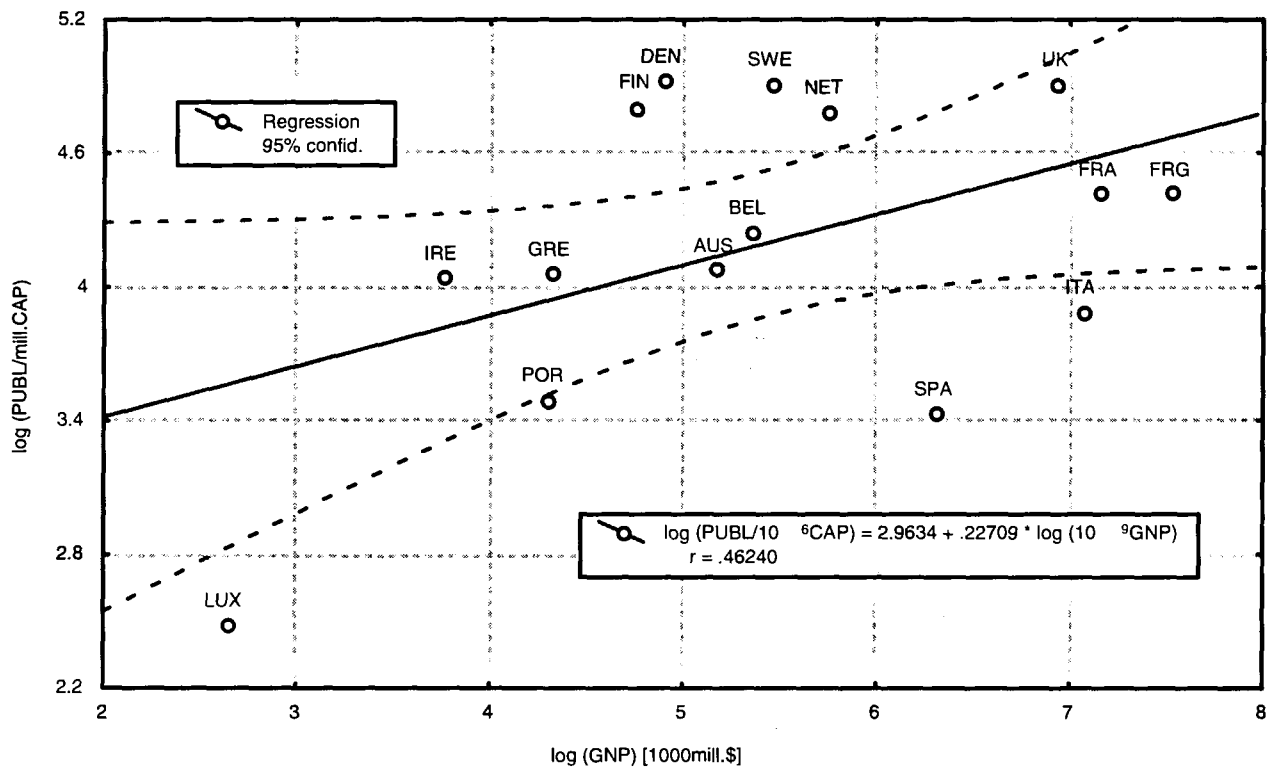


**Fig.3**  
**GROSS NATIONAL PRODUCT vs ENGINEERING S&T PUBLICATION OUTPUT**  
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

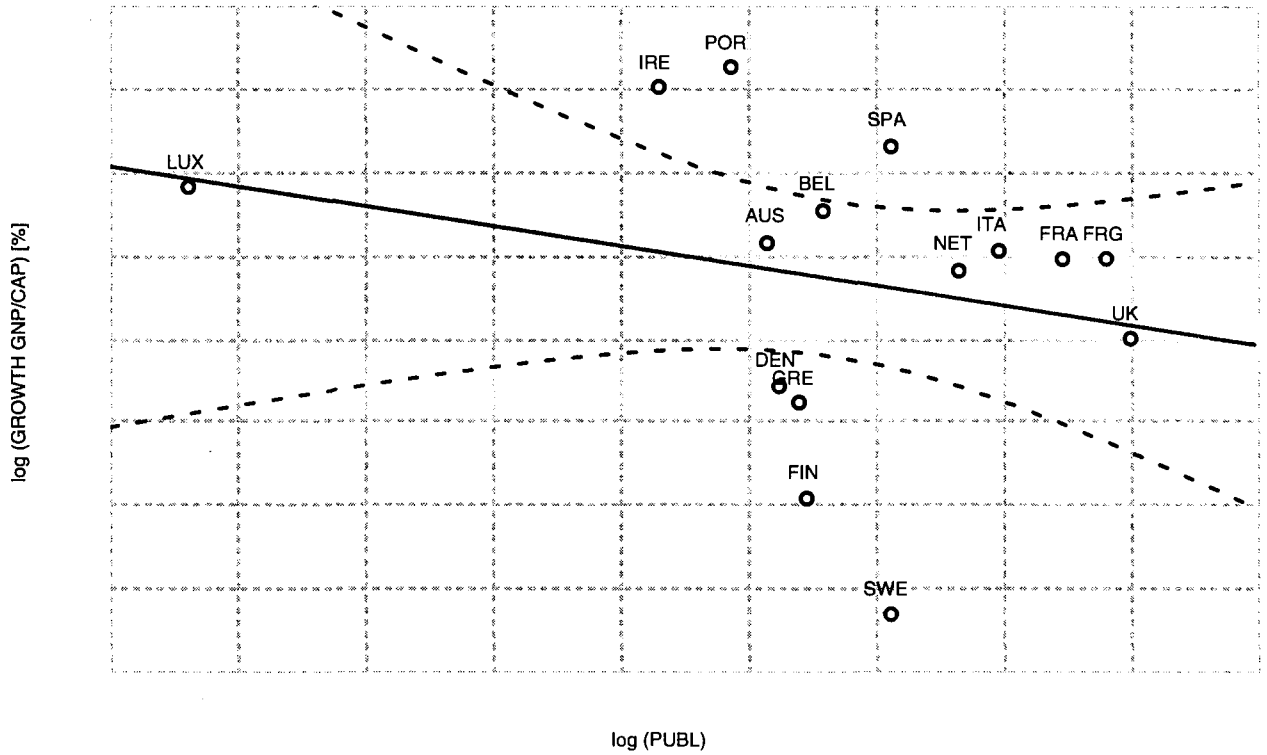
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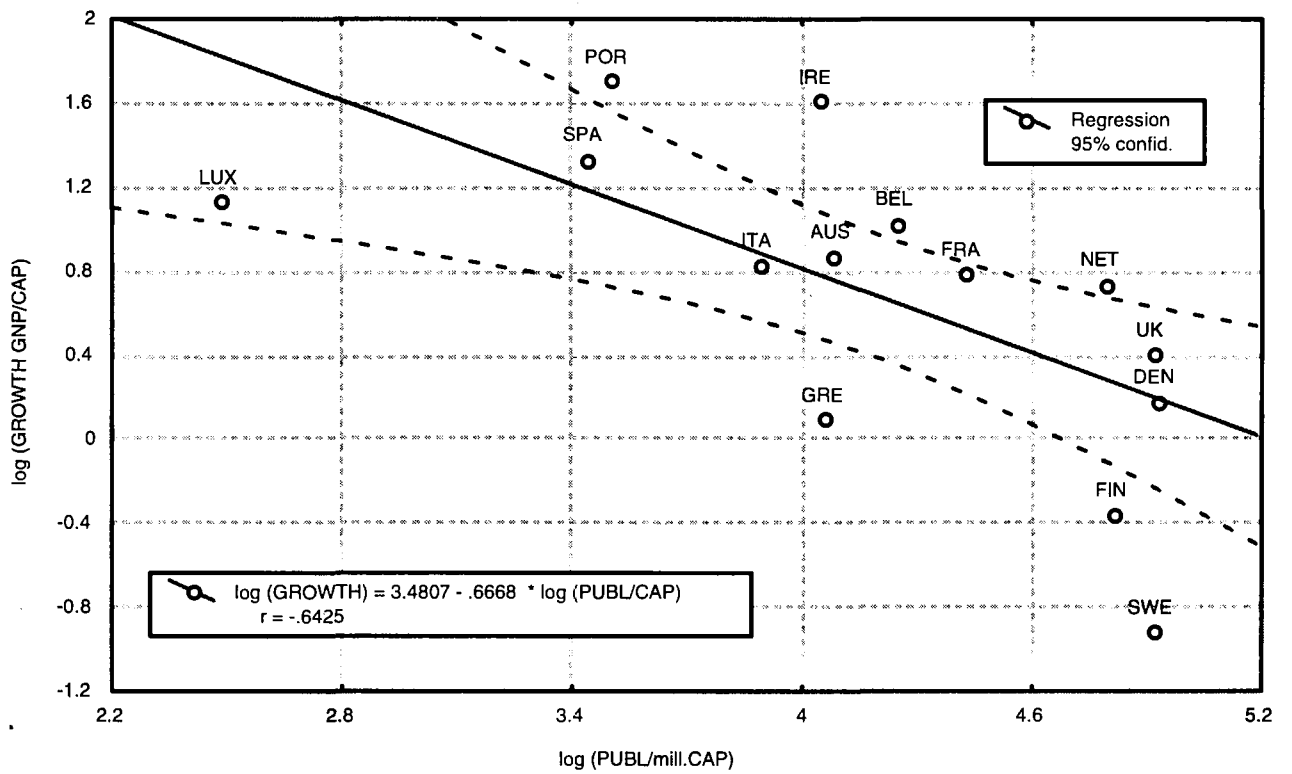
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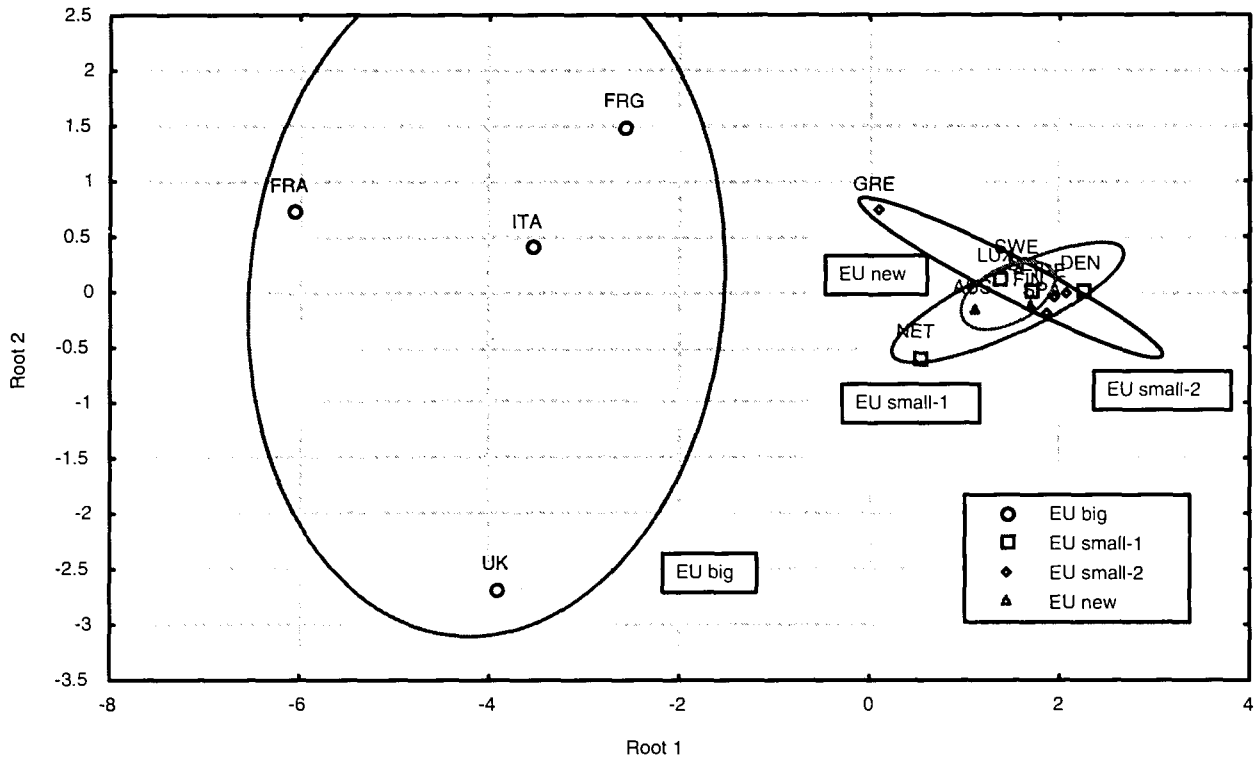


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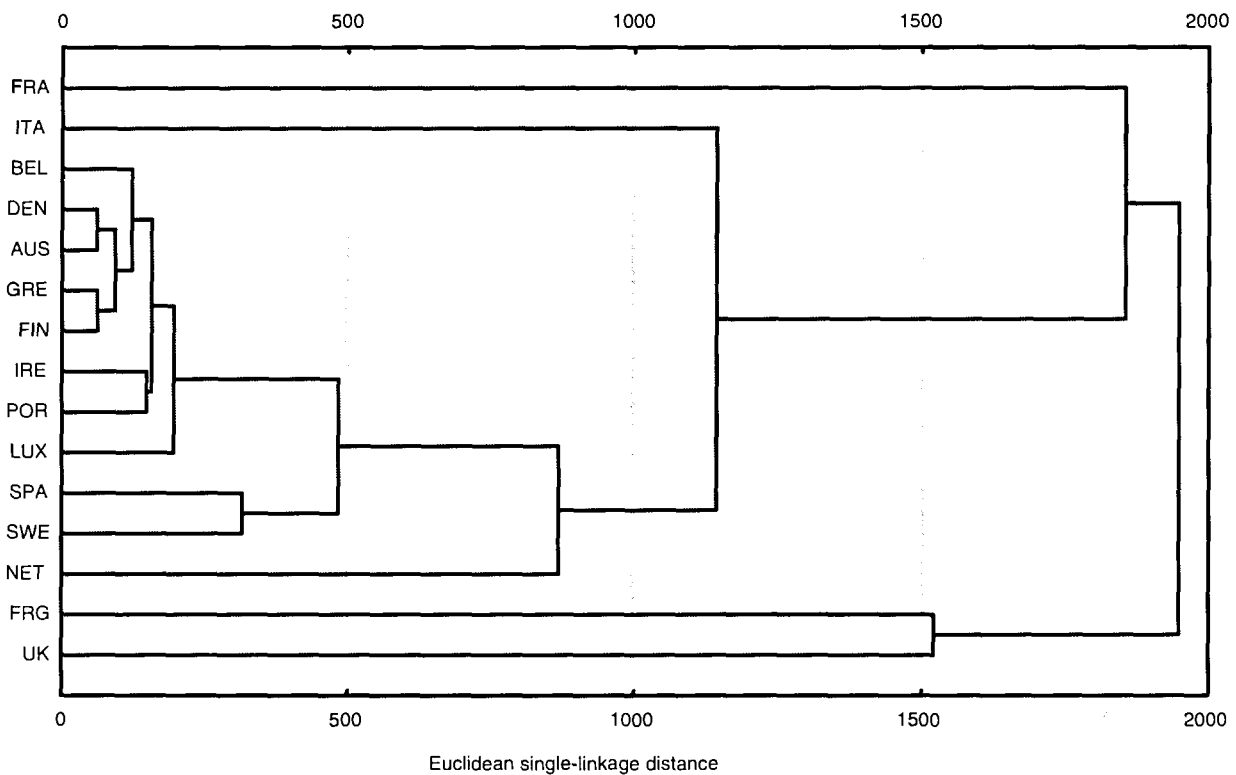
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

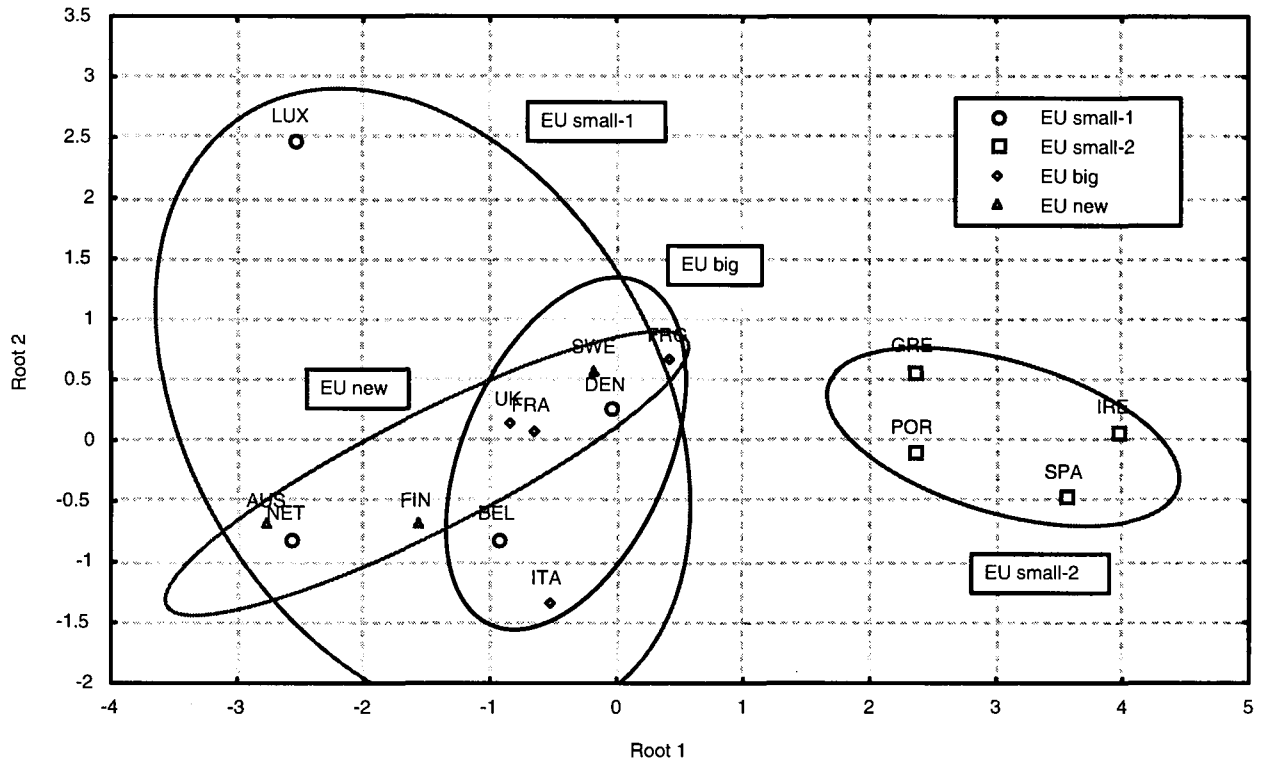
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

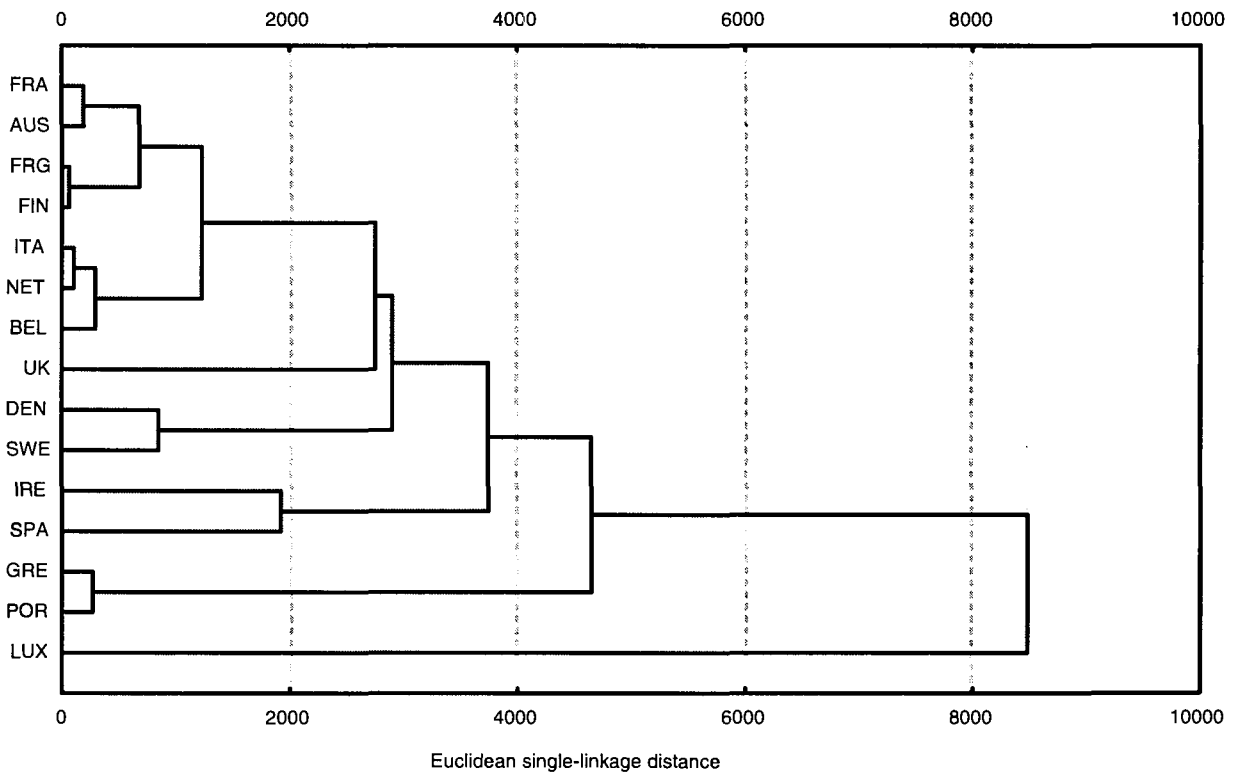


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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

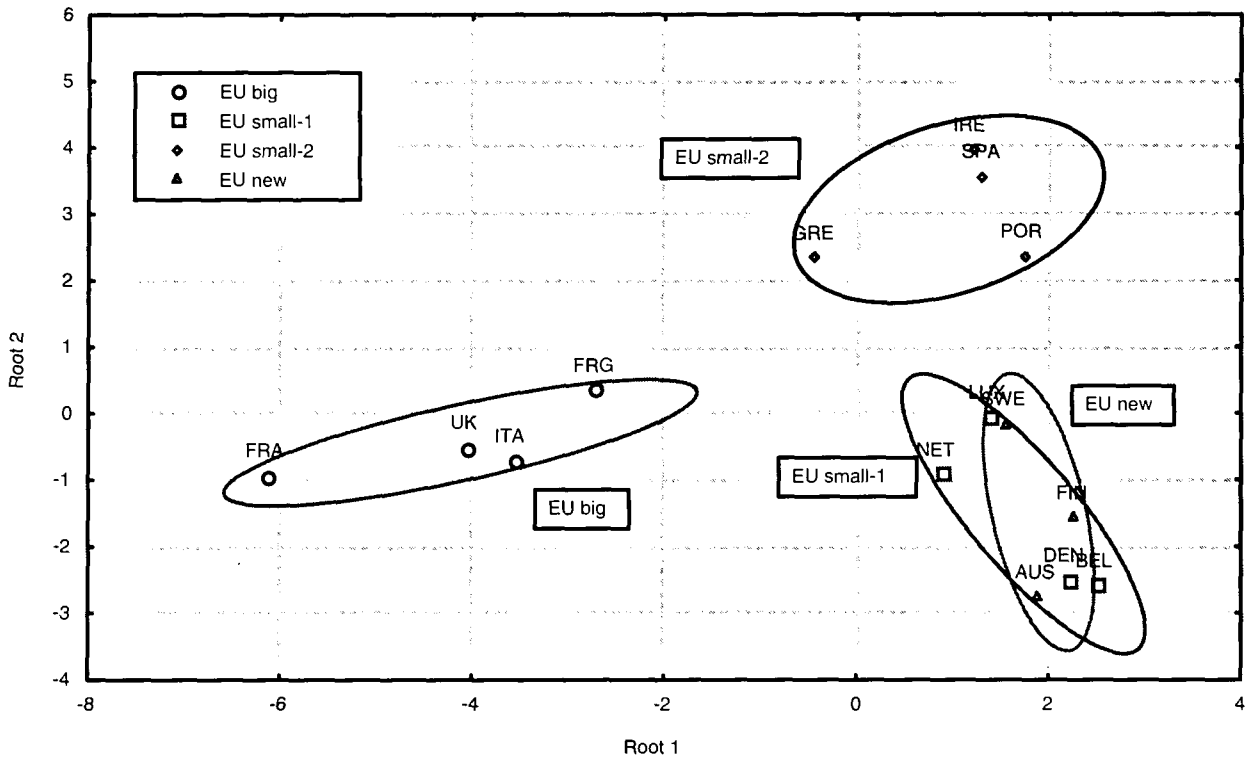
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

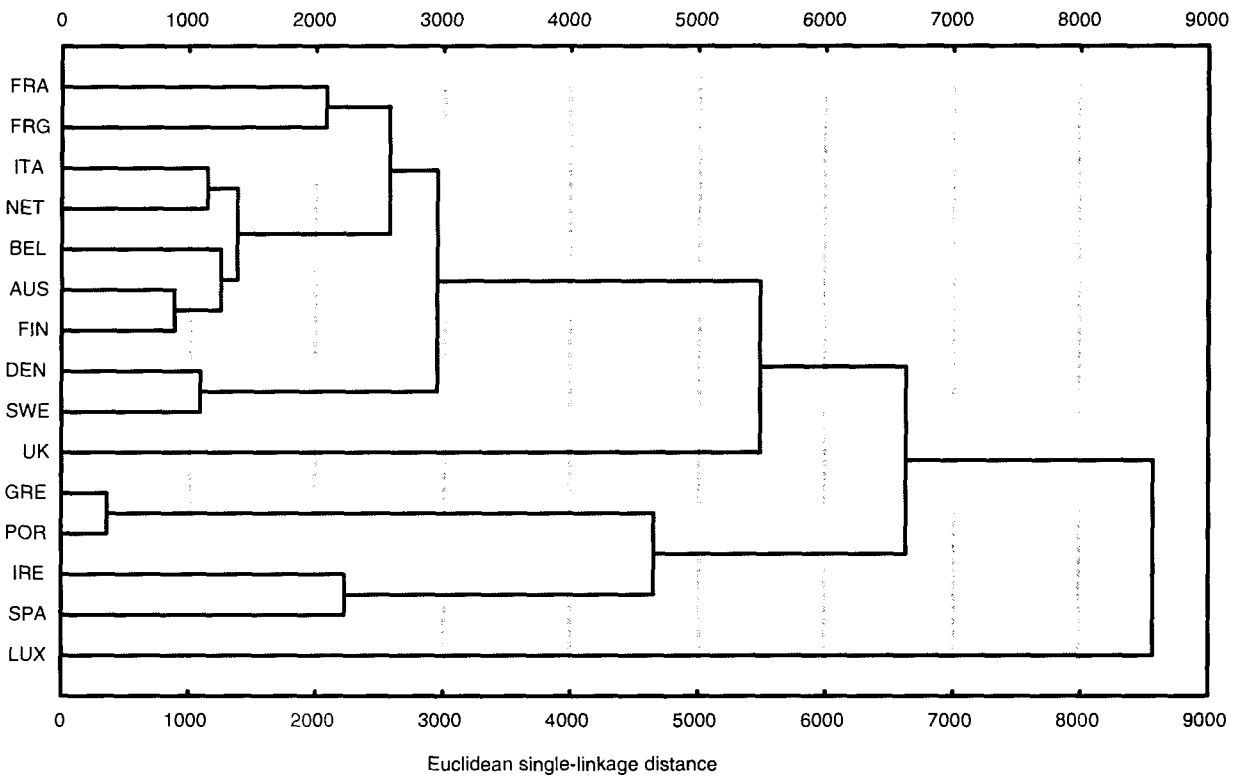


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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

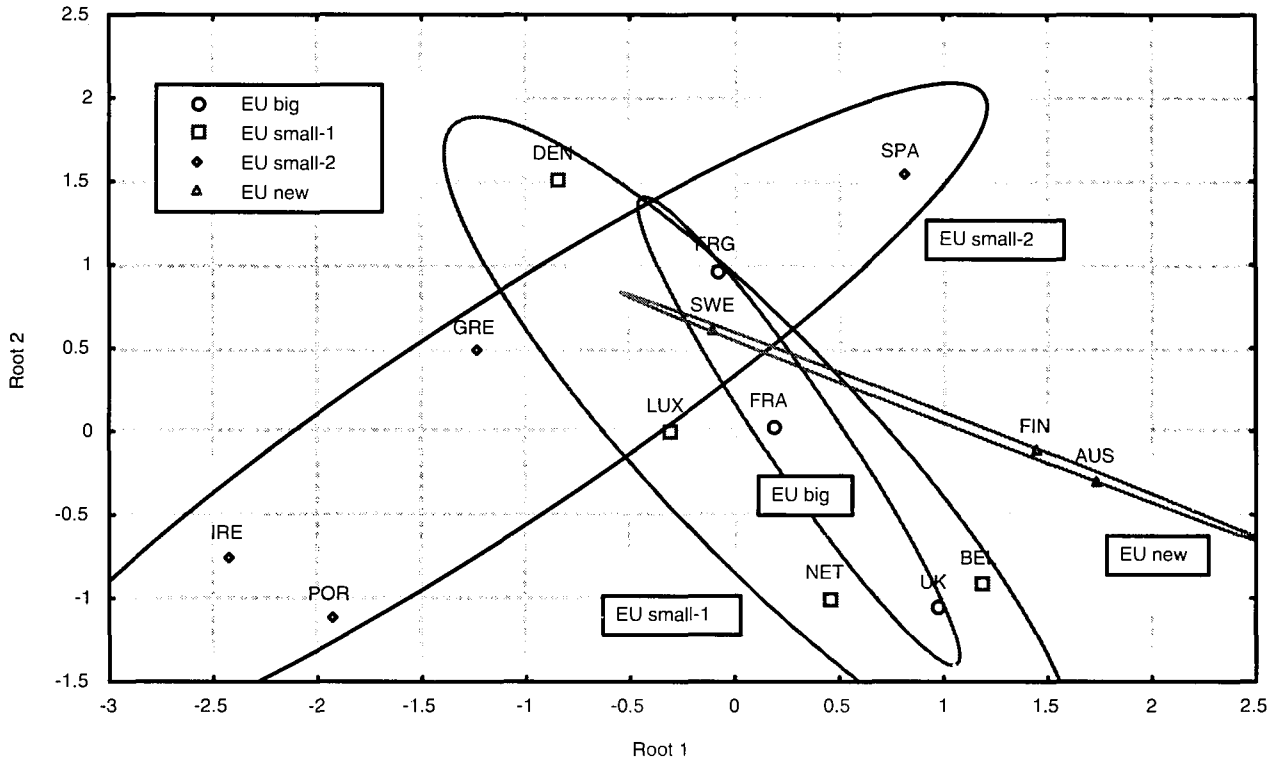
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

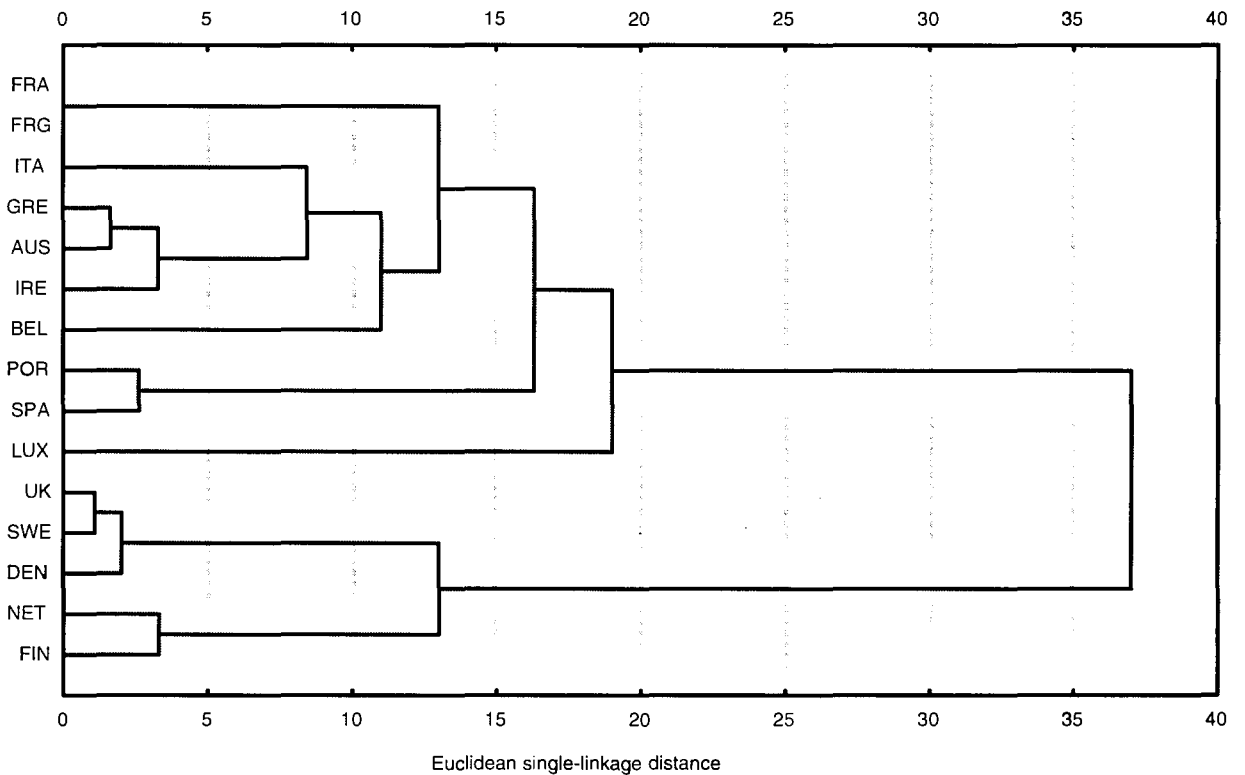


**Fig.10a**  
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

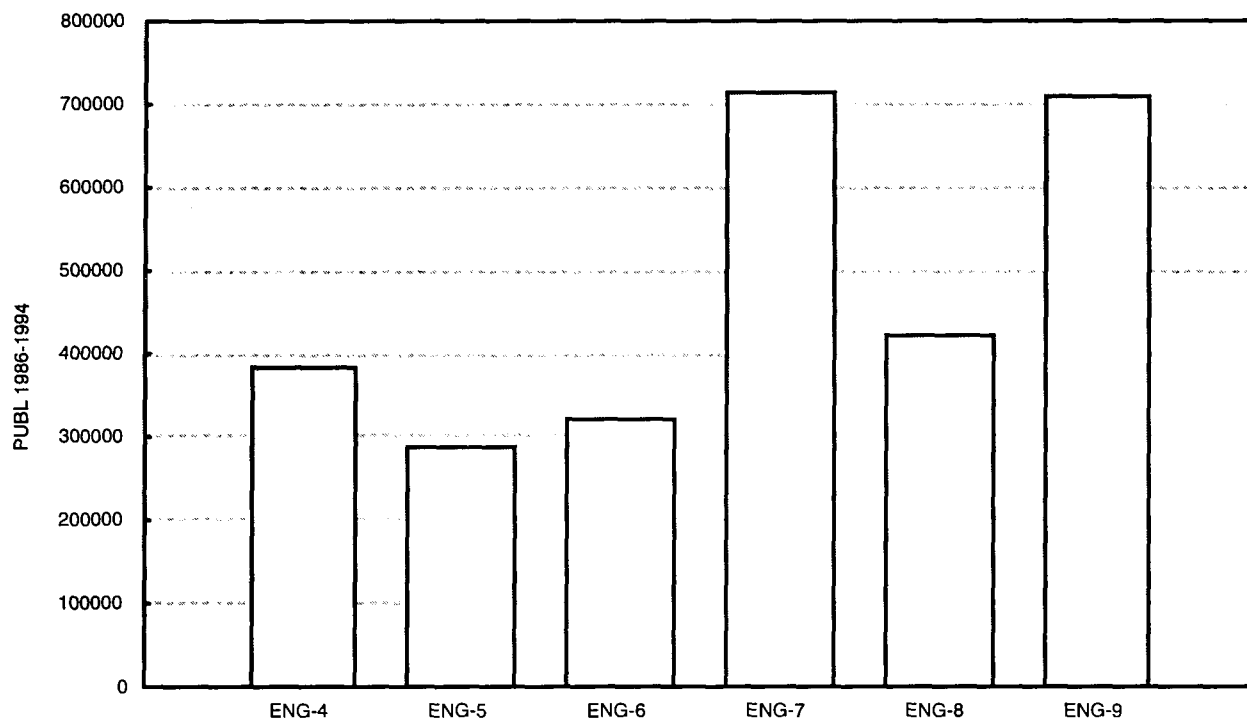
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Sources: World Bank 1994 / Compendex 1986-1994 / Vlachý 1995

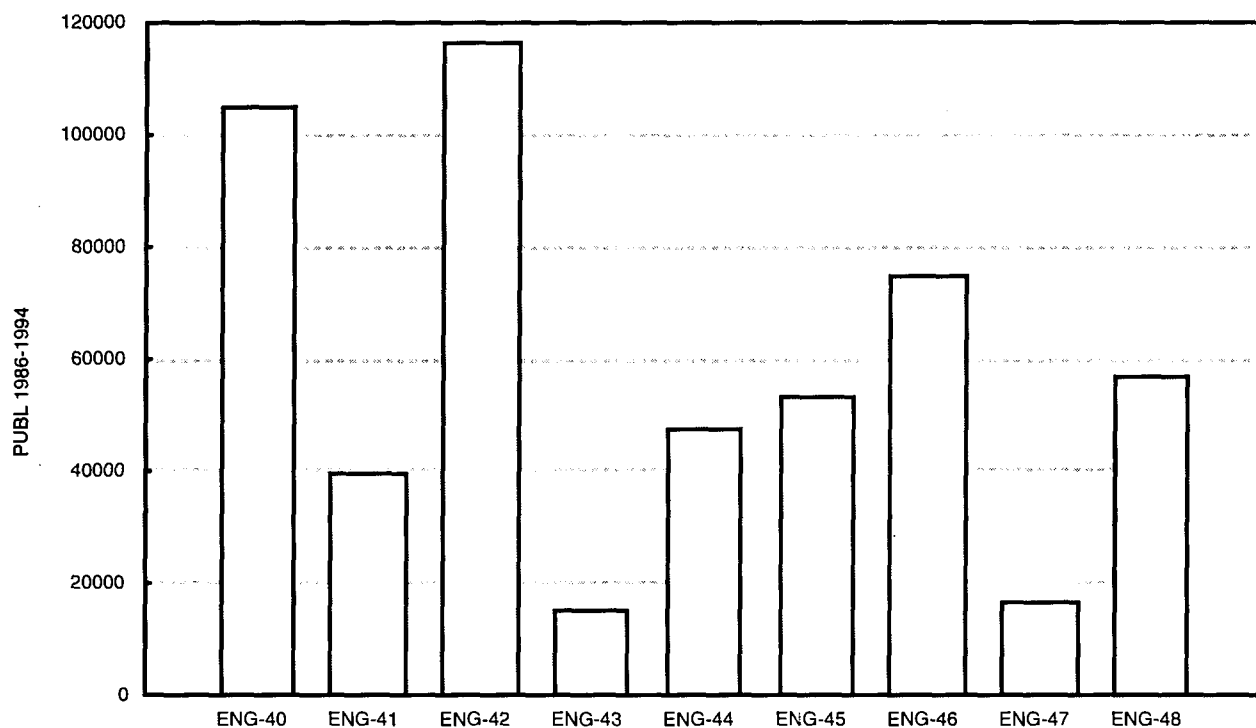


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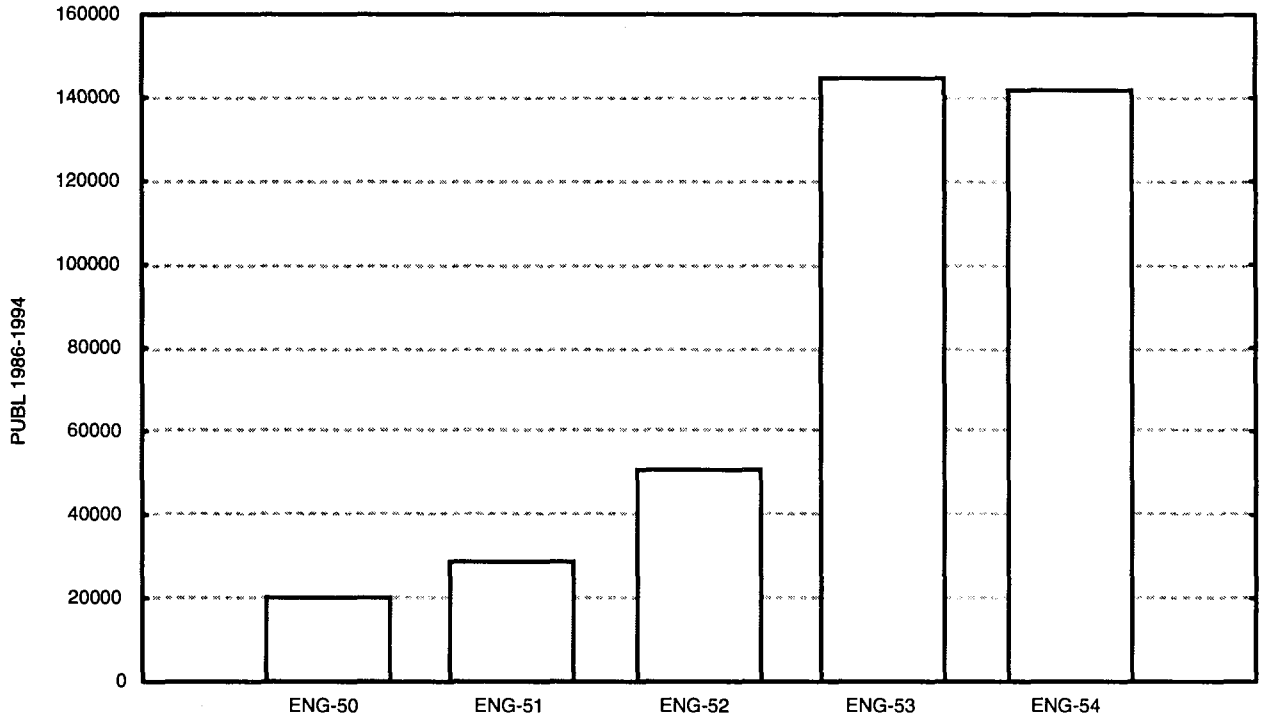
Sources: Compendex 1986-1994 / Vlachý 1995

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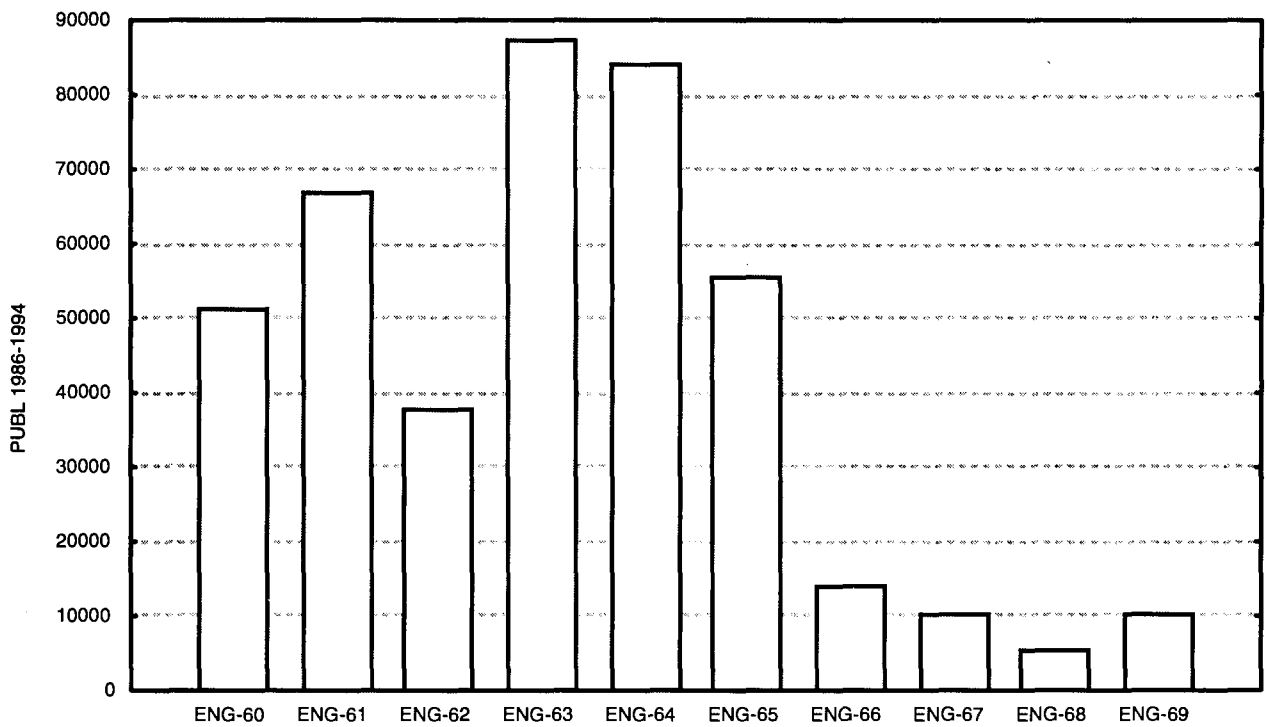
Sources: Compendex 1986-1994 / Vlachý 1995

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Sources: Compendex 1986-1994 / Vlachý 1995

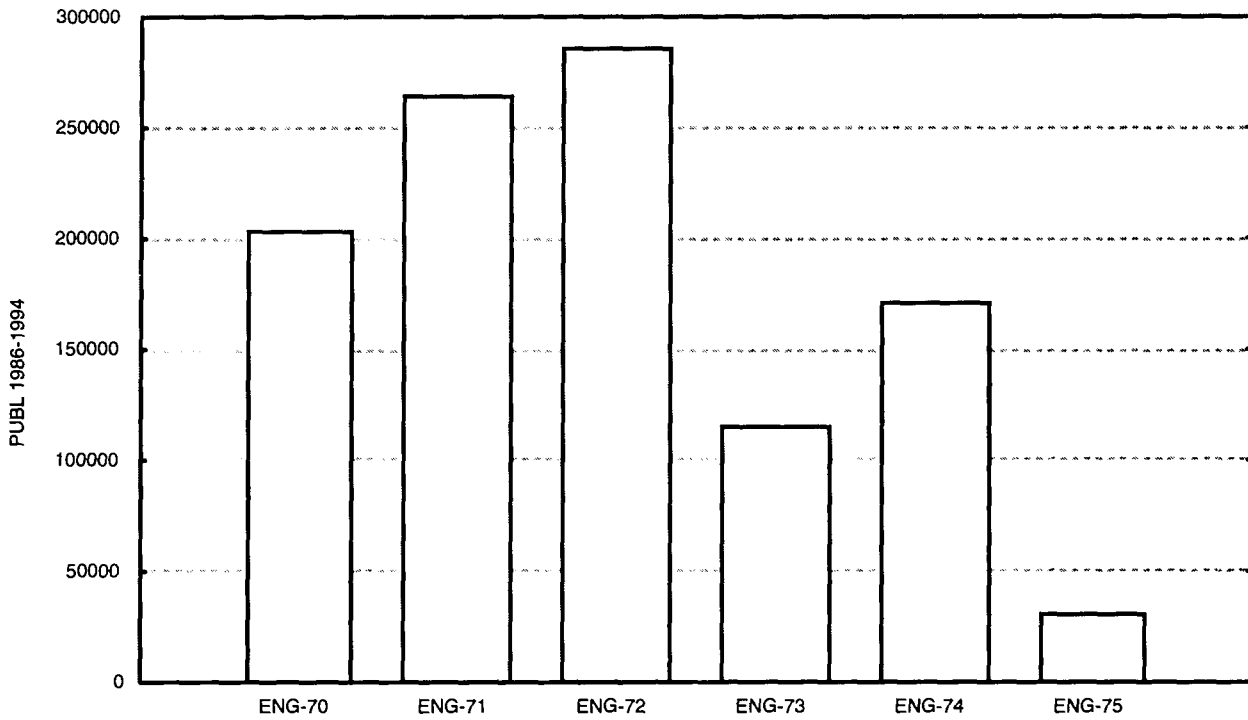
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**CUMULATIVE DISTRIBUTION OF THE WORLD PUBLICATION OUTPUT**  
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Sources: Compendex 1986-1994 / Vlachý 1995

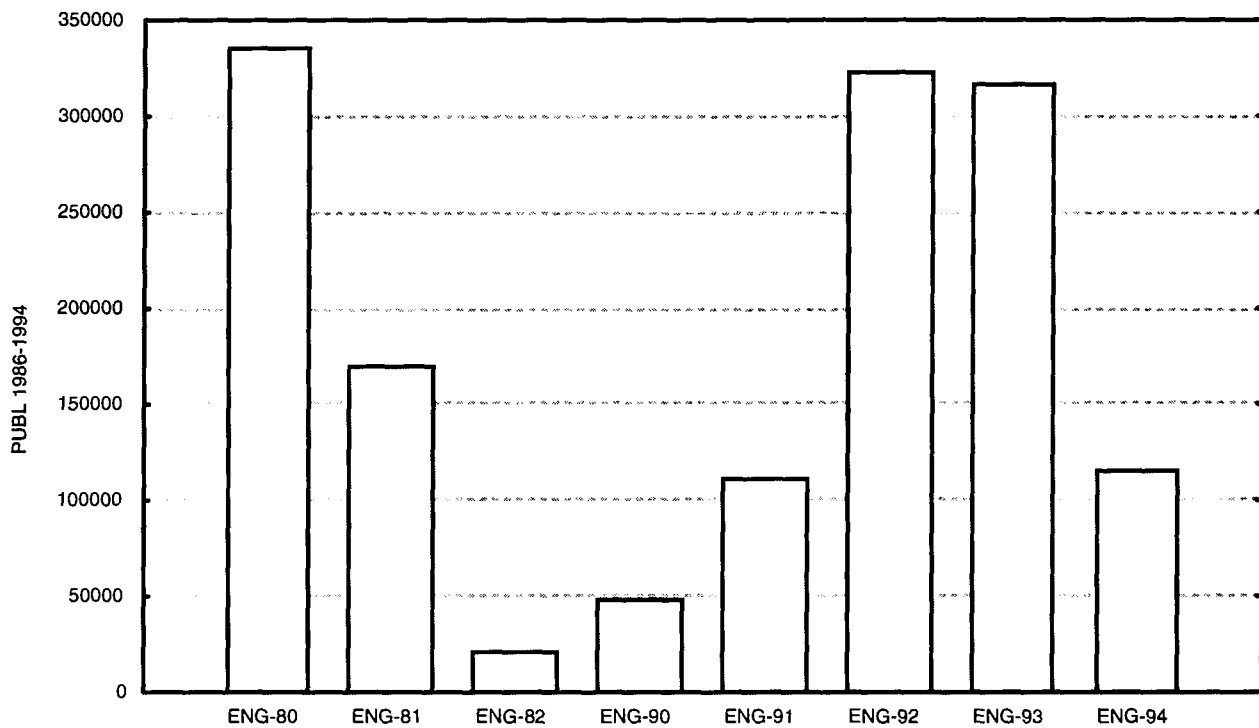


**Fig.15**  
**CUMULATIVE DISTRIBUTION OF THE WORLD PUBLICATION OUTPUT**  
**GROUP ENG-7 OF MAJOR ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995

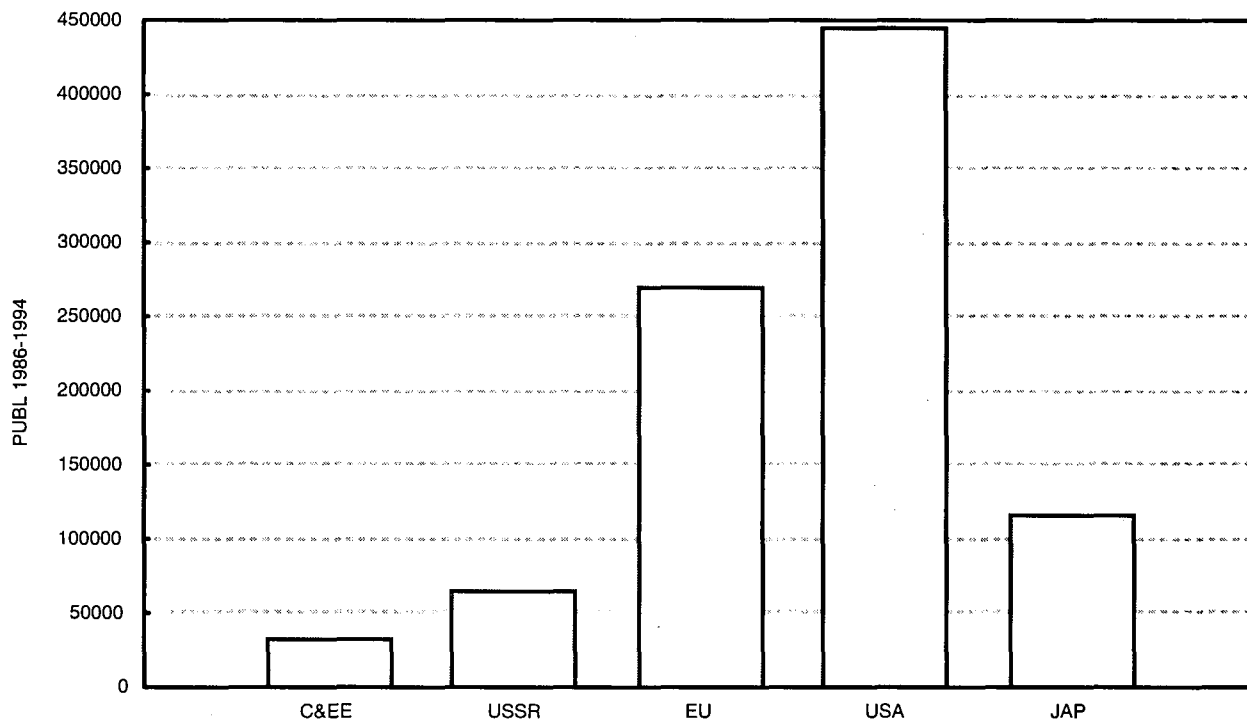
**Fig.16**  
**CUMULATIVE DISTRIBUTION OF THE WORLD PUBLICATION OUTPUT**  
**GROUPS ENG-8 AND ENG-9 OF MAJOR ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995

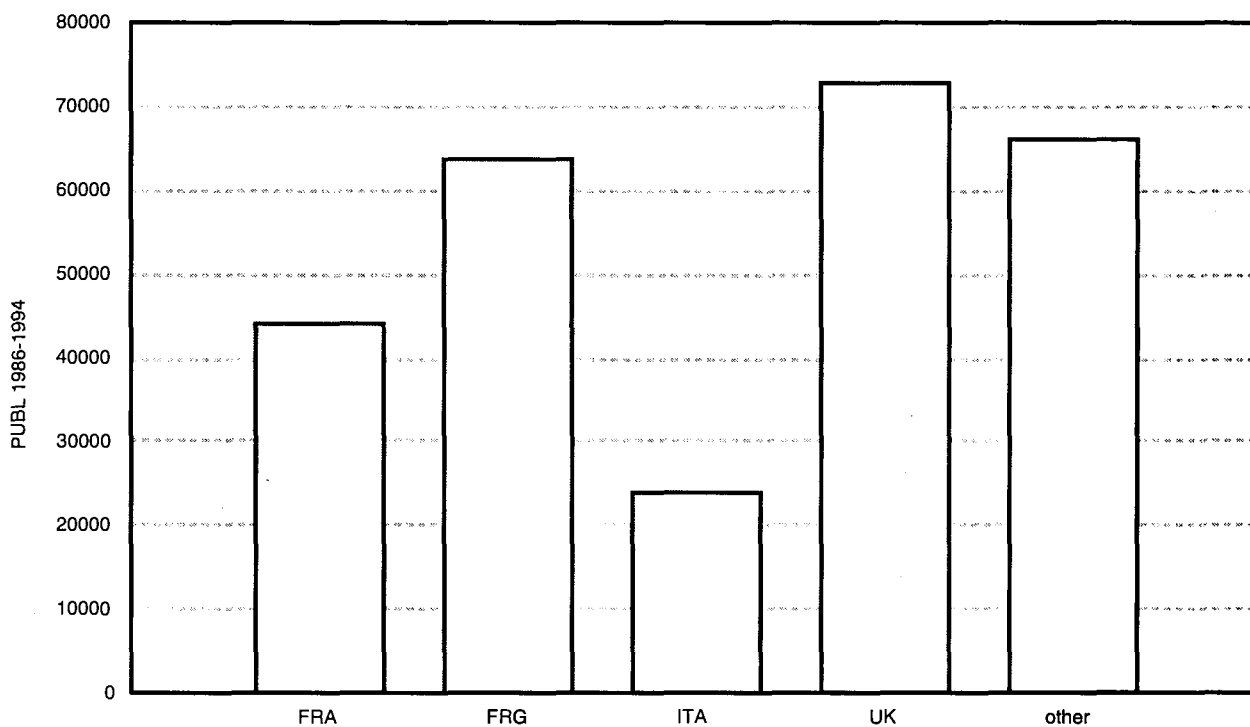


**Fig.17**  
**CUMULATIVE DISTRIBUTION OF THE WORLD PUBLICATION OUTPUT**  
**MAJOR WORLD REGIONS**



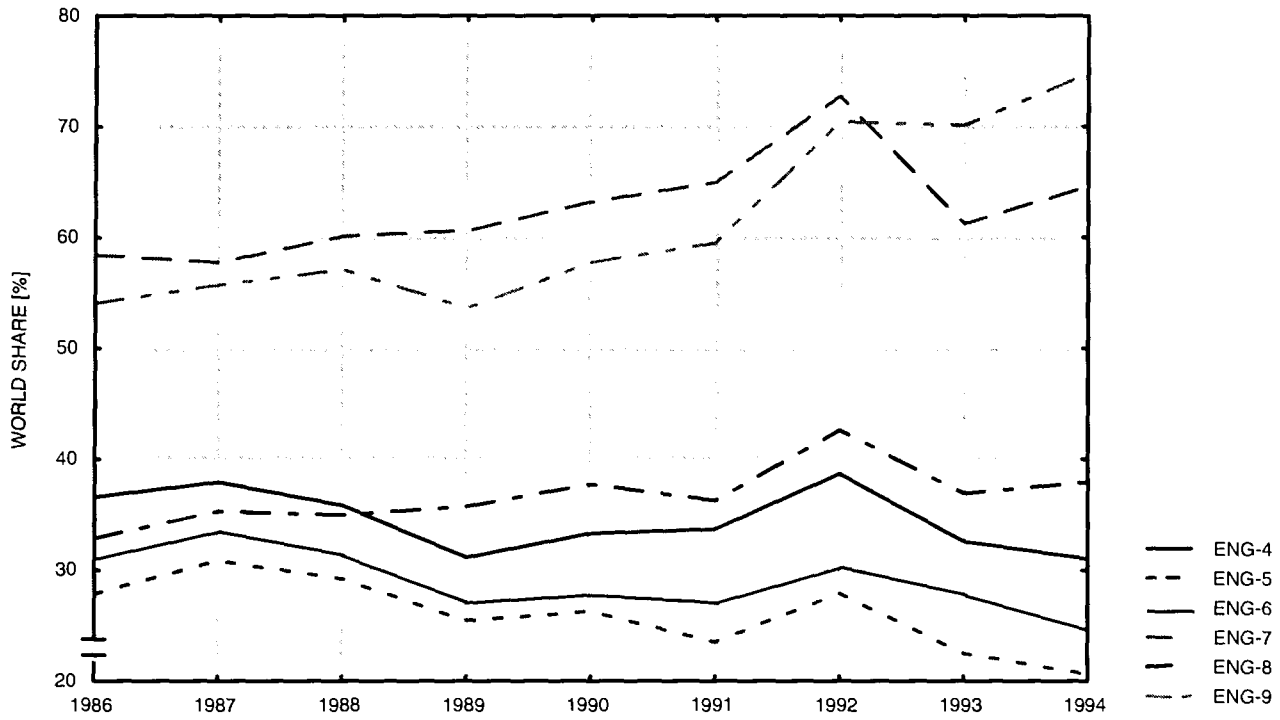
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.18**  
**CUMULATIVE DISTRIBUTION OF THE EUROPEAN PUBLICATION OUTPUT**  
**EUROPEAN UNION**



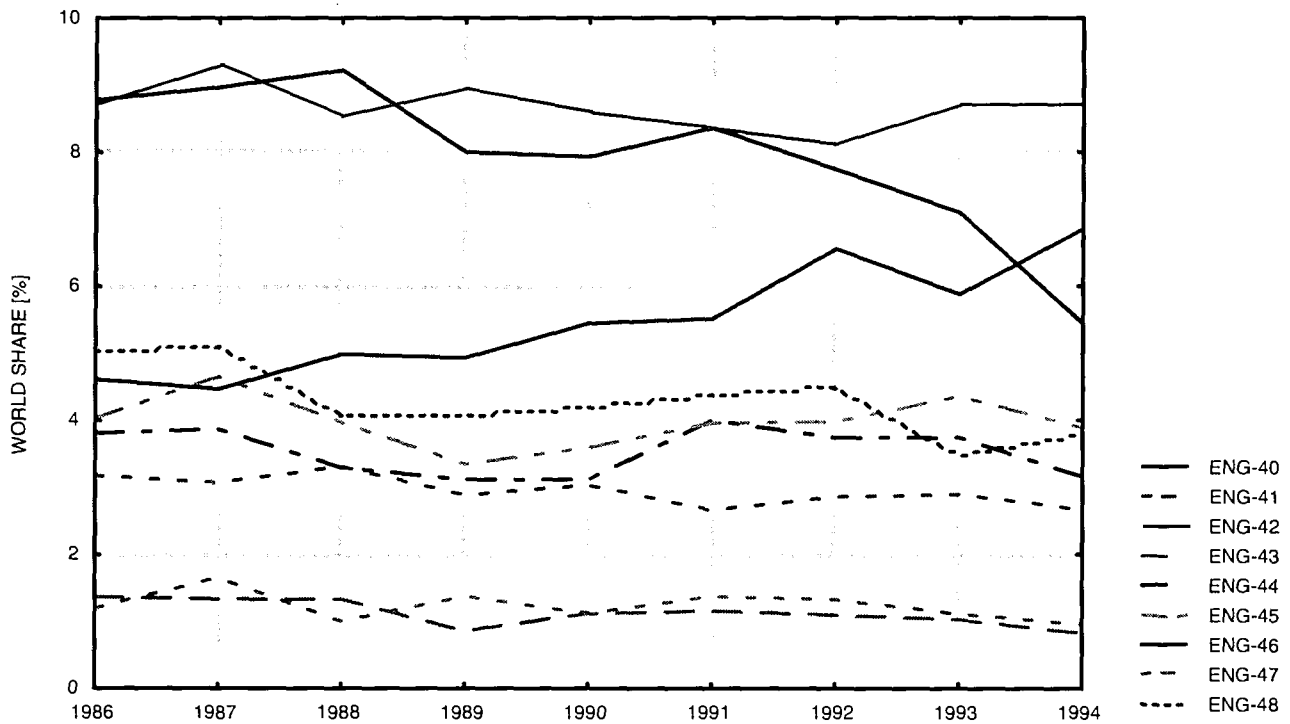
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.19**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUPS OF MAJOR ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995

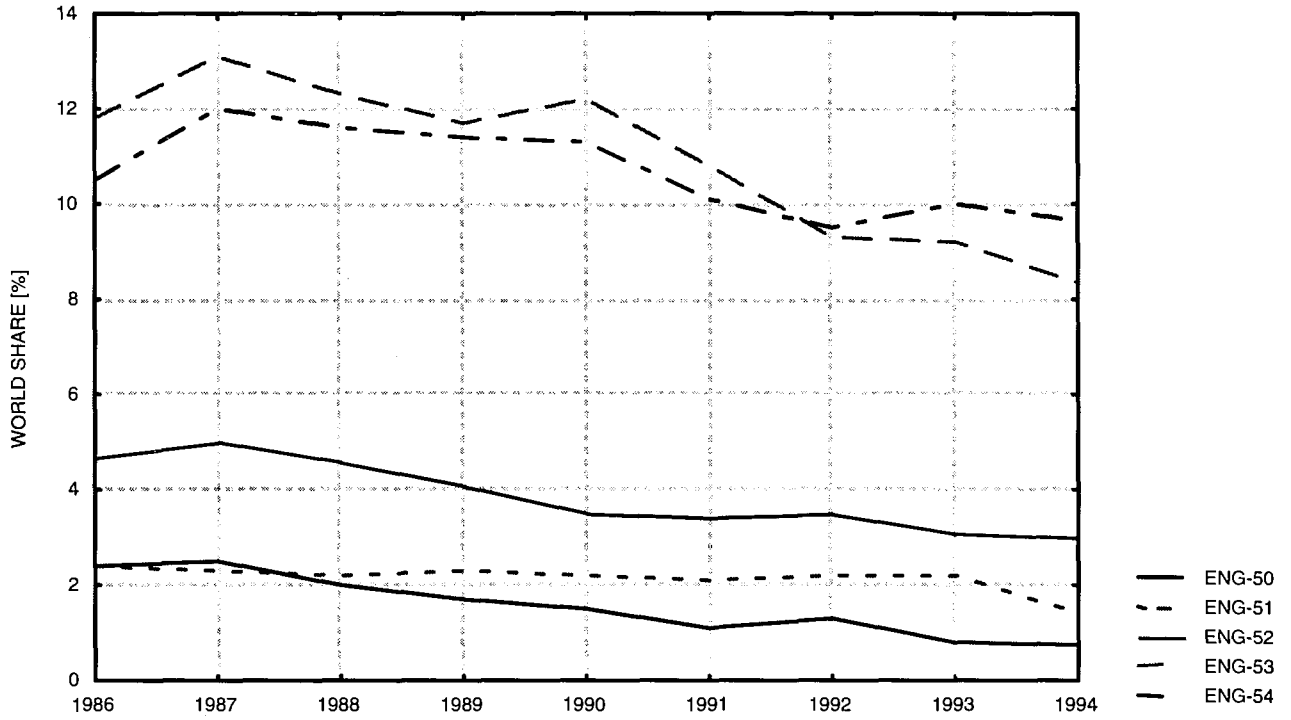
**Fig.20**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUP ENG-4 OF MAJOR ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995

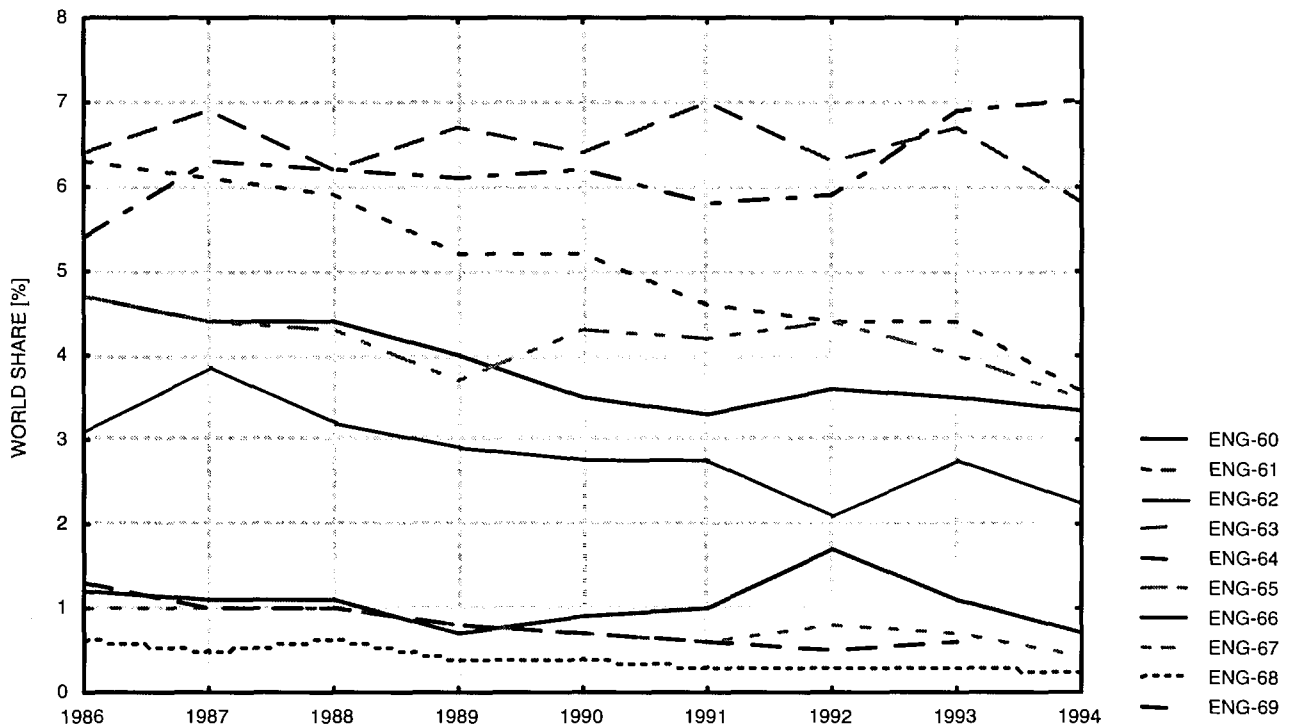


**Fig.21**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUP ENG-5 OF MAJOR ENGINEERING S&T FIELDS**



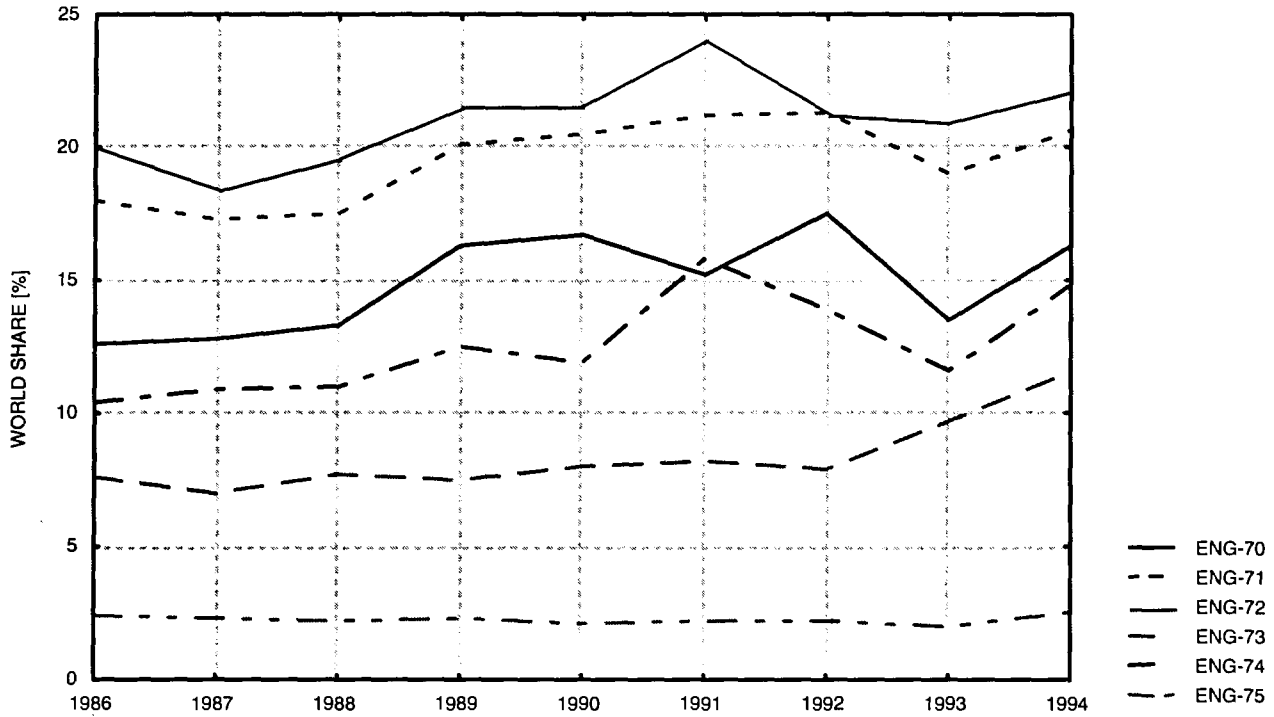
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.22**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUP ENG-6 OF MAJOR ENGINEERING S&T FIELDS**



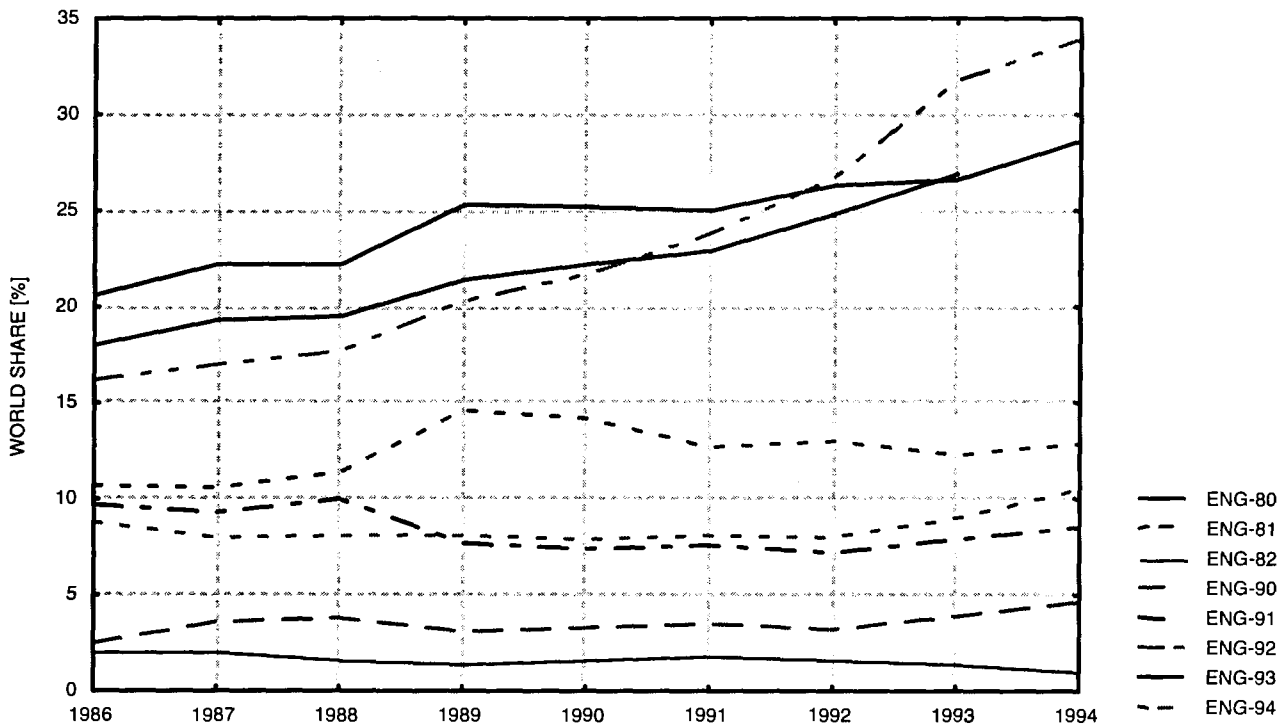
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.23**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUP ENG-7 OF MAJOR ENGINEERING S&T FIELDS**



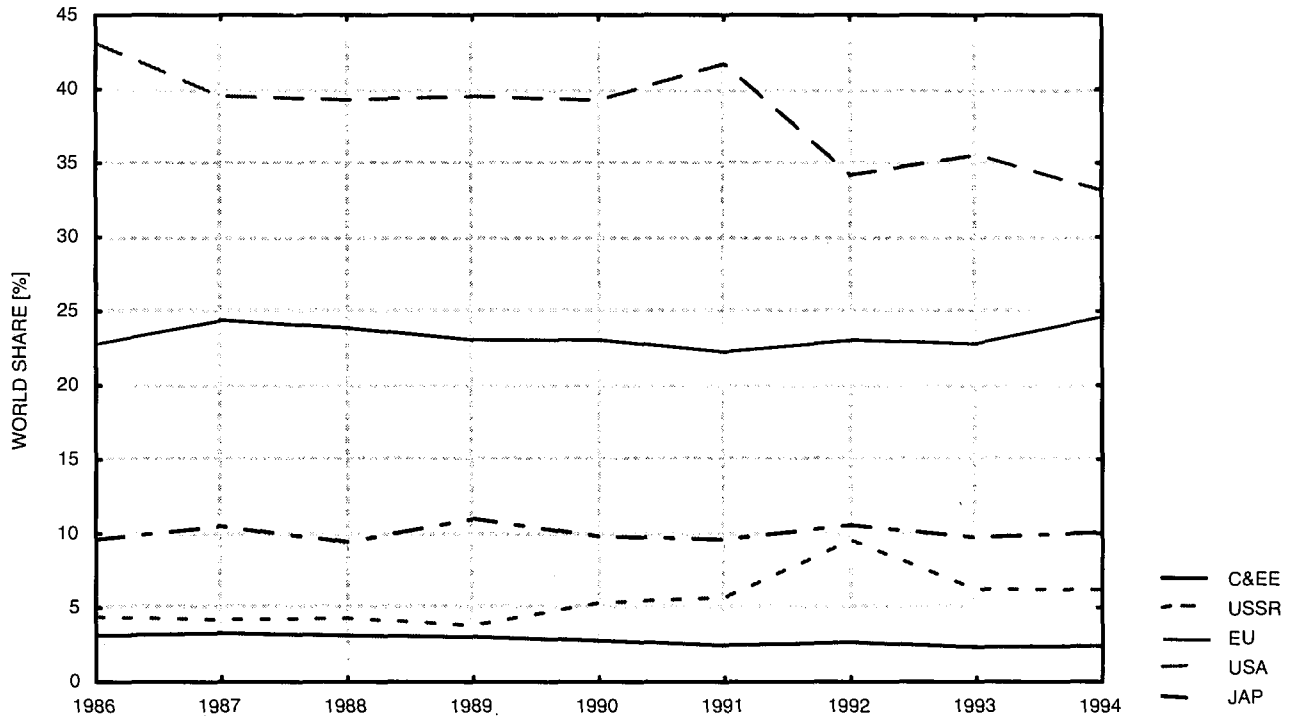
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.24**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**GROUPS ENG-8 AND ENG-9 OF MAJOR ENGINEERING S&T FIELDS**



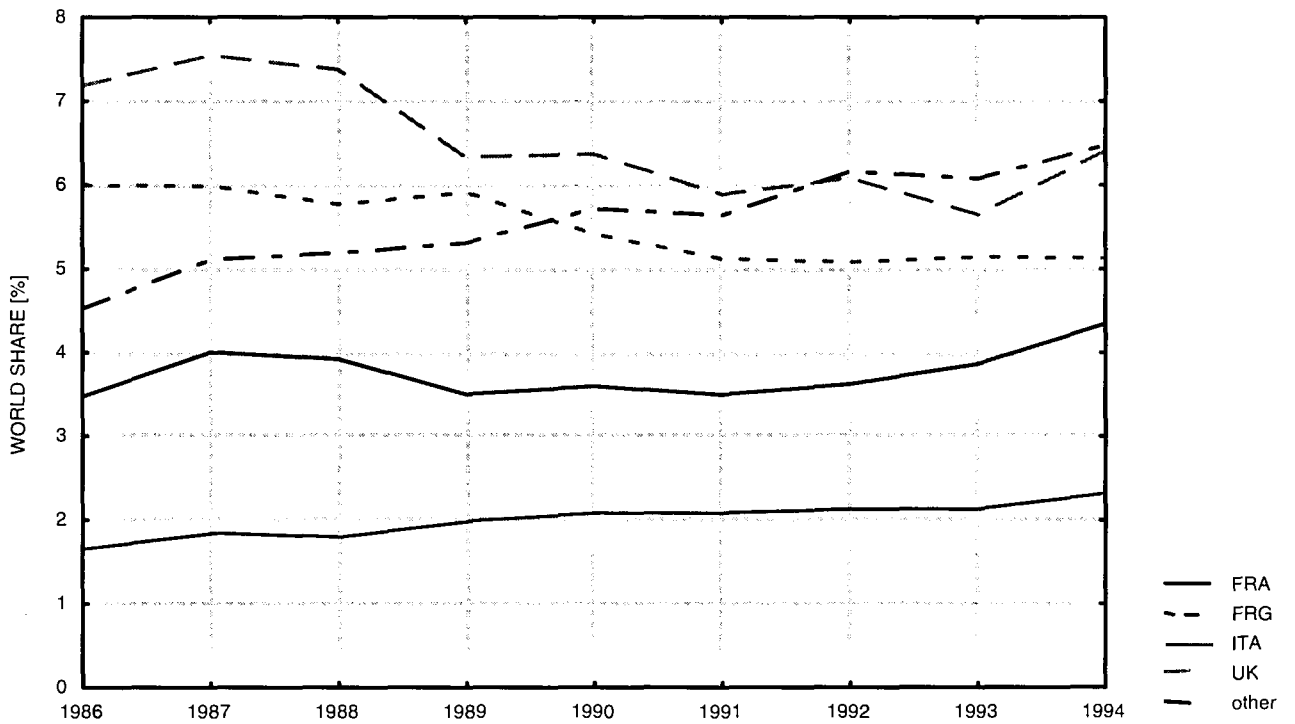
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.25**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**MAJOR REGIONS**



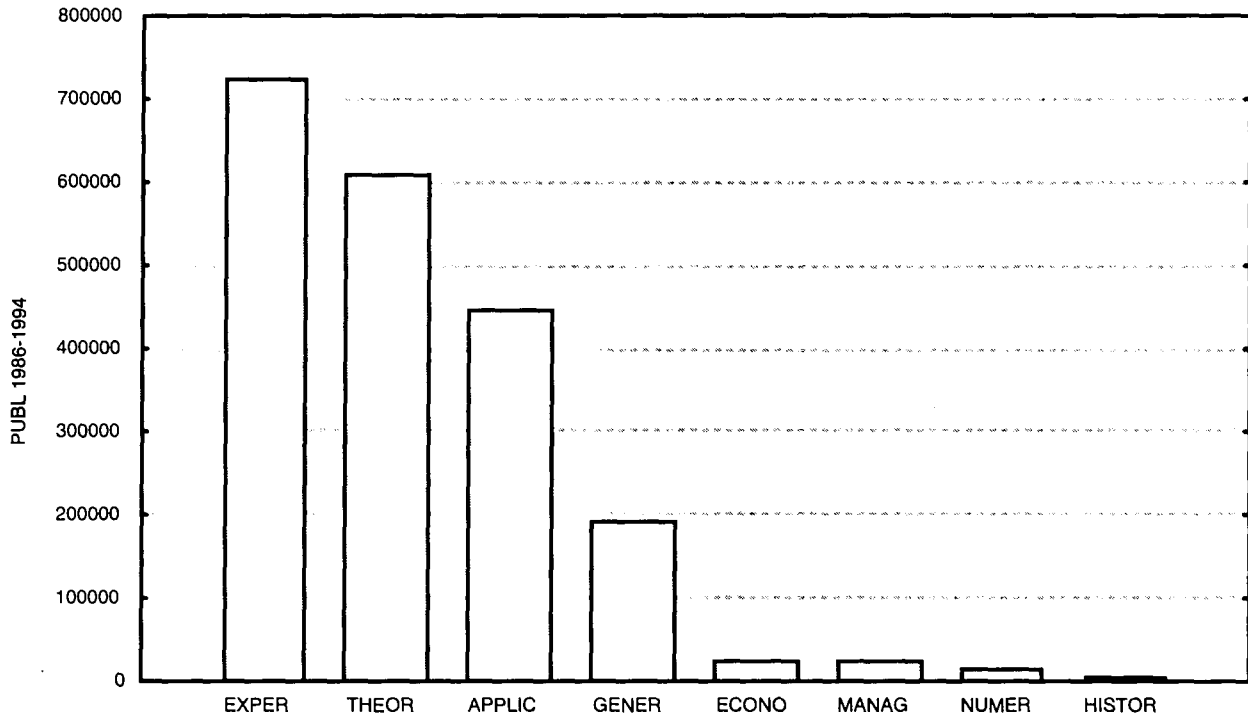
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.26**  
**RELATIVE GROWTH TRENDS IN THE EUROPEAN PUBLICATION OUTPUT**  
**EUROPEAN UNION**



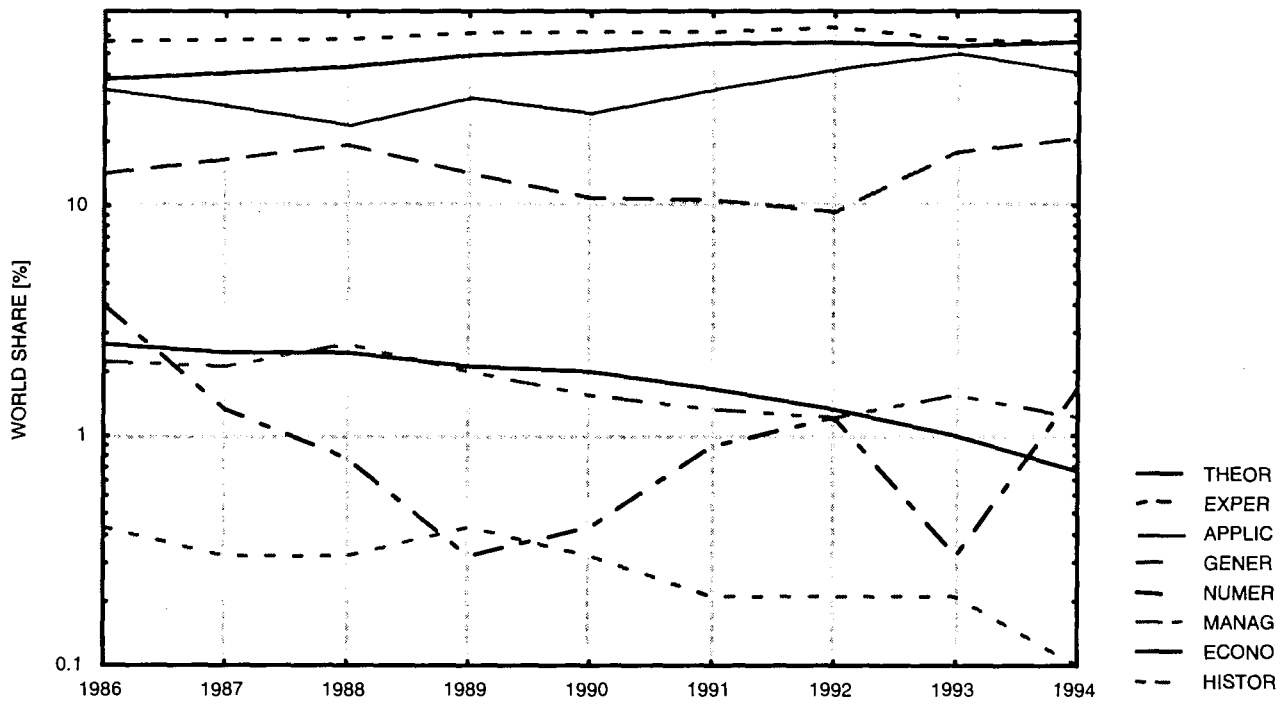
Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.27**  
**CUMULATIVE DISTRIBUTION OF THE WORLD PUBLICATION OUTPUT**  
**TREATMENT CRITERIA**



Sources: Compendex 1986-1994 / Vlachý 1995

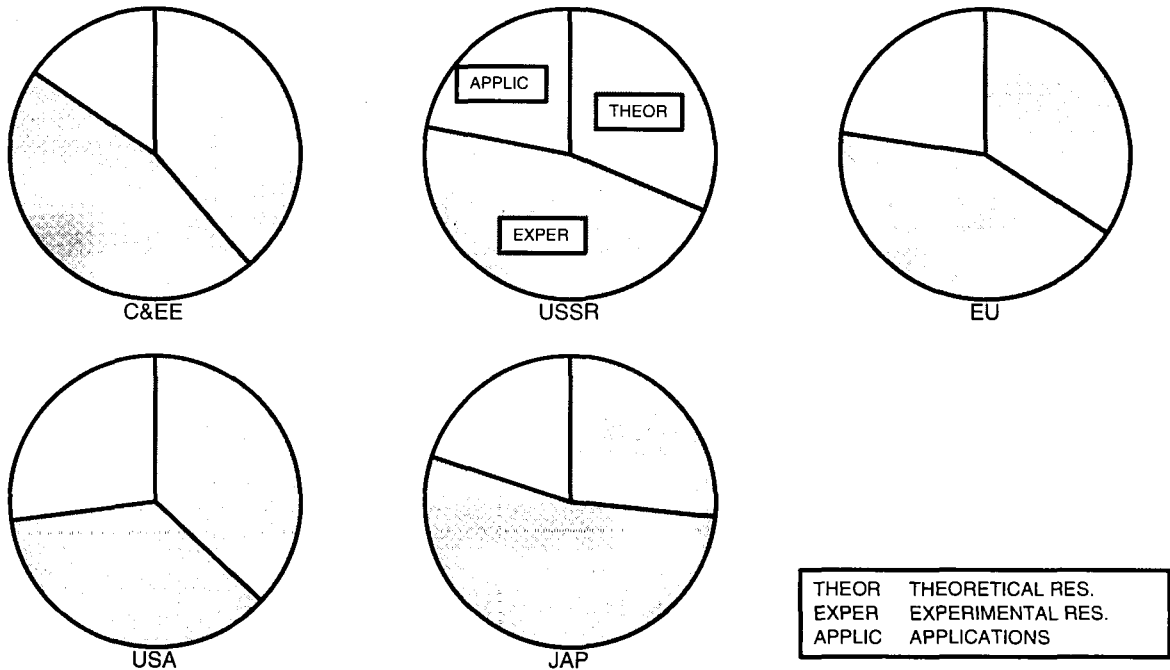
**Fig.28**  
**RELATIVE GROWTH TRENDS IN THE WORLD PUBLICATION OUTPUT**  
**TREATMENT CRITERIA**



Sources: Compendex 1986-1994 / Vlachý 1995

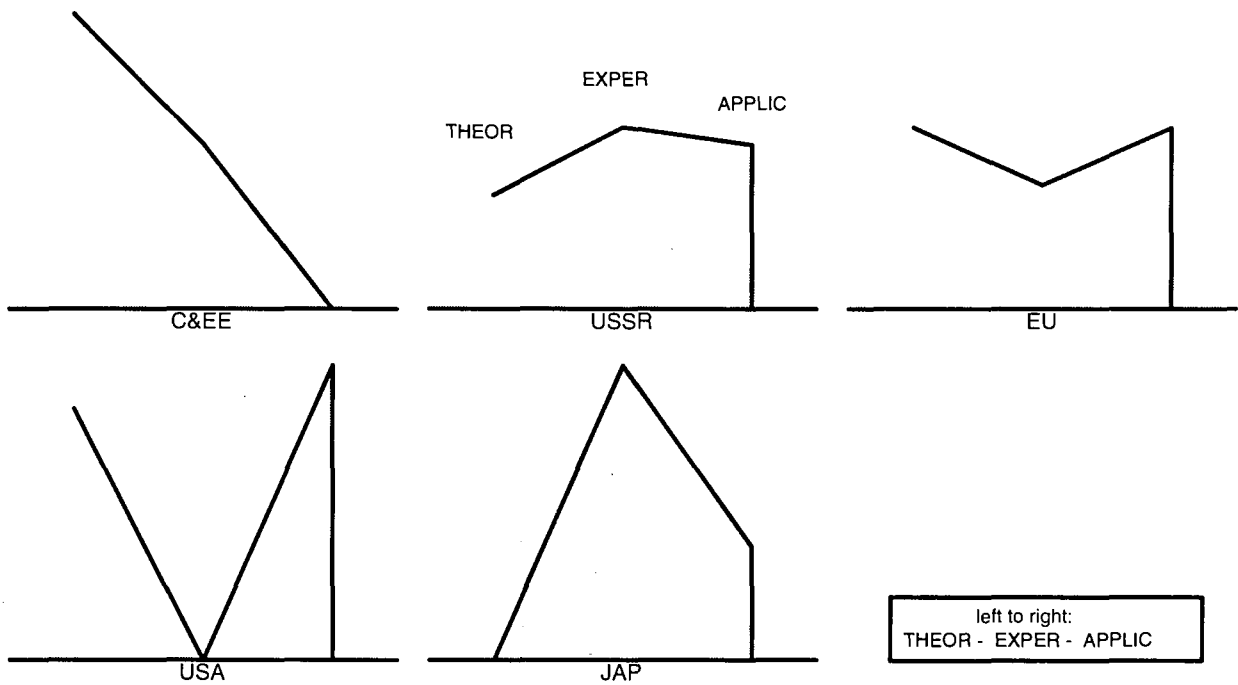


**Fig.29a**  
**RELATIVE CUMULATIVE DISTRIBUTION IN MAJOR REGIONS 1986-1994**  
**TREATMENT CRITERIA**



Sources: Compendex 1986-1994 / Vlachý 1995

**Fig.29b**  
**RELATIVE CUMULATIVE PROFILES IN MAJOR REGIONS 1986-1994**  
**TREATMENT CRITERIA**

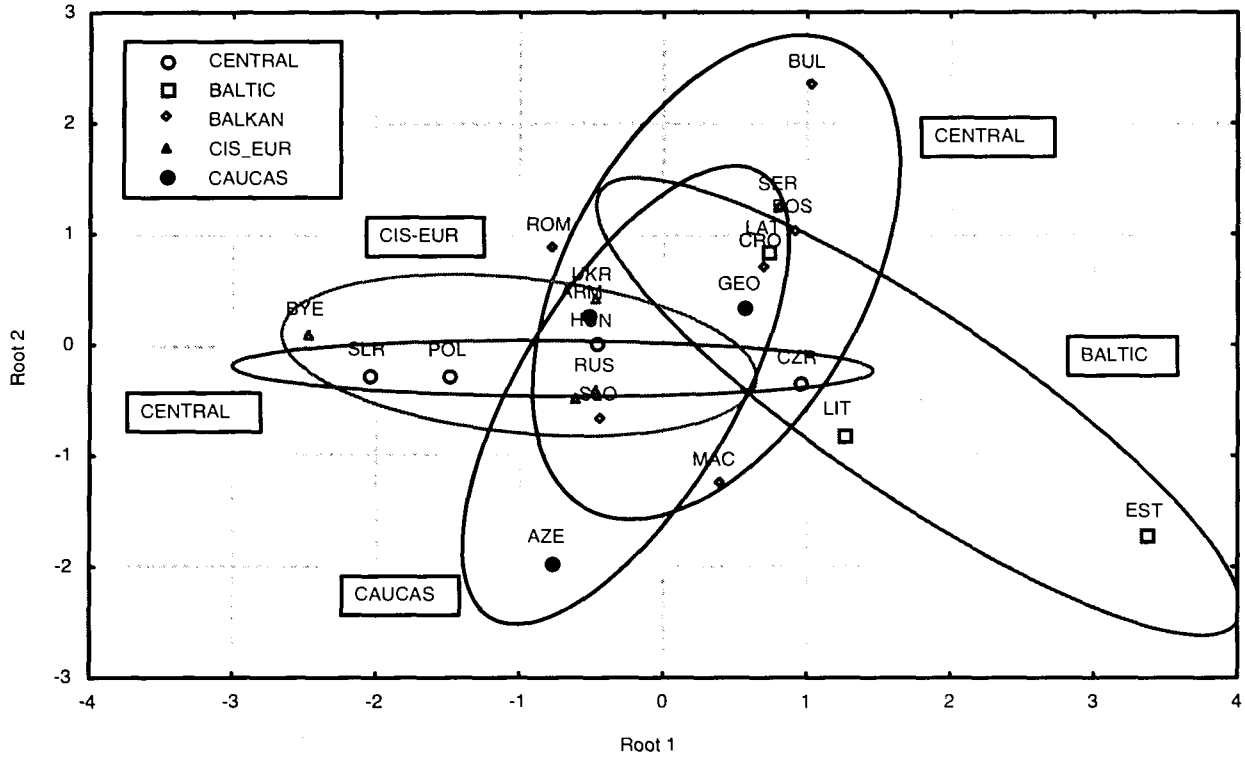


Sources: Compendex 1986-1994 / Vlachý 1995



Fig.30a

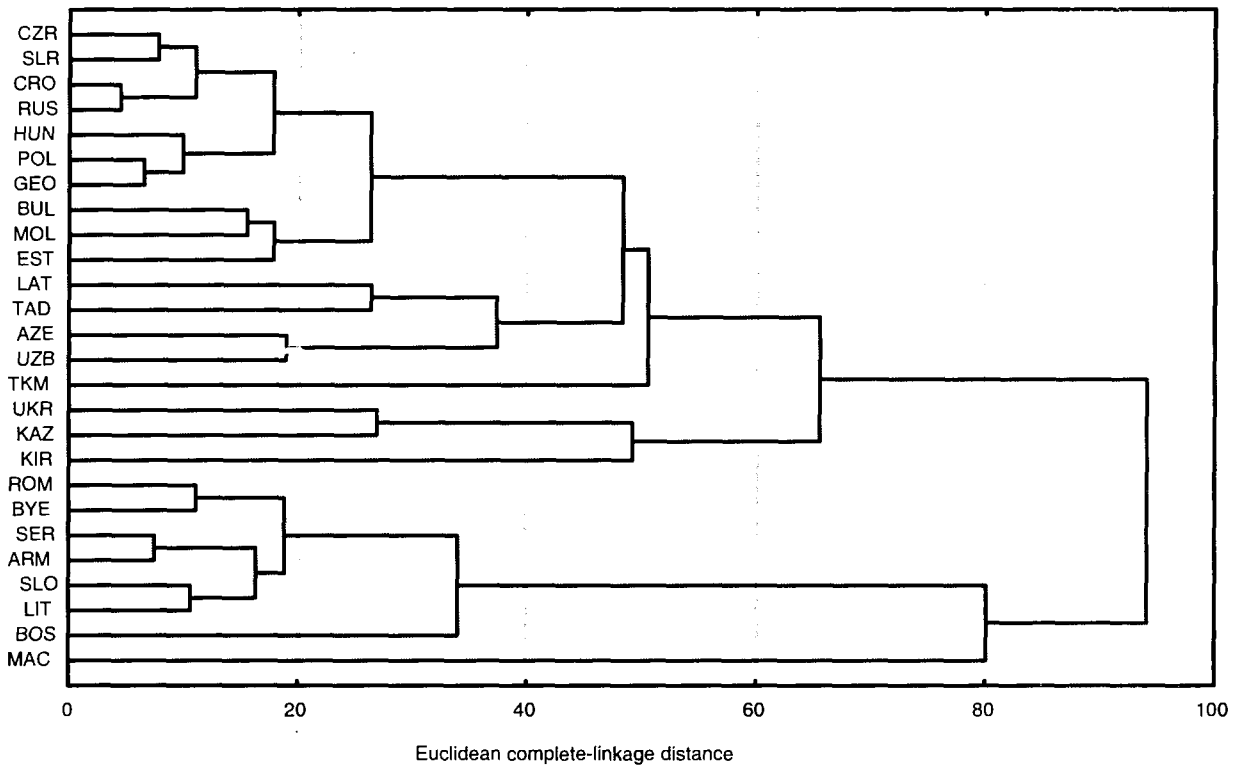
**DISCRIMINANT ANALYSIS OF THE CENTRAL & EAST EUROPEAN COUNTRIES 1986-1994**  
**SCATTERPLOT OF CANONICAL SCORES: GROUPS ENG-4 to ENG-9 OF ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995

Fig.30b

**SIMILARITIES BETWEEN THE CENTRAL & EAST EUROPEAN COUNTRIES 1986-1994**  
**DENDROGRAM FOR: GROUPS ENG-4 to ENG-9 OF ENGINEERING S&T FIELDS**



Sources: Compendex 1986-1994 / Vlachý 1995



## ENGINEERING S&T CLASSIFICATION SCHEME

### ENG-4

ENG-40 CIVIL ENGINEERING  
ENG-41 CONSTRUCTION MATERIALS  
ENG-42 MATERIALS PROPERTIES & TESTING  
ENG-43 TRANSPORTATION  
ENG-44 WATER & WATERWORKS ENGINEERING  
ENG-45 POLLUTION & SANITARY ENGINEERING  
ENG-46 BIOENGINEERING  
ENG-47 OCEAN TECHNOLOGY  
ENG-48 ENGINEERING GEOLOGY

### ENG-5

ENG-50 MINING ENGINEERING  
ENG-51 PETROLEUM ENGINEERING  
ENG-52 FUEL TECHNOLOGY  
ENG-53 METALLURGICAL ENGINEERING  
ENG-54 METAL GROUPS

### ENG-6

ENG-60 MECHANICAL ENGINEERING  
ENG-61 PLANT & POWER ENGINEERING  
ENG-62 NUCLEAR TECHNOLOGY  
ENG-63 FLUID DYNAMICS & VACUUM TECHNOL.  
ENG-64 HEAT & THERMODYNAMICS  
ENG-65 AEROSPACE ENGINEERING  
ENG-66 AUTOMOTIVE ENGINEERING  
ENG-67 MARINE ENGINEERING  
ENG-68 RAILROAD ENGINEERING  
ENG-69 MATERIALS HANDLING

### ENG-7

ENG-70 ELECTRICAL ENGINEERING  
ENG-71 ELECTRONICS & COMMUNICATIONS  
ENG-72 COMPUTERS & DATA PROCESSING  
ENG-73 CONTROL ENGINEERING  
ENG-74 OPTICAL TECHNOLOGY  
ENG-75 ACOUSTICAL TECHNOLOGY

### ENG-8

ENG-80 CHEMICAL ENGINEERING  
ENG-81 CHEMICAL PROCESS INDUSTRIES  
ENG-82 AGRICULTURE & FOOD TECHNOLOGY

### ENG-9

ENG-90 GENERAL ENGINEERING  
ENG-91 ENGINEERING MANAGEMENT  
ENG-92 ENGINEERING MATHEMATICS  
ENG-93 ENGINEERING PHYSICS  
ENG-94 INSTRUMENTS & MEASUREMENT

Socio-economic relationships and country groupings, cumulations and trends 1986-1994, as well as treatment criteria and research profiles are also available from data files on 180 engineering S&T subfields.

## COUNTRY CODES

### EUROPEAN UNION

(assessed)

FRA FRANCE  
FRG FEDERAL REPUBLIC OF GERMANY  
ITA ITALY  
UK UNITED KINGDOM

AUS AUSTRIA  
BEL BELGIUM  
DEN DENMARK  
FIN FINLAND  
GRE GREECE  
IRE IRELAND  
LUX LUXEMBOURG  
NET NETHERLANDS  
POR PORTUGAL  
SPA SPAIN  
SWE SWEDEN

### CENTRAL & EAST EUROPEAN COUNTRIES

(assessed)

CZR CZECH REPUBLIC  
HUN HUNGARY  
POL POLAND  
SLR SLOVAK REPUBLIC  
  
BUL BULGARIA  
ROM ROMANIA  
BOS BOSNIA-HERZEGOVINA  
CRO CROATIA  
MAC MACEDONIA  
SER SERBIA  
SLO SLOVENIA  
  
RUS RUSSIA  
UKR UKRAINE  
BYE BYELARUS  
MOL MOLDOVA  
EST ESTONIA  
LAT LATVIA  
LIT LITHUANIA  
  
ARM ARMENIA  
AZE AZERBAIJAN  
GEO GEORGIA  
  
KAZ KAZAKHSTAN  
KIR KIRGIZIA

### OTHER EUROPEAN COUNTRIES

(available from data files)

ICE ICELAND  
NOR NORWAY  
SWI SWITZERLAND  
TUR TURKEY

### NON-EUROPEAN COUNTRIES (assessed)

USA UNITED STATES OF AMERICA  
JAP JAPAN

### OTHER NON-EUROPEAN COUNTRIES

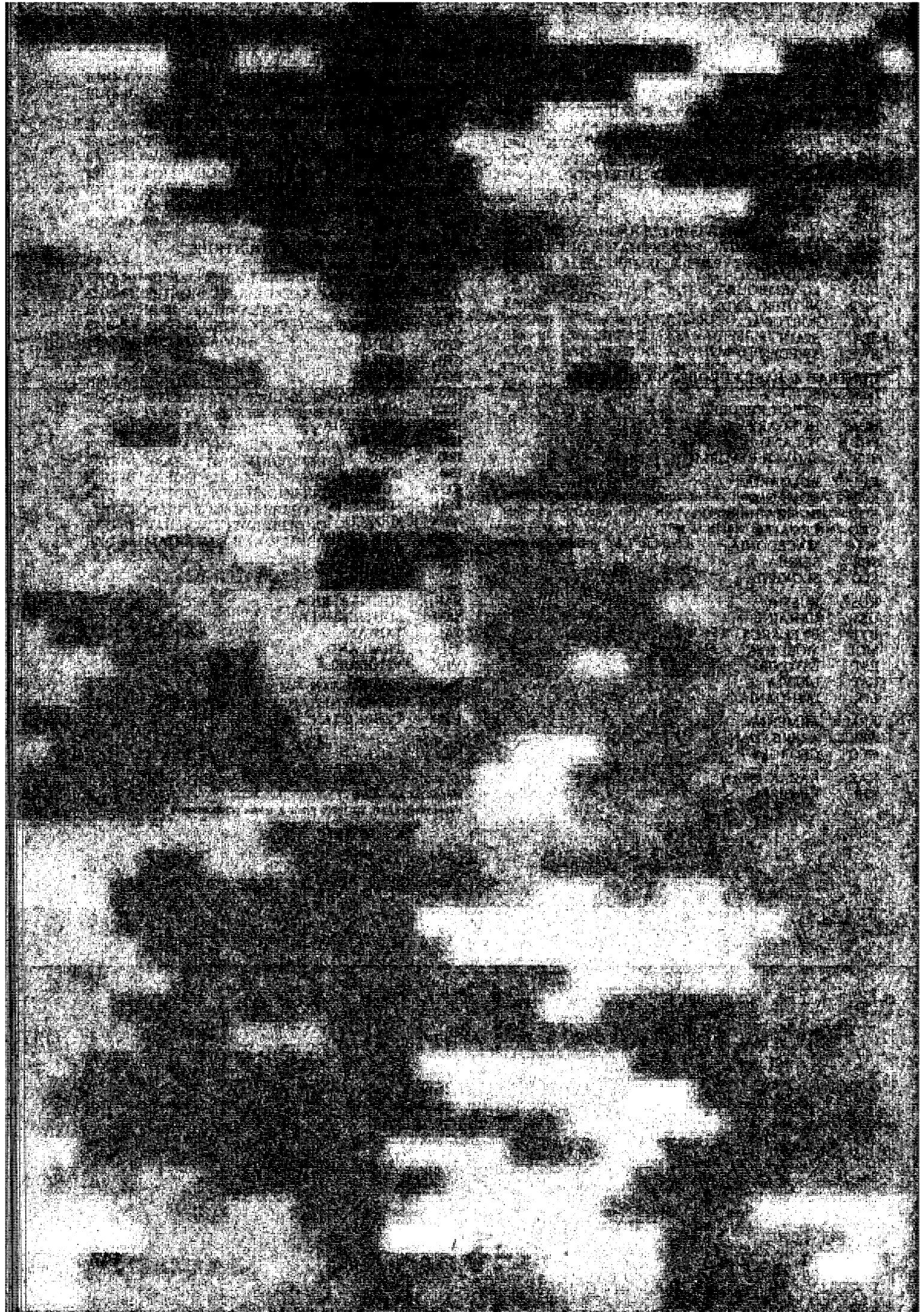
(available from data files)

ARG ARGENTINA  
AUL AUSTRALIA  
BRA BRAZIL  
CAN CANADA  
CHN CHINA  
CHL CHILE  
EGY EGYPT  
HKG HONG-KONG  
INDI INDIA  
INDO INDONESIA  
IRN IRAN  
IRQ IRAQ  
ISR ISRAEL  
KUW KUWAIT  
MAL MALAYSIA  
MEX MEXICO  
NZE NEW ZEALAND  
PAK PAKISTAN  
PHI PHILIPPINES  
SIN SINGAPORE  
SAF SOUTH AFRICA  
SKO SOUTH KOREA  
TAI TAIWAN  
THA THAILAND  
VEN VENEZUELA  
  
TAD TADJIKISTAN  
TKM TURKMENISTAN  
UZB UZBEKISTAN

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# Building business: evidence from Europe & North America on growth, competitiveness and jobs

*Debate on competitiveness is usually framed in terms of evidence at the macro-economic level for industries or national economies. But policies for competitiveness only work if they assist the achievements of individual businesses. It is at this level that competitive achievement and competitive capability should be tested.*

*Proposals for policies to improve the competitive capability of businesses must make assumptions about what aids profits and growth. Models focusing on costs and productivity are sometimes presented as alternatives to those driven by "intangible" factors such as innovation or quality.*

This article summarises a statistical study designed to examine the drivers of competitiveness from evidence on individual business operations in a wide range of different markets. The study examines a number of measures, tests their relative importance, and investigates the situations where they have the greatest impact.

The study uses "hard" measures of competitive achievement for businesses, including:

- pre-tax, pre-interest return on capital employed (ROCE);
- growth of share in the business' target market;
- growth of value added, which is the contribution a business makes to GDP.

The study also examines the creation of full-time equivalent jobs, because of the importance of the latter to EU policy.

The study links measures of competitive achievement to competitive capabilities which economists often describe as "intangible" as they are difficult to quantify in macro-economic studies. Such measures include relative quality of products and services, innovation, marketing efforts, R&D investment and intellectual property. They are measures which can be quantified at a "micro" level, by managers in individual business operations.

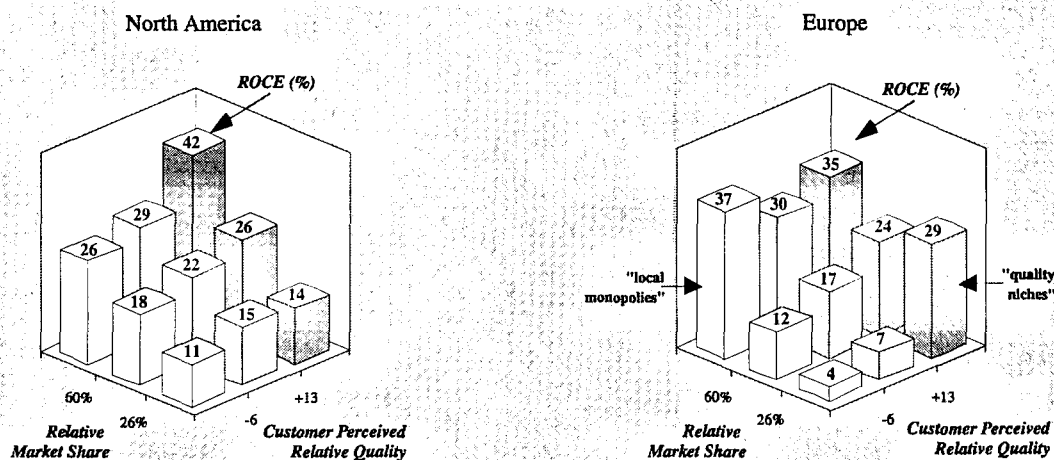
The source of information for the study is the 1994 edition of the PIMS database, containing over 3 000 business years of data from European enterprises, and more from North America. Each observation in the database is a business unit, although normally not an entire company, covering a minimum period of four years.

## MAIN CONCLUSIONS

The three major conclusions are:

- "Intangible" factors are more powerful drivers of medium-term business growth than the "tangible" factors that were measured;
- Innovation and intellectual property are the strongest drivers of competitive achievement. There are clear statistical links between R&D, management capability, intellectual prop-

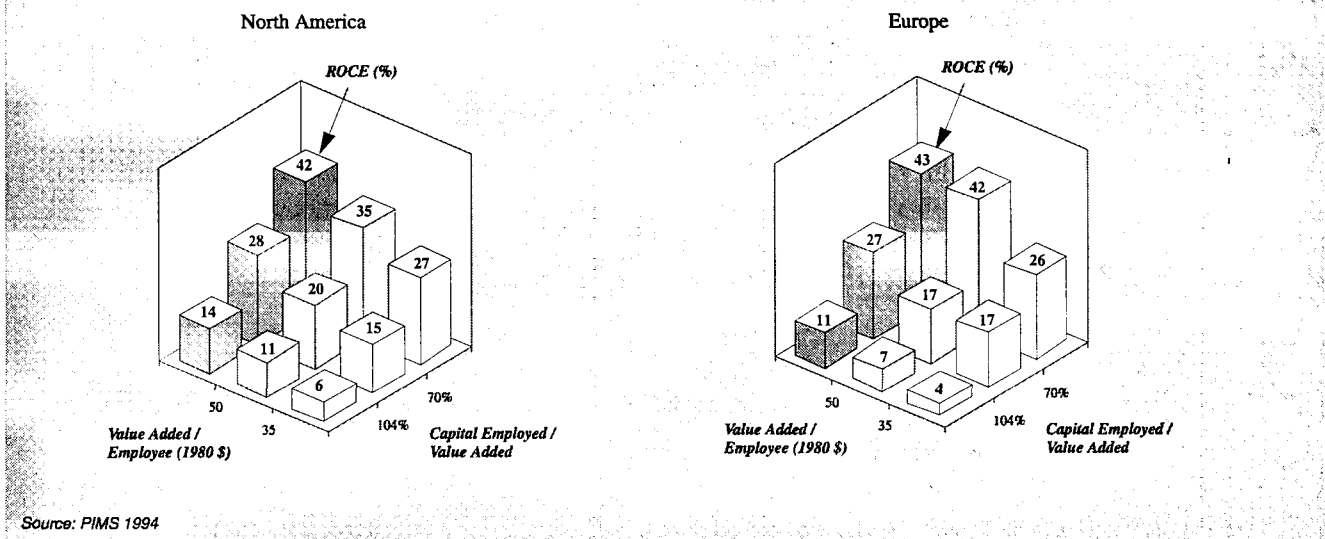
**Figure 1: Market share, quality and profits**  
 European market barriers appear to benefit quality niches and local monopolies



Source: PIMS 1994



**Figure 2: Capital intensity, productivity and profits**



erty, innovation, customer preference and market focus, and rising market share, growing value added and jobs created.

- Relative costs and productivity affect growth and profits. However, labour productivity gains which are achieved by “capital deepening”, i.e. substituting capital for labour, usually destroy both jobs and profits.

The business performance data that were used show that responsive management, measured by “speed to market”, is a significant factor in innovation, and that clarity of distribution objectives helps turn innovation into growth.

Customer preference, or quality, are more important as drivers of growth and profits in North America than it is in Europe. This demonstrates the merits of an effective Single Market and strong competition policy. Expect it to become the pattern in Europe as the Single Market develops.

The data also show that the biggest boost to value added and employment growth is to be found in “challenger” businesses, which are growing from weaker market shares rather than from dominant positions. Previous research based on the database (Patten 1986) shows that such businesses with high

current investment in marketing and R&D “intangibles” usually lose money over the medium term.

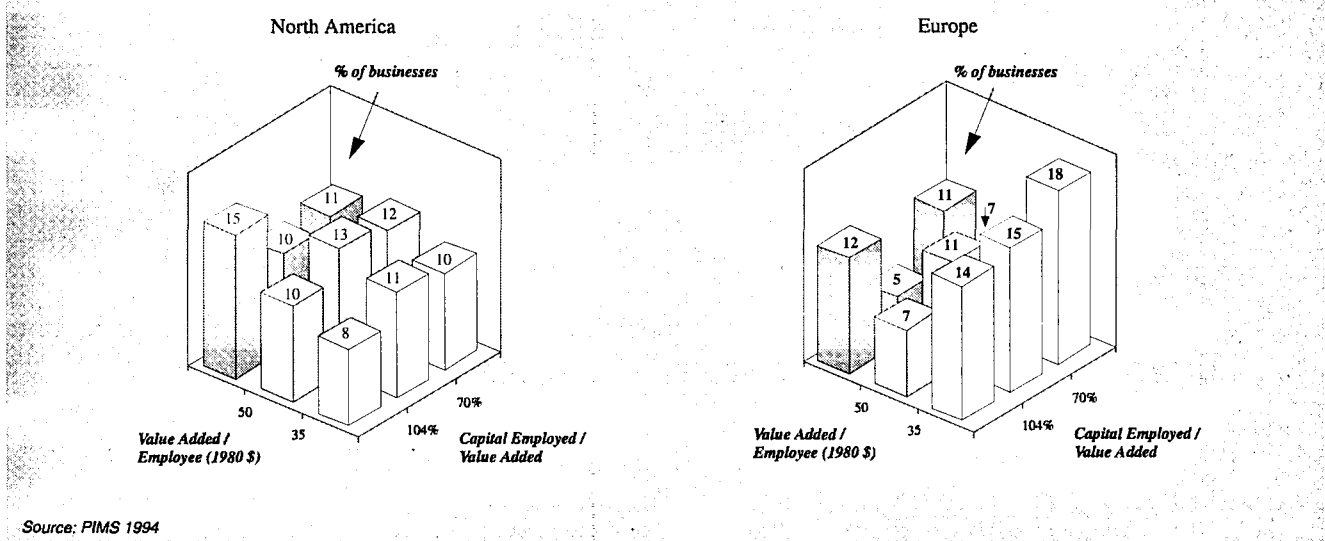
The statistical evidence for these conclusions is summarised in the sections below.

**POLICY IMPLICATIONS**

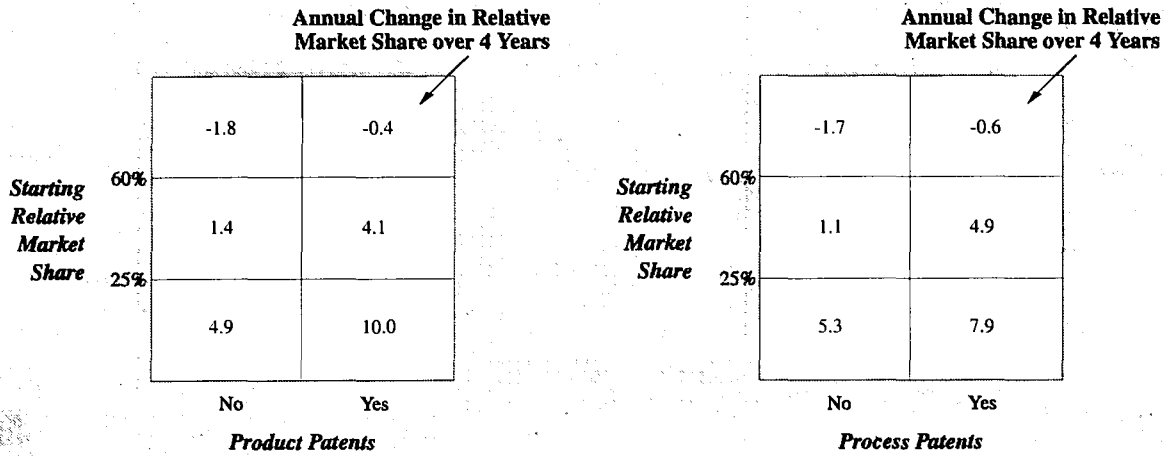
The main implications for policy are:

- Adequate protection of intellectual property advantage is a key issue in encouraging businesses to invest in innovative research;
- Accounting and tax treatment of “intangible” investment, particularly R&D and innovation costs, differ significantly between EU countries and are often less favourable than treatment of investment in fixed assets. These direct disincentives to businesses to invest in ways which aid competitive achievement should be reduced;
- The importance of “speed of response” may preclude direct fiscal intervention by way of public policy mechanisms to support specific innovations, simply because another stage in the innovation process involving decision by public agencies would impose delay. However, mechanisms which reduce the costs, the risks, or the time lag of innovation for

**Figure 3: More low productivity business in Europe**



**Figure 4: Intellectual property and share gain**



Source: PIMS 1994

“challenger” businesses are worth considering, particularly where there is a reasonable chance of achieving competitive advantage in growth markets as a result;

- Policies concerned with the power of producers versus distributors should pay attention to the effects on the ability of innovators to respond to customer needs and should not limit the ability of innovators to focus on specific segments of their markets.
- Incentives for “capital deepening”, i.e. substituting capital for labour, in slow-moving or declining sectors should be removed wherever possible.

**Defining Competitiveness**

There has been a great deal of debate on appropriate measures of competitiveness. This study uses two types of indicators to track competitive success. Each of these is measurable at the level of the individual business unit.

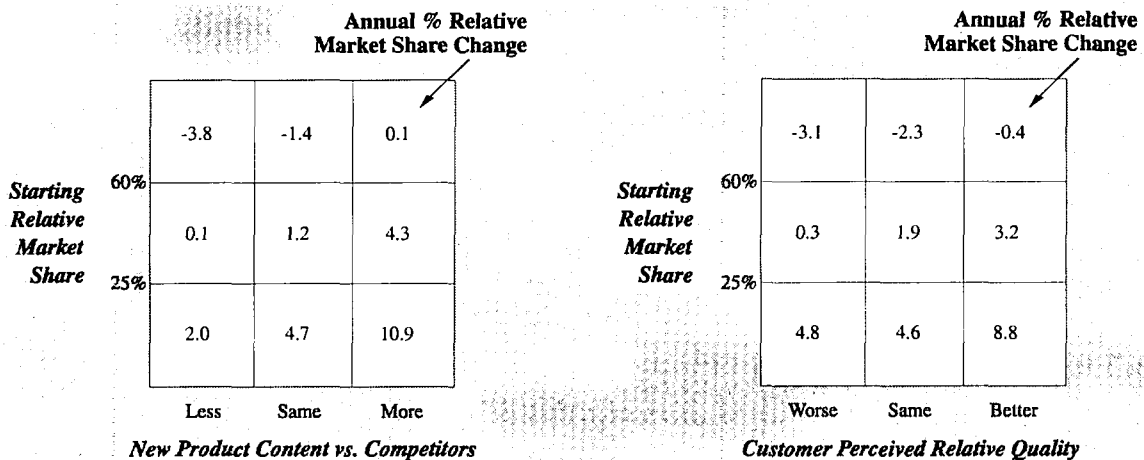
- Competitive achievement measures:
- How profitable is the activity, in terms of return on capital employed (ROCE)?

- How successful is the activity in achieving share growth in its target market, relative to its leading competitors?
- Is the activity successful in creating value added which its customers are prepared to pay for?

These are indicators of the competitive position of a business in two markets, the market for capital to finance its growth, and the market for the products and services it supplies. Value added growth also measures the business’ contribution to growth in the national or international economy. In addition, the study looks at another measure of achievement, which lies behind many of the EU’s policy proposals on competitiveness, namely: how successful is a business in creating jobs ?

- Competitive capability measures, which include:
- How well does a business satisfy the expressed needs of its customers relative to other suppliers, quantified as “customer-perceived relative quality”?
- How effective is a business in developing new products and services, measured as the percentage of its revenue from new offerings ?

**Figure 5: Innovation, quality and share gain**

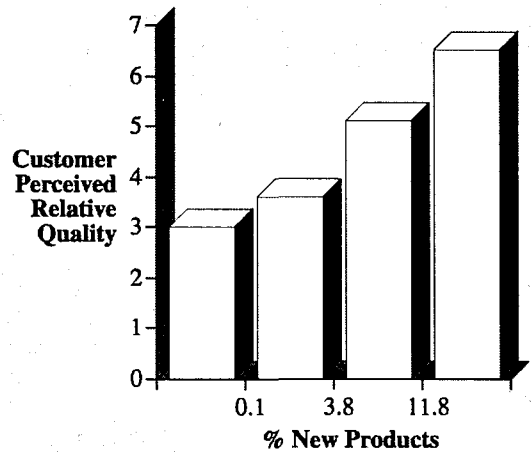
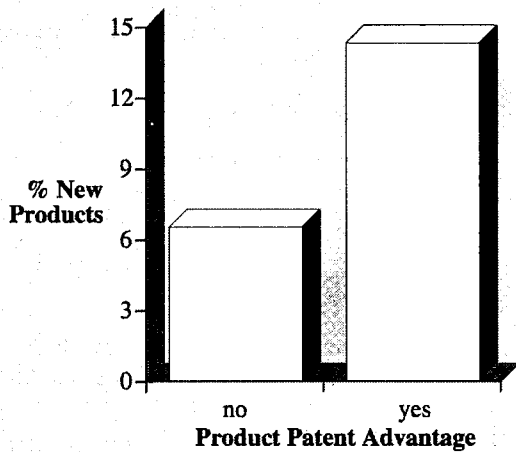


Source: PIMS 1994





**Figure 6: Intellectual property, innovation and quality**



Source: PIMS 1994

- What intellectual property advantages does a business have ?
- How do business costs and prices compare to those of the competitors ?

In addition to these relative measures of competitive capability which help define the competencies of a business in relation to others, absolute measures of capital and labour productivity are also examined.

Most of the evidence referred to has been validated in multivariate regressions in order to establish precisely how the various effects relate to each other. However, the maximum number of relationships presented simultaneously here is two. Each statistical chart has been individually tested for significance.

In many of the exhibits the effect on one variable (such as business ROCE or change in share) of two others (e.g. current relative market share and relative quality) is presented. In Figure 1, for example, the left-hand diagram relating to North America indicates how ROCE (on the ordinate) increases with relative market share (on the left axis) and with relative quality (on the right axis). The data for Europe in the right-hand diagram show a more complex pattern.

**COMPETITIVE STRENGTH AND PROFITABILITY**

**Evidence**

Profit margins and return on capital employed (ROCE) for the 3 000 businesses in the database are strongly, and positively, related to:

- business share of the target market, relative to the share held by the top three competitors (relative market share)
- customer rating of product or service performance, relative to competitors (customer-perceived relative quality)
- asset productivity, measured in terms of value added to capital employed
- employee productivity, measured in terms of real value added per person.

These main “profit drivers” were among the first to be identified from the database when research based on it began twenty years ago. None of the relationships appears to have weakened as the database has grown. If anything, the statistical significance of quality in relation to ROCE may have increased during the 1980s as businesses have become more skilled at measuring quality performance.

Each of these relationships applies with reasonable consistency across:

- businesses in growing and declining markets;
- businesses in Europe and North America;
- businesses in consumer, industrial and service markets.

However, there are some statistically significant differences from these broad trends:

- in growing markets, where high quality and strong market share more than reinforce each other, this leading to very high profit levels for strong share and quality leaders;
- in consumer markets, where businesses with low share positions are unable to turn high relative-quality positions into good returns on capital, because they fall short of the minimum required scale in consumer marketing.

There are also competitive effects which appear to be specific for Europe. During the 1970s and 1980s, a number of businesses seem to have used dominant positions in local markets to make extraordinary profits, despite lacking customer-perceived quality advantages (Figure 1). It also appears to be the case that businesses in Europe with small market share are better able to gain returns from high quality “niche” positions. Possible explanations for these effects are:

- Market barriers, particularly prior to the Single Market, permitted local geographic monopolies to survive;
- Differences in customer taste and distribution in Europe are more likely to allow “niche” positions to be rewarded than do the more homogeneous markets in North America.

Relationships between productivity and profit are similar in Europe and North America; on neither continent is it likely that an investment intensive business will achieve high returns to capital, particularly if value added per employee is low. Capital intensity reduces profits because heavy investment, particularly fixed investment, changes the dynamics of competition. The positive impact of productivity on profits is understandable (Figure 2).

However, European businesses are much more likely to display low labour productivity. On average, European productivity is around 20 % below that of comparable North American businesses. There appears to be a significantly larger group in the European sample with value added per employee below 35 000 US dollars (1980 prices) even among the businesses which are relatively capital intensive (Figure 3).





The study does not offer a definitive explanation for the reasons behind the distinctively higher labour productivity in North American business, even when allowing for greater capital input. However, there is clear evidence from the sample that American business both invests significantly more in inputs to intellectual property, and achieves more by way of innovation. As is seen in the next two sections, this almost certainly underpins a higher sustainable rate of business growth and, in addition, higher growth in business value added. One would therefore expect productivity in North America to gain from this effect.

### MODELS FOR COMPETITIVE GROWTH - EVIDENCE

An enterprise which is able to gain shares on the target market at the expense of other suppliers is clearly "competitive". The study investigates the performance of businesses in terms of Relative market share, defined as the share of a business within its target market divided by the share sum of its three main competitors. Success in increasing relative market share is perhaps the ultimate measure of competitiveness, provided it is not attained at the expense of reduced profits.

In examining the evidence, it is necessary to take account of the fact that in most markets high-share businesses see their market positions decay. In identifying the impact of specific competitive capability factors, it is essential to take account of whether a business is defending a strong share position or starting from a weaker one. Each charts in this section thus present starting relative market share on the ordinate (high share businesses at the top, low-share businesses at the bottom), whilst the abscissa represents the competitive factor, the impact of which is being tracked. In each cell, the average movement of relative market share for the businesses contained is displayed.

Exclusive know-how is strongly correlated with share performance. Businesses with patented or proprietary products perform substantially better in gaining or retaining market

share than those without. But even with this key advantage, high-share businesses still lose out. Intellectual property related to performance reveals similar, but less dramatic, effects (Figure 4).

Innovation, measured by the share of revenue from new products in a business, and the margin by which this figure is ahead of or behind that of the competitors, is strongly related to share gain. Relative innovation advantage is the only factor that was found which allows high-share businesses to hold or even advance their positions. But high share businesses which face more innovative rivals are particularly vulnerable to rapid loss of market share (Figure 5).

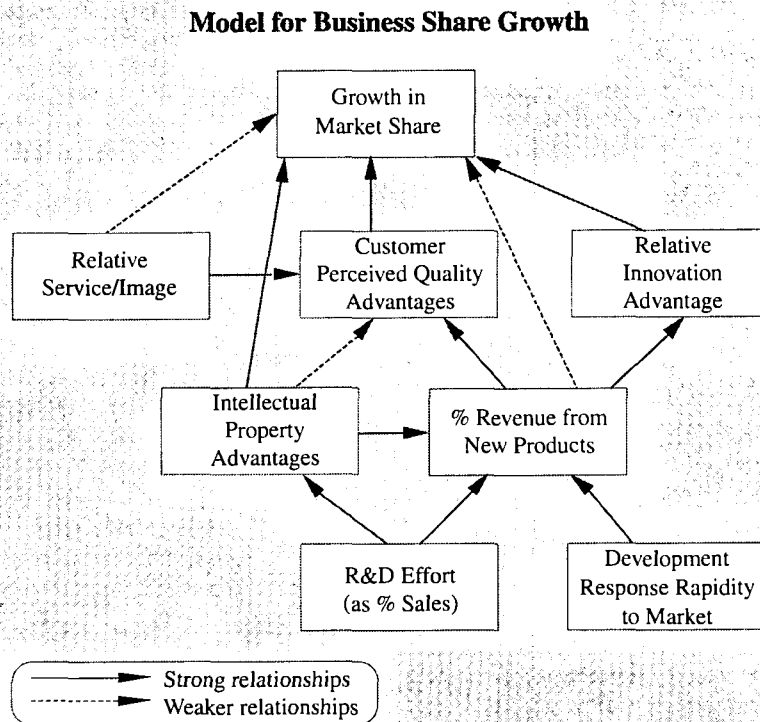
There is clear evidence that quality, i.e. the quality of products or services perceived by the customers relative to those of competitors, leads to stronger share gain for low- and medium-share businesses, and helps high share businesses to resist share loss. The data suggest that this relationship may have become stronger during the 1980s, either because markets have become more sensitive to quality, or because buyers and sellers are now better at measuring it. The absolute level of new product introductions also has a positive impact, distinct from the relative innovation effect above.

Other measures of relative quality, such as relative service and image, have significant effects on share, as do various measures of relative marketing effort. Sales force and promotion have clear positive effects on the ability of small share businesses to grow, but little measurable effect for most large-share businesses. Somewhat surprisingly, advertising, the basis for some measurements of "brand value", shows no such effect.

When one takes a closer look at some of the drivers of market share change identified above, at the factors which affect and link intellectual property advantage, innovation and relative quality, one finds a set of relationships which are "intuitively right" but which are seldom demonstrated statistically. There are clear and significant links between:

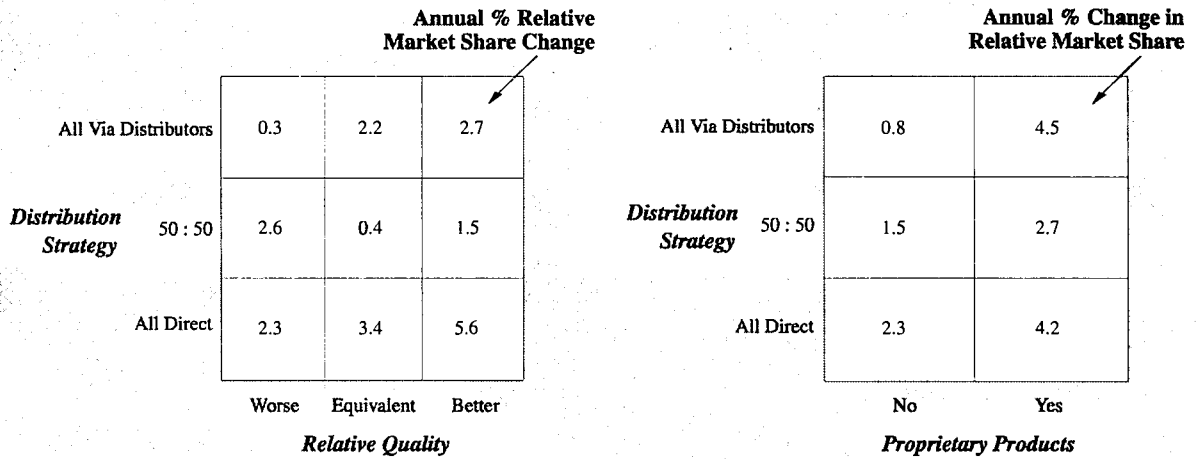
- R&D effort, speed to market and innovation achievement;

Figure 7: Model for business share growth



Source: PIMS/IMI

**Figure 8: Focused distribution helps turn advantages into share gains**



Source: PIMS 1994

- R&D effort and the possession of intellectual property advantage;
- intellectual property advantage, innovation and quality (Figure 6).

These relationships demonstrate most of the relationships necessary in a causal model linking management capability and R&D effort, through intellectual property and innovation, to quality supported by marketing on to market share growth (Figure 7).

The individual links in this model can be demonstrated despite the fact that neither in this database, nor in the DABLE database of company performance, is it possible to detect a sufficiently strong relationship between R&D and growth, on which to base policy.

Relative price positioning has surprisingly little impact on medium-term share gain in most cases, perhaps because it is usually either supported by a differentiated product or service offering, or quickly matched by competitors. The only situations in which it appears to be significant is where market leaders attempt to sustain high price premiums, and then lose share quite quickly. This is particularly evident where new competitors enter a market and attack the premium suppliers.

The evidence on relative costs is stronger, but similar. High-cost market leaders risk substantial share loss.

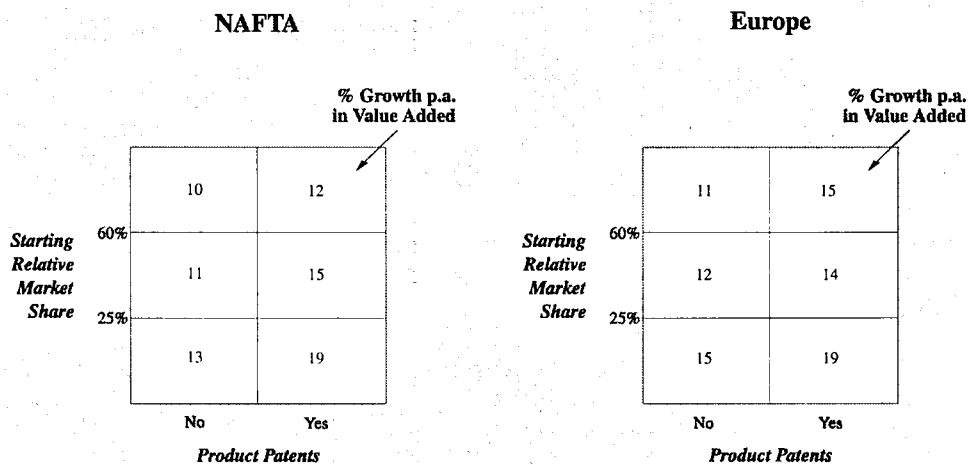
**EFFECTS OF MARKET STRUCTURE - EVIDENCE**

The type of market structure within which a business operates may affect the way in which the forces outlined above work in practice. Scope and complexity, measured by relative range of products or customer types, tend to be broad in high-share businesses. Allowing for this, there is evidence that increased product or customer complexity lowers the ability of businesses to gain market share.

Distribution complexity also affects the rate at which businesses turn competitive capability into share gain. Where businesses must divide their marketing approaches between distributors and direct sale, their ability to turn patents and innovation into share growth is weaker (Figure 8).

The blunting of competitive edge through mixed distribution strategies seems to apply both to the effects of quality, and those of intellectual property. Related evidence also suggests that distributor power, measured as the mark-up achieved between producer and user price, also slows down the conversion of quality advantage into share gain.

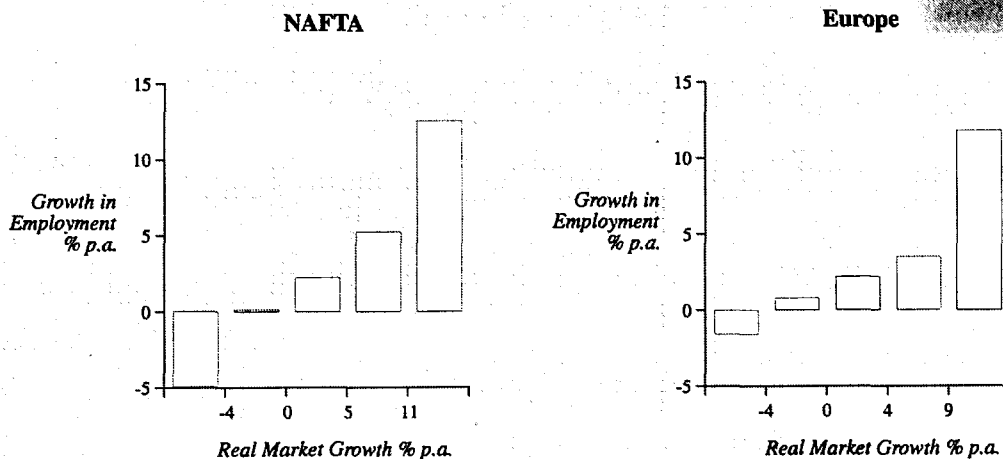
**Figure 9: Intellectual property and value added growth**



Source: PIMS 1994



Figure 10: Jobs and market growth - less flexibility in Europe



Source: PIMS 1994

VALUE ADDED AND EMPLOYMENT CREATION

Evidence

Gains in market share indicate that a business is able to win the preference of an increasing proportion of its potential customers for its products or services. But if one wishes to measure what a business contributes to overall economic growth, one must look at its value added. This is the link between "micro-" and "macro-" economic measurement.

The evidence shows that business value added growth is driven by broadly the same factors as market share. Intellectual property is certainly just as strongly related to value added growth as it is to share gain (Figure 9). Businesses with patent advantages are better able to raise value added even if they are already strong in their markets.

Quality proves to be a stronger driver of growth in North America than it does in Europe. Innovation, however, shows an effect on value added different from the impact that is visible with respect to market share; whereas new product content of sales is a powerful driver of value added growth for low-share businesses, it has little impact in medium- and high-share businesses, both in Europe and in North America. This effect occurs despite the fact that, as was demonstrated

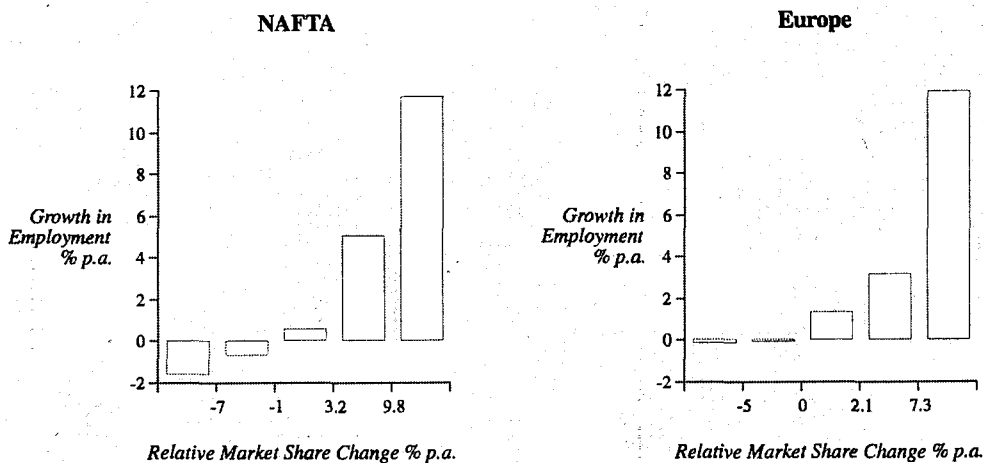
in the previous section, a higher rate of innovation helps secure or defend market share for these businesses. The implication of this evidence is that "challenger" or lower-share businesses are more likely to turn innovation into economic value than existing market leaders.

Having identified the impact of these "intangible" factors on competitiveness and growth, can one assume that the same factors will help employment? A large part of the European Commission's work on competitiveness, as well as that of national governments, has been directed at employment creation, so this is clearly a crucial question, and one which can be addressed at the business unit level.

The findings suggest that employment growth is as strongly correlated with market share growth of businesses within their markets as it is with market growth itself. It also shows that the main competitive capability measures which drive market share growth (innovation, relative quality and marketing) also drive employment growth.

Relationships between business growth and employment growth display two significant differences between Europe and North America:

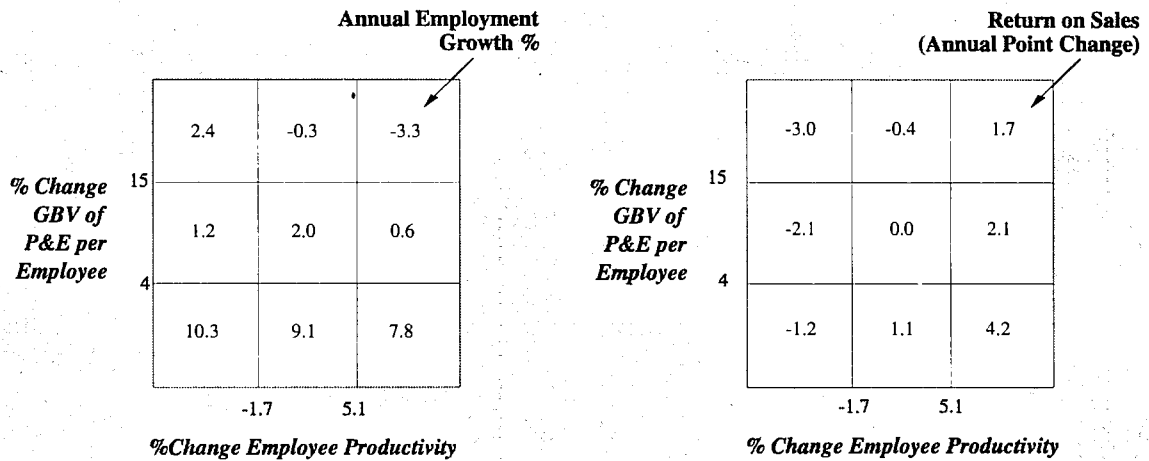
Figure 11: Jobs and market share change - less volatility in Europe



Source: PIMS 1994



**Figure 12: Productivity, employment and margins**



Source: PIMS 1994

- The distribution of market growth for businesses in the database clearly displays a more favourable pattern for North America, where there are more businesses in high-growth markets (Figure 10);
- Whereas the relationships between market growth, share gain and employment growth are similar where there is growth, North American businesses are much more likely to cut employment in response to sustained market decline or share loss (Figures 10 and 11). European businesses in the sample have tended to hold on to labour in downturns.

Not surprisingly, productivity improvement restricts or reverses employment growth in businesses. What is perhaps unexpected is the evidence that productivity gains achieved through substituting capital for labour, in the absence of significant business growth, not only reduce jobs, but also profits. This is related to the phenomenon that was visible in the section on competitive strength. Increasing capital intensity may reduce costs, but it usually changes the dynamics of competition in a market to ensure that little of the cost saving is retained by the business (Figure 12).

In practice, one finds that "capital deepening", i.e. significantly increasing the fixed capital per employee in a business, can

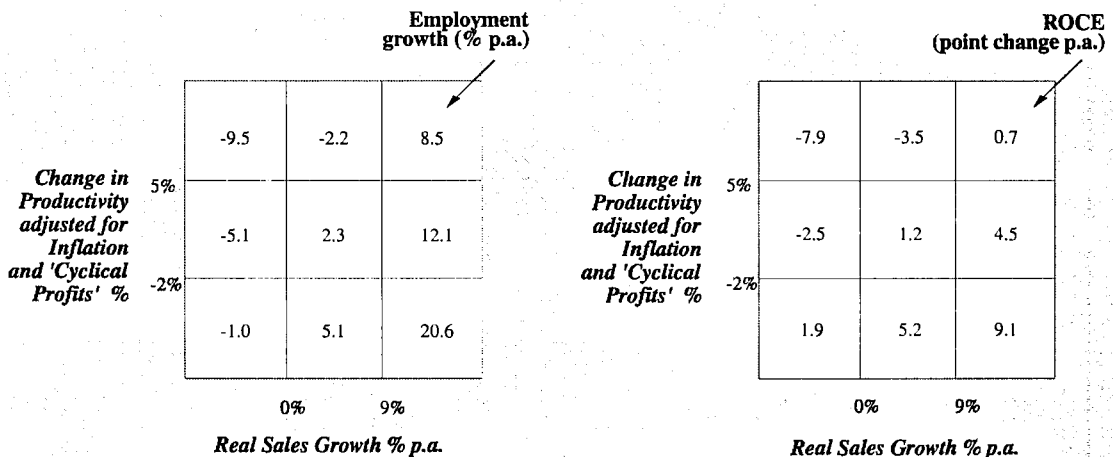
only be sustained without deteriorating margins if real output is increasing. The strong relationship between output growth and productivity growth makes it important to strip the effect of cyclical upswings (on costs and prices) from the relationships that have been examined. If one does this, the evidence is even more startling. Productivity gains achieved without real output growth are usually associated with declining profits as well as declining employment (Figure 13).

**Conclusions**

The evidence that has been brought forward shows that "intangible" measures of competitive capability are the most important determinants of competitive achievement. We have identified clear statistical links between:

- R&D effort in businesses and the "amount" of innovation they achieve, and the creation of intellectual property advantage;
- speed to market and success in sustaining innovation;
- innovation, intellectual property and the ability of businesses to achieve customer quality preference for their products and services;

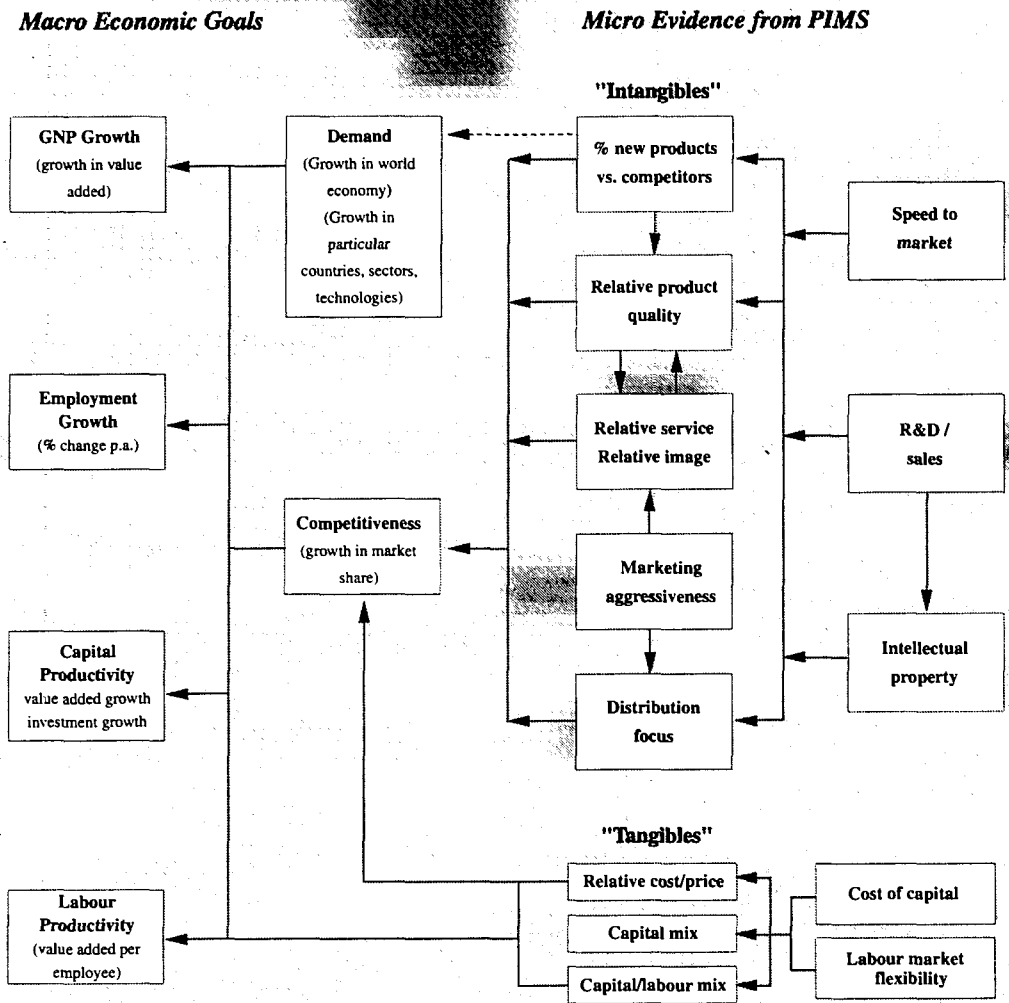
**Figure 13: Value added productivity and sales growth**



Source: PIMS 1994



Figure 14: Conclusions

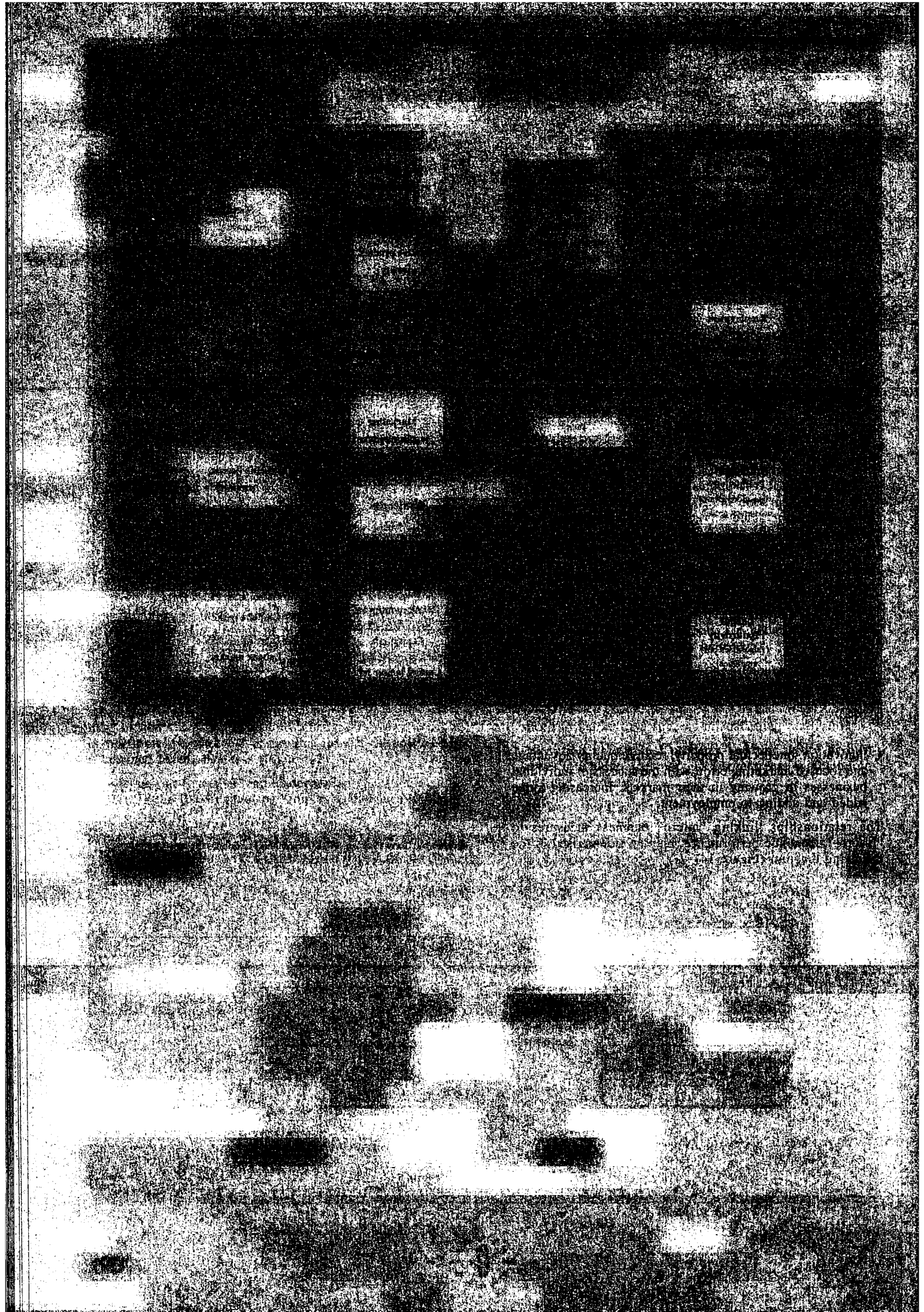


Source: PIMS/IMI

- innovation, intellectual property, relative quality advantage and focused marketing effort with the success of individual businesses in growing in their markets, increasing value added and adding to employment.

The relationships, linking "micro" business measures to "macro-" economic performance, may be summarised in the following diagram (Figure 14).

Written by: Tony Clayton, PIMS Associates, London, UK; and Charles Carroll, Irish Management Institute, Dublin.



## Classification of 500 cooperatives, mutual benefit societies and associations

### OBJECTIVES

This document is the synthesis of a study carried out by SOFICATRA in 1993 and 1994 at the request of the DG XXIII of the European Commission.

The objective of the study was to create two classifications:

- the first consisting of the 500 largest Cooperatives, Mutual Benefit Societies and Associations (CMAs), in order to list and identify the 500 largest bodies in the CMA world
- the second consisting of the 500 most dynamic Cooperatives, Mutual Benefit Societies and Associations in terms of employment growth, in order to bring to light, on this occasion, those CMAs which are expanding, creating employment and which will probably become the largest CMAs in the future.

### WHY TWO CLASSIFICATIONS?

The world of the CMA is probably not well known and is difficult to define, because it is very diverse as regards its legal forms and methods of operation and above all it is very heterogeneous and disparate within the different countries of Europe.

It was decided to create two classifications because it is a matter of defining how the Social Economy is performing: in fact, it is based neither on the characteristics of the CMA within a country, nor on the management of legal statutes.

The representativeness of the classification is that of a self-proclaimed profession, in so far as the classifications include only those CMAs which answered the questionnaires sent to them.

In this context, it would be futile to attempt to extrapolate the full geography of the European Social Economy from these two classifications.

It is advisable merely to regard them as two tables which are both impressionistic, because they consist only of points connected with one and the same world, and impressive, because this is the first time so many participants of the same kind have been brought together.

### METHODOLOGY

At the start, SOFICATRA contacted 534 CMA federations in the 12 countries of Europe requesting them to select from among their members:

- those CMAs with more than 500 equivalent full-time staff (not including unpaid voluntary work) - in order to create the classification of large CMAs;
- those CMAs which they felt were particularly dynamic and where employment had very likely risen during the last five years.

So as to use only CMAs whose size was consistent with visibility from the European viewpoint, we deliberately restricted ourselves, in the case of the second classification - the most dynamic CMAs - to those employing more than 50 equivalent full-time paid staff in 1993.

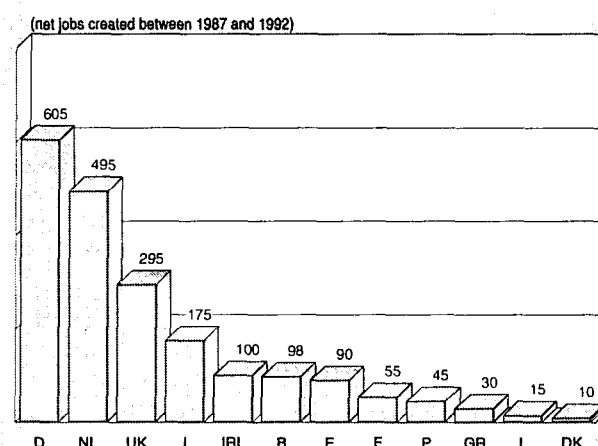
Moreover, we have distinguished two types of CMAs:

- the CMAs themselves which are entities established as companies or which are established in a legal form which groups together all the activities quoted;
- the CMA groups which do not exist as a legal entity, but where, because of similar activities or other major synergies, the turnover and employment figures are often artificially consolidated "legally and fiscally".

We have essentially worked on the basis of the CMAs, but have also published the classification which includes groups, for information only.

We note that only 18.5 % of the 534 federations actually answered our questionnaire, which meant we had approximately 1 700 sets of data about CMAs able to be contacted for the purpose of appearing under at least one of the two classifications.

Figure 1: Average number of jobs created by CMAs by country



Source: SOFICATRA study

**Table 1: Ranking of the 50 most dynamic CMAs according to Birch**

Rank	Birch	Name	CMA	Country	Employment (beginning)	Employment (end)
1	12 766	Co-operative Wholesale Society Ltd	1	UK	20 000	28 850
2	8 798	Kerry Co-operative Creameries Ltd	1	IRL	2 615	6 279
3	7 447	Nationwide Building Society	2	UK	6 453	10 873
4	7 260	Debeka Krankenversicherung sverein a.g., Sitz Koblenz	2	D	4 786	8 755
5	6 380	Rabobank Nederland	1	NL	30 833	36 258
6	5 690	Waterford Co-operative Society Ltd	1	IRL	1 166	3 224
7	5 178	Hamburg-Mannheimer Versicherung	2	D	10 801	14 625
8	5 148	R+V Lebensversicher. A.g.	2	D	8 066	11 635
9	4 501	Cebeco - Handelsraad	1	NL	3 024	5 499
10	4 447	United/Norwest Co-operatives Ltd - Southern/Northern/Central	1	UK	5 918	8 881
11	4 068	Norwich Union Life Insurance Society	2	UK	5 265	7 957
12	3 600	London Lighthouse	3	UK	6	150
13	3 589	Scottish Widows' Fund and Life Assurance Society	2	UK	2 529	4 532
14	3 335	Coop Italiana di Ristorazione	1	I	421	1 414
15	3 223	Signal Krankenversicherung a.g.	2	D	3 912	6 010
16	2 840	Eroski, s. Coop.	1	E	1 683	3 184
17	2 739	Gothaer Versicherungsbank v.v.a.g.	2	D	5 808	7 795
19	2 362	Federation Nationale Leo Lagrange	3	F	447	1 275
20	2 304	Datenverarbeitungsorganisation des Steuerberatenden Berufes in der BR	1	D	2 814	4 316
21	2 253	Apofruit	1	I	206	792
22	2 215	Konsumgenossenschaft Dortmund-Kassel eg	1	D	10 030	11 897
23	2 072	Coop Schleswig-Holstein e.g.	1	D	5 447	7 048
24	2 044	Cheltenham & Gloucester Building Society	2	UK	1 417	2 552
25	2 041	Shaw Trust Ltd	3	UK	1 010	2 027
26	2 039	Ass. Naz. Famiglie Fanciulli Adulti Subnormali	3	I	1 300	2 403
27	1 968	Serist Servizi Tor Vergata	1	I	31	263
28	1 904	The Bristol & West Building Society	2	UK	2 020	3 216
29	1 800	Grupo Empresarial Cooperativo Valenciano	1	E	1 214	2 205
30	1 766	Apothekers Coöperatie opg u.a.	1	NL	1 381	2 398
31	1 763	Acorns Children's Hospice	3	UK	4	86
32	1 610	GruLa - Grupo Lisboa de Abastecimento de Produtos Alimentares cri	1	P	185	646
33	1 572	Bradford & Bingley Building Society	2	UK	2 476	3 567
34	1 445	Asepeyo Mutua Patr de Accid de Trab.151	2	E	1 071	1 890
35	1 326	Huk-Coburg	2	D	4 172	5 230
36	1 219	Signal Unfallversicherung a.g.	2	D	436	979
37	1 201	Vestjyske Slagterier	1	DK	4 783	5 777
38	1 152	Coop Estense	1	I	1 323	2 062
39	1 122	C.A.M.S.T.	1	I	1 604	2 365
40	1 100	Association des Paralysés de France	3	F	5 336	6 272
41	1 043	Confederation Nationale du Credit Mutuel	1	F	21 139	22 135
42	1 012	Mac Intyre Care	3	UK	248	640
43	933	Royal National Institute for the Blind	3	UK	2 100	2 800
44	922	Avero Centraal Beheer Groep	1	NL	2 774	3 504
45	921	Verenigde Coöperatieve Melkindustrie Coberco b.a.	1	NL	3 337	4 089
46	860	Scottish Amicable Life Assurance Society	2	UK	1 737	2 368
47	857	Md - Foods Amba	1	DK	4 939	5 684
48	835	Golden Vale Food Products Ltd	1	IRL	511	957
49	833	Co op Ulm Konsumgenossenschaft eg	1	D	1 024	1 568
50	797	Haftpflicht Verband der deuts. Industrie v.a.g.	2	D	2 253	2 877

Source: SOFICATRA study

These 1 700 sets of data account for one third of all the questionnaires sent out, i.e. a total of 5 314.

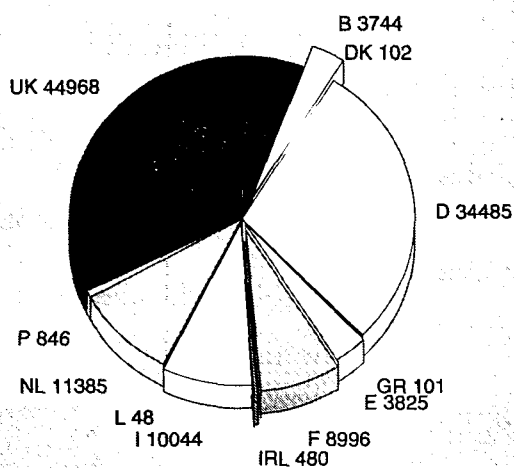
The other two thirds of the information comes from: data banks; other studies; meetings, information and lists of participants during symposia; an informal network which was built up gradually throughout the study.

A questionnaire was posted to these 5 314 CMAs, followed up by a fax, and in the last instance a telephone call. These procedures meant that over 2 000 replies were received (a 39 % return rate) uniformly distributed among the twelve EU countries.



**Figure 2: Total number of jobs created by all CMAs by country**

(net jobs created between 1987 and 1992)



Source: SOFICATRA study

If only those CMAs employing over 500 people (the large ones) and those with more than 50 people which have experienced employment growth during the last five years (the dynamic ones) are taken into account, almost 1 000 of the questionnaires returned fulfil at least one of these two conditions for taking part in the study.

### MAIN RESULTS OF THE SAMPLE AS A WHOLE

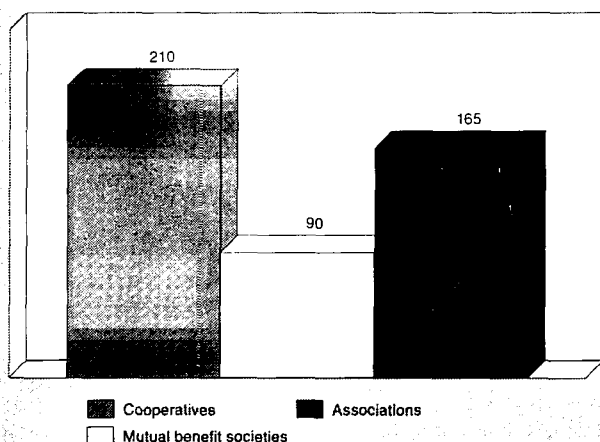
A perusal of the 950 positive questionnaires received (returned by those CMAs which meet the criteria of size and/or growth) provides us with particularly interesting data concerning their internationalisation, financing and the number of jobs created during the last five years.

#### Internationalisation

More than 10 % of the CMAs which replied already have a significant export business with the following characteristics:

- three small to medium-sized countries stand out as exporting more than the average: Ireland, Denmark and Spain;

**Figure 3: Number of entities in the classification of the most dynamic CMAs**



Source: SOFICATRA study

- three large countries export less in our sample: Germany, Italy and the United Kingdom.

Furthermore, out of the total of 950 questionnaires, 637 future development projects are mentioned.

We have been particularly surprised, and very pleasantly so at that, by the number of projects already formalised: 637 projects from 950 questionnaires returned, which corresponds, in fact, to 0.66 projects per CMA.

These projects seem to be mainly directed towards other countries in the Community, since:

- only 58 projects (less than 10 %) would be carried out within their own country;
- 532 projects would require a partner in another EU country;
- 47 projects are even directed towards countries outside the EU.

The CMAs most anxious to expand are mainly from the United Kingdom, France and lastly Spain. They are particularly trying to set up in Germany, France and the United Kingdom, in that order.

Lastly, there are also many CMAs with an existing partner or "subsidiary" in another country in the EU or outside it. Out of the 950 questionnaires returned to us, we found there were 815 existing partnerships, i.e. almost one partnership per CMA.

However, in this case, it is seen that some CMAs have existing partnerships in many countries within the EU whilst the majority have not yet become established in any country.

The main countries with existing partnerships are chiefly the large ones, since the three leading countries where partnerships exist are France (86 partnerships in France), Germany (82) and Italy (77), whilst the countries with the fewest partnerships are more often than not smaller ones such as Ireland (45), Greece and Luxembourg (42).

The United Kingdom's position in the very middle, well down in terms of its size, should be noted, seemingly showing that with a figure of 64 partnerships it is still lagging behind the other large countries when it comes to opening new businesses, which fact is confirmed by the low export rate we had found in an earlier question. This relative isolation of the CMAs in the United Kingdom would also explain the large number of future development projects originating in and intended for the United Kingdom (in order to make it less isolated).

#### Financing requirements

One of the questions in the questionnaire concerned the possible financial requirements of the CMAs. They were asked to state the following amounts:

- their owners' equity (or equivalent) at the end of 1992;
- their medium- and long-term debt at the same date;
- their future financing requirements on the same date.

Very precisely 174 CMAs indicated an amount in the box covering financing requirements, which is equivalent to one CMA in every five of the sample of 950 questionnaires returned; however, account must be taken of the fact that the question was particularly indiscreet, since it not only asked whether there was a future financial requirement, but also asked that an estimated figure of this requirement be given.

If the financing requirements of these 174 CMAs are related to the number of CMAs which indicated their owners' equity (626 CMAs) or the amount of their medium- and long-term debt at the end of 1992 (484 CMAs), the financing requirement rate of 18.3 % of the CMAs rises to 27.7 % and even 36 % (the number of CMAs expressing financing requirements in relation to those with existing long-term debt).

**Table 2: Ranking of the largest CMA's according to employment**

Rank	Employment	Name	CMA	Country
1	80000	Assistance Publique	3	F
2	78615	Harrogate College Ltd.	3	UK
3	38800	John Lewis Partnership plc	3	UK
4	36258	Rabobank Nederland	1	NL
5	28850	Co-operative Wholesale Society Ltd	1	UK
6	26492	Caisse Centrale des Banques Populaires	1	F
7	24598	Halifax Building Society	1	UK
8	22135	Confederation Nationale du Credit Mutuel	1	F
9	14625	Hamburg-Mannheimer Versicherung	2	D
10	14080	Caisse Centrale des Mutuelles Agricoles	2	F
11	13000	Max Plank Gesellschaft zur Foerderung der Wissenschaften e.v.	3	D
12	13000	Assistance Public Hopitaux de Marseille	3	F
13	12500	CIS	1	UK
14	12326	Co-operative Retail Services Ltd	1	UK
15	11897	Konsumgenossenschaft Dortmund-Kassel eg	1	D
16	11635	R+v Lebensversicher. A.g.	2	D
17	11360	Groupama	2	F
18	11000	Association pour la Formation Professionnelle des Adultes	3	F
19	10873	Nationwide Building Society	2	UK
20	10806	Alliance & Leicester Building Society	1	UK
21	10331	Fellesforeningen for Danmarks Brugsforenin	1	DK
22	10229	Remploy ltd.	3	UK
23	10160	Croix Rouge Francaise	3	F
24	10000	Konsumgenossenschaft Halle e.g.	1	D
25	10000	Centre Hospitalier Universitaire de Bordeaux	3	F
26	9500	Mutuelle Generale de l'Education Nationale	2	F
27	8881	United/Norwest Co-operatives ltd - Southern/Northern/Central	1	UK
28	8755	Debeka Krankenversicherungsverein a.g., Sitz Koblenz	2	D
29	8376	Moeller-Stiftung Holding & co. Kg	3	D
30	8369	Sodiaal	1	F
31	8125	Mutuelle Generale de l'Education Nationale	2	F
32	7999	Woolwich Building Society	1	UK
33	7957	Norwich Union Life Insurance Society	2	UK
34	7930	Fagor Oficinas Centrales, s.c.l.	1	E
35	7800	Paralysés de France (Association des)	3	F
36	7795	Standard Life Assurance Company	2	UK
37	7500	Centre Hospitalier Regional	3	F
38	7453	Banca Popolare di Novara scarl	1	I
39	7432	Arbeiter-Samariter-Bund Deutschland e.v.	3	D
40	7117	Edeka Offenburg eg.	1	D
41	7048	Coop SchleswigHolstein e.g.	1	D
42	6772	Siemag Weiss Stiftung & co. Kg	3	D
43	6700	Fraunhofer Gesellschaft zur Foerderung der Angewandten Forschung e.v.	3	D
44	6500	Friesland (Frico Domo)	1	NL
45	6500	Christliches Jugenddorf-Werk Deutschlands e.v.	3	D
46	6317	Leeds Permanent Building Society	1	UK
47	6293	Marie Curie Memorial Foundation	3	UK
48	6279	Kerry Co-operative Creameries ltd	1	IRL
49	6272	Association des Paralysés de France	3	F
50	6019	Slagteriselskabet Danish Crown Amba	1	DK

Source: SOFICATRA study

Moreover, in the United Kingdom, where the practice of distributing accounts is much more widespread, the percentage rate of CMA's indicating a future financing requirement in relation to those with existing long-term debt is 52.7 %.

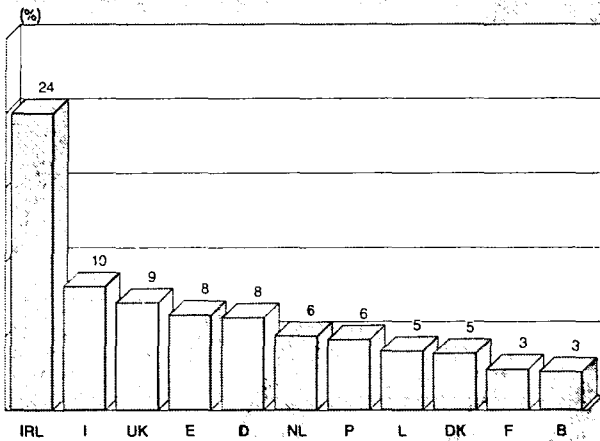
Taking the average rate of 36 % of CMA's expressing financing requirements, the realities of the situation are found to be very different, such as:

- a rate of 28 % for the cooperatives;
- a rate of 22 % for the mutual benefit societies;
- a rate of 54 % for the associations.

If the very large CMA's (the large banks and mutual benefit societies) which distort the average are excluded, the following profile of a CMA looking for future financing requirements can be drawn up:

- it employs around 300 equivalent full-time staff;
- it achieves a turnover of almost 78 million ECU;
- it had owners' equity of 15 million at the end of 1992;
- it had long-term debt of 7.5 million ECU (the equivalent of 50 % of its owners' equity);

**Figure 4: Average annual percentage of jobs created by country**



Source: SOFICATRA study

- in order to cater for its expansion it sought additional permanent funds of approximately 5 million ECU, which represents around 20 % of the total capital employed of the average CMA.

### Net creation of jobs

Based on the 950 questionnaires and eliminating the groups (to avoid duplications) and the CMAs which did not supply us with data for the two years (1992 and 1987), we are left with 604 CMAs.

Between 1987 and 1992, these 604 CMAs very precisely created a net total of 119 196 jobs, which is equivalent to each CMA creating 196 jobs on average.

These 604 CMAs must also be divided into two different categories:

- 487 CMAs which created a gross total of 136 259 jobs, i.e. 279 jobs per CMA;
- 127 CMAs which shed 17 063 jobs over five years, which is equivalent to an average of 134 jobs per CMA.

This net figure of one hundred and twenty thousand newly created jobs is distributed differently according to the countries involved for which the average number of jobs created per CMA is not uniform, since it ranges from 6 for the Danish CMAs to 605 for the German CMAs.

This average net figure of 196 jobs created per CMA must be related to the original number of jobs in these CMAs which was close to 2 000 equivalent full-time staff in 1987.

This annual job creation figure of almost 2 % per annum has therefore made it possible to create one hundred and twenty thousand jobs in five years, of which the breakdown by country is shown in Figure 2.

The jobs created therefore appear to be distributed to the advantage of three countries which account for almost 80 % of the 120 000 new jobs created over the five year period:

- the United Kingdom, which sweeps up almost 40 % of the total;
- Germany, which, despite a low response rate to our study (less than 10 % of the 950 questionnaires), obtains almost 30 % of the newly created jobs;
- the Netherlands, which is close to 10 %.

The biggest loser, at least in our sample, is France, which returned almost 30 % of the questionnaires to us but where

it seems that job creation has not followed, because it represents only 7.5 % of our sample's total.

Taken as a whole, it is nevertheless interesting to note that in all the European countries without exception, the CMAs which replied to the questionnaires have, on average, created a significant number of jobs (10 % over 5 years), whereas they account for an average of 2 000 people and at the present time it is more usual for an organisation of this size to cut its workforce rather than increase it.

The following suggestions can be advanced to explain this undoubted expansion of the role of the CMAs in the economies of Europe:

- the CMAs are engaged in activities now partly abandoned by the State, which is withdrawing from direct involvement in a series of sectors; in fact, the State would appear to be experiencing the same phenomenon as witnessed among the large industrial groups, namely outsourcing all of its non-strategic activities and, consequently refocusing on its core functions;
- the activities of the CMAs are, in the main, better distributed and cover fields which, generally speaking, are much more buoyant than the average in terms of consumption. These buoyant segments would appear to include the following:
  - savings and insurance, which, as a reaction to insecurity, tend to increase in times of economic crisis;
  - health and paramedical activities, which benefit from the extension of the average life span and the larger percentage of older people in the age pyramid;
  - training and culture, which will assume an increasingly important role in our economies;
  - all activities connected with assisting the many persons who have become marginalised (the unemployed, injured, handicapped, homeless, etc.) whose numbers, unfortunately, are constantly on the increase.

The CMAs have now learned to use modern techniques totally efficiently, for example: mass communication for Non-Governmental Organisations; marketing is also found to be expanding as regards internationalising activities; business combinations and mergers are also to be seen in almost all sectors, but mainly in banking, insurance and agriculture.

Probably all these factors individually contribute in part to the development of the cooperatives, mutual benefit societies and associations such as we have seen in the questionnaires returned to us.

### CLASSIFICATION OF THE 500 MOST DYNAMIC CMAs

The aim of classifying the 500 most dynamic CMAs is to provide a current picture of those organisations which are growing the fastest and which, in a way, thus foreshadow the profile of the organisations of the future.

We have chosen a parameter devised by an American, D. Birch, to select these CMAs.

This index is half-way between:

- the number of jobs created which favours the large CMAs more because it is easier to create 500 jobs from a starting figure of 10 000 than it is from zero; and
- the percentage increase in employment which favours the small CMAs too much because it is easier to produce a 10 % increase when there are 100 employees than when there are 1 000.

The index used by D. Birch harmoniously reconciles the two aspects of job creation since it satisfies the following formula: (Employment 92 - Employment 88) X (Employment 92 / Em-



**Table 2: Ranking of the largest CMAs according to employment**

Rank	Employment	Name	CMA	Country
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4	36258	Rabobank Nederland	1	NL
5	28850	Co-operative Wholesale Society Ltd	1	UK
6	26492	Caisse Centrale des Banques Populaires	1	F
7	24598	Halifax Building Society	1	UK
8	22135	Confederation Nationale du Credit Mutuel	1	F
9	14625	Hamburg-Mannheimer Versicherung	2	D
10	14080	Caisse Centrale des Mutuelles Agricoles	2	F
11	13000	Max Plank Gesellschaft zur Foerderung der Wissenschaften e.v.	3	D
12	13000	Assistance Public Hopitaux de Marseille	3	F
13	12500	CIS	1	UK
14	12326	Co-operative Retail Services Ltd	1	UK
15	11897	Konsumgenossenschaft Dortmund-Kassel eg	1	D
16	11635	R+v Lebensversicher. A.g.	2	D
17	11360	Groupama	2	F
18	11000	Association pour la Formation Professionnelle des Adultes	3	F
19	10873	Nationwide Building Society	2	UK
20	10806	Alliance & Leicester Building Society	1	UK
21	10331	Fellesforeningen for Danmarks Brugsforenin	1	DK
22	10229	Remploy Ltd.	3	UK
23	10160	Croix Rouge Francaise	3	F
24	10000	Konsumgenossenschaft Halle e.g.	1	D
25	10000	Centre Hospitalier Universitaire de Bordeaux	3	F
26	9500	Mutuelle Generale de l'Education Nationale	2	F
27	8881	United/Norwest Co-operatives Ltd - Southern/Northern/Central	1	UK
28	8755	Debeka Krankenversicherungsverein a.g., Sitz Koblenz	2	D
29	8376	Moeller-Stiftung Holding & co. Kg	3	D
30	8369	Sodiaal	1	F
31	8125	Mutuelle Generale de l'Education Nationale	2	F
32	7999	Woolwich Building Society	1	UK
33	7957	Norwich Union Life Insurance Society	2	UK
34	7930	Fagor Oficinas Centrales, s.c.l.	1	E
35	7800	Paralysés de France (Association des)	3	F
36	7795	Standard Life Assurance Company	2	UK
37	7500	Centre Hospitalier Regional	3	F
38	7453	Banca Popolare di Novara scarl	1	I
39	7432	Arbeiter-Samariter-Bund Deutschland e.v.	3	D
40	7117	Edeka Offenburg eg.	1	D
41	7048	Coop Schleswigholstein e.g.	1	D
42	6772	Siemag Weiss Stiftung & co. Kg	3	D
43	6700	Fraunhofer Gesellschaft zur Foerderung der Angewandten Forschung e.v.	3	D
44	6500	Friesland (Frico Domo)	1	NL
45	6500	Christliches Jugenddorf-Werk Deutschlands e.v.	3	D
46	6317	Leeds Permanent Building Society	1	UK
47	6293	Marie Curie Memorial Foundation	3	UK
48	6279	Kerry Co-operative Creameries Ltd	1	IRL
49	6272	Association des Paralysés de France	3	F
50	6019	Slagteriselskabet Danish Crown Amba	1	DK

Source: SOFICATRA study

Moreover, in the United Kingdom, where the practice of distributing accounts is much more widespread, the percentage rate of CMAs indicating a future financing requirement in relation to those with existing long-term debt is 52.7 %.

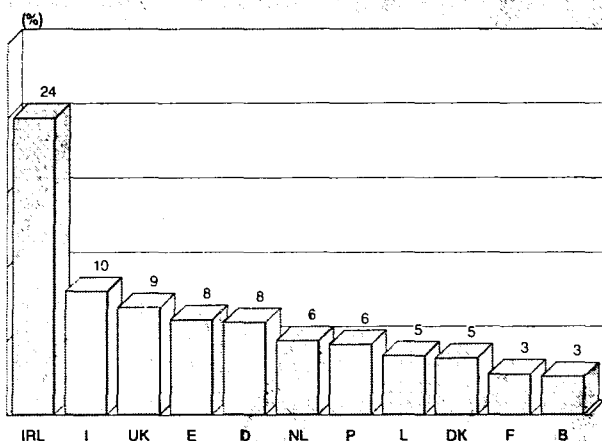
Taking the average rate of 36 % of CMAs expressing financing requirements, the realities of the situation are found to be very different, such as:

- a rate of 28 % for the cooperatives;
- a rate of 22 % for the mutual benefit societies;
- a rate of 54 % for the associations.

If the very large CMAs (the large banks and mutual benefit societies) which distort the average are excluded, the following profile of a CMA looking for future financing requirements can be drawn up:

- it employs around 300 equivalent full-time staff;
- it achieves a turnover of almost 78 million ECU;
- it had owners' equity of 15 million at the end of 1992;
- it had long-term debt of 7.5 million ECU (the equivalent of 50 % of its owners' equity);

**Figure 4: Average annual percentage of jobs created by country**



Source: SOFICATRA study

- in order to cater for its expansion it sought additional permanent funds of approximately 5 million ECU, which represents around 20 % of the total capital employed of the average CMA.

### Net creation of jobs

Based on the 950 questionnaires and eliminating the groups (to avoid duplications) and the CMAs which did not supply us with data for the two years (1992 and 1987), we are left with 604 CMAs.

Between 1987 and 1992, these 604 CMAs very precisely created a net total of 119 196 jobs, which is equivalent to each CMA creating 196 jobs on average.

These 604 CMAs must also be divided into two different categories:

- 487 CMAs which created a gross total of 136 259 jobs, i.e. 279 jobs per CMA;
- 127 CMAs which shed 17 063 jobs over five years, which is equivalent to an average of 134 jobs per CMA.

This net figure of one hundred and twenty thousand newly created jobs is distributed differently according to the countries involved for which the average number of jobs created per CMA is not uniform, since it ranges from 6 for the Danish CMAs to 605 for the German CMAs.

This average net figure of 196 jobs created per CMA must be related to the original number of jobs in these CMAs which was close to 2 000 equivalent full-time staff in 1987.

This annual job creation figure of almost 2 % per annum has therefore made it possible to create one hundred and twenty thousand jobs in five years, of which the breakdown by country is shown in Figure 2.

The jobs created therefore appear to be distributed to the advantage of three countries which account for almost 80 % of the 120 000 new jobs created over the five year period:

- the United Kingdom, which sweeps up almost 40 % of the total;
- Germany, which, despite a low response rate to our study (less than 10 % of the 950 questionnaires), obtains almost 30 % of the newly created jobs;
- the Netherlands, which is close to 10 %.

The biggest loser, at least in our sample, is France, which returned almost 30 % of the questionnaires to us but where

it seems that job creation has not followed, because it represents only 7.5 % of our sample's total.

Taken as a whole, it is nevertheless interesting to note that in all the European countries without exception, the CMAs which replied to the questionnaires have, on average, created a significant number of jobs (10 % over 5 years), whereas they account for an average of 2 000 people and at the present time it is more usual for an organisation of this size to cut its workforce rather than increase it.

The following suggestions can be advanced to explain this undoubted expansion of the role of the CMAs in the economies of Europe:

- the CMAs are engaged in activities now partly abandoned by the State, which is withdrawing from direct involvement in a series of sectors; in fact, the State would appear to be experiencing the same phenomenon as witnessed among the large industrial groups, namely outsourcing all of its non-strategic activities and, consequently refocusing on its core functions;
- the activities of the CMAs are, in the main, better distributed and cover fields which, generally speaking, are much more buoyant than the average in terms of consumption. These buoyant segments would appear to include the following:
  - savings and insurance, which, as a reaction to insecurity, tend to increase in times of economic crisis;
  - health and paramedical activities, which benefit from the extension of the average life span and the larger percentage of older people in the age pyramid;
  - training and culture, which will assume an increasingly important role in our economies;
  - all activities connected with assisting the many persons who have become marginalised (the unemployed, injured, handicapped, homeless, etc.) whose numbers, unfortunately, are constantly on the increase.

The CMAs have now learned to use modern techniques totally efficiently, for example: mass communication for Non-Governmental Organisations; marketing is also found to be expanding as regards internationalising activities; business combinations and mergers are also to be seen in almost all sectors, but mainly in banking, insurance and agriculture.

Probably all these factors individually contribute in part to the development of the cooperatives, mutual benefit societies and associations such as we have seen in the questionnaires returned to us.

### CLASSIFICATION OF THE 500 MOST DYNAMIC CMAs

The aim of classifying the 500 most dynamic CMAs is to provide a current picture of those organisations which are growing the fastest and which, in a way, thus foreshadow the profile of the organisations of the future.

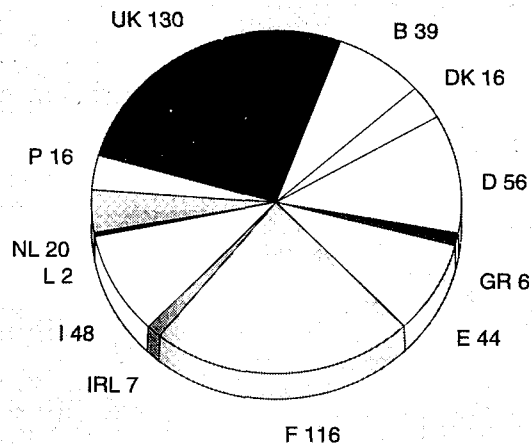
We have chosen a parameter devised by an American, D. Birch, to select these CMAs.

This index is half-way between:

- the number of jobs created which favours the large CMAs more because it is easier to create 500 jobs from a starting figure of 10 000 than it is from zero; and
- the percentage increase in employment which favours the small CMAs too much because it is easier to produce a 10 % increase when there are 100 employees than when there are 1 000.

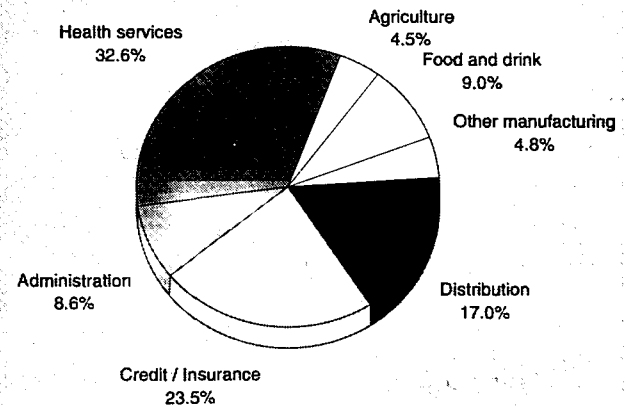
The index used by D. Birch harmoniously reconciles the two aspects of job creation since it satisfies the following formula: (Employment 92 - Employment 88) X (Employment 92 / Em-

**Figure 5: Number of dynamic CMAs by country**



Source: SOFICATRA study

**Figure 6: Breakdown by sector of the 500 dynamic CMAs**



Source: SOFICATRA study

ployment 88). This index produces positive results if there is job creation, and negative results if there are job losses.

It is thought that to achieve a Birch index of 100 in five years is a real success story since this means a company has to: grow from 20 people in 1988 to 57 people in 1992; start with 50 people in 1988 and be around 100 people in 1992; number 585 in 1992, from a total of 500 in 1988; start with 1 000 people in 1988 and reach 1 092 people in 1992.

We have taken only the Cooperatives, Mutual Benefit Societies and Associations into account and have not considered "groups", which come under a separate category.

A detailed analysis of the classification of the 500 CMAs producing the highest Birch indices shows that:

- In comparison with the other criteria which we could have used to classify dynamism representatively, this is the only one which gives associations a share similar to what we perceive to be the real situation: in fact, a criterion such as the rate of variation in turnover between 1992 and 1988 meant the associations got the smallest share (less than 4 % of the sample) because they are smaller and their budget is often only the sum of their wage costs and operating costs (few raw materials purchased); consequently, by choosing the Birch index it is possible to compare the three categories of organisation together, highlight their differences, without obliterating or excessively stifling one of them;
- The top CMA in our classification has a BIRCH index of 12 766 (creating 8 850 jobs, since it moves from 20 000 to 28 850 jobs);
- The CMA in 500th place creates 4 jobs (up from 171 in 1988 to 175 in 1992) which we feel is still a significant performance for someone at the bottom of the table;
- The average Birch index for the classification stands at 405, which as far as the CMAs in our classification are concerned, is equivalent to the following performance:
- a CMA of 20 people in 1988 creates 80 jobs to stand at 100 in 1992;
- a CMA of 100 people in 1988 creates 150 jobs and totals 250 in 1992;
- a CMA of 1 000 people in 1988 creates 300 jobs to total 1 300 in 1992.

In practice, working on the basis of the average CMA in our classification of the 500 dynamic ones, it is seen that the BIRCH index of 405 corresponds to employment rising from 837 people in 1988 to 1 084 people in 1992. This trend therefore implies the creation of 247 jobs per CMA over 5 years and is equivalent to annual employment growth of 6.6 % per annum.

From the total sample of 500 dynamic CMAs, total employment rises from 405 000 units in 1988 to 525 000 units in 1992.

#### Analysis of dynamism by category

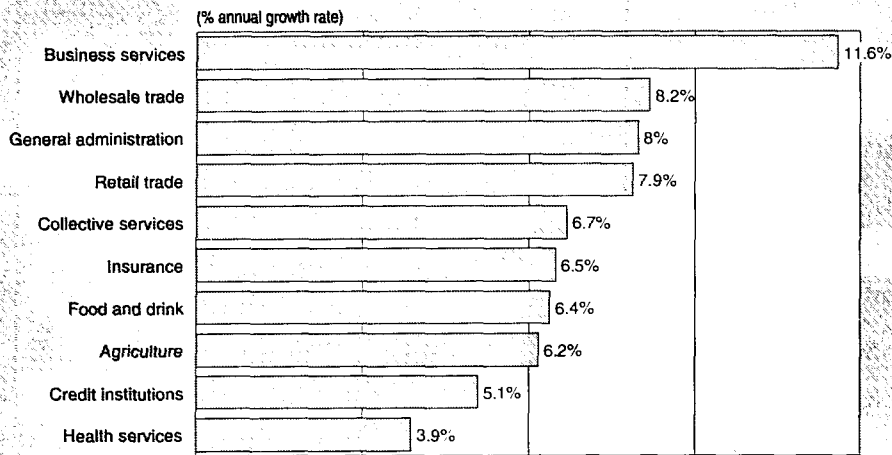
When analysing the first 500 of the classification according to their different categories (Cooperative, Mutual Benefit Society or Association), the following emerges:

- In terms of the number of entities within the classification, the cooperatives account for 44 %, the mutual benefit societies 20 % and the associations 36 % (the number of representatives in the three categories is shown in Figure 3);
- The profile of the entities within each category is very different, however, in so far as:
- the 221 cooperatives rise on average from 867 jobs in 1988 to 1 156 jobs in 1992;
- the 102 mutual benefit societies are large, since they start off with 1 263 jobs in 1988 and finish with 1 842 jobs in 1992;
- the 177 associations are modest in size - 380 people in 1988 - but rising to 515 people in 1993;

Although at the beginning the average size of the three categories differs considerably, the rate at which new jobs are created varies little according to category and therefore according to the size of the entity, since employment increases by an average of 6.6 % per annum, as against: 6.2 % per annum for the cooperatives, 7.6 % for the mutual benefit societies, 5.9 % for the associations.

The corollary of this is that, as the growth rate is similar within the three categories, the average number of jobs created between 1988 and 1992 will be proportional to the size of the entities: 289 jobs per cooperative, 579 jobs per mutual benefit society, 135 jobs per association.

**Figure 7: Employment growth rate according to sector**



Source: SOFICATRA study

**Analysis of dynamism by country**

Figure 4 clearly shows the comparative annual job creation rates of the entities in the sample.

It can be seen that the countries enjoying the best growth rates are Ireland, Italy, the United Kingdom, Spain and Germany, which are all above the 7 % figure for new jobs each year !

At the other extreme, the three least dynamic countries in terms of job creation are Belgium, France and Denmark, whose job creation rates are 50 % lower.

An analysis of these results seems to show that there is apparently no significant relationship between the job creation rate and the size of the country, or even the size of the entity. Instead it is apparently necessary to turn to explanations of a sectorial nature, or to analyse the age of the entities or the world of the CMAs or even to compare the compulsory levy rates in order to create a framework for justifying these differences.

If the breakdown of the 500 CMAs is analysed according to country, it can be seen that the United Kingdom and France each account for one quarter of the entities in the classification, a third quarter being shared between Germany, Italy and Spain with all the other countries accounting for the last quarter.

Compared with the large CMAs and the sample as a whole, the countries which are over-represented in terms of the dynamism of their operators are mainly the United Kingdom and Spain. The countries whose operators seem considerably less dynamic than the average are France and Germany.

In terms of average size the dynamic CMAs also vary significantly, depending on the country, compared with the all-country average of 1 100 persons in 1992:

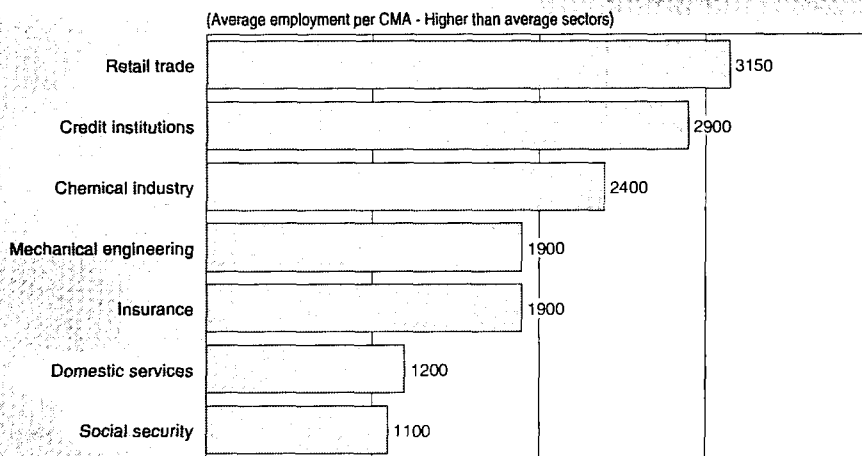
- three countries produce entities well above this average: the Netherlands with 3 070 people on average, Germany with 2 198 jobs per entity, Denmark with 1 304.
- the CMAs of three small countries fall below half of the average employment figure: Luxembourg with an average of 183 employees, Greece with 202 employees and Portugal with 466 employees.

**Analysis of dynamism by sector of activity**

A breakdown of the 500 dynamic CMAs by sector provides the following information:

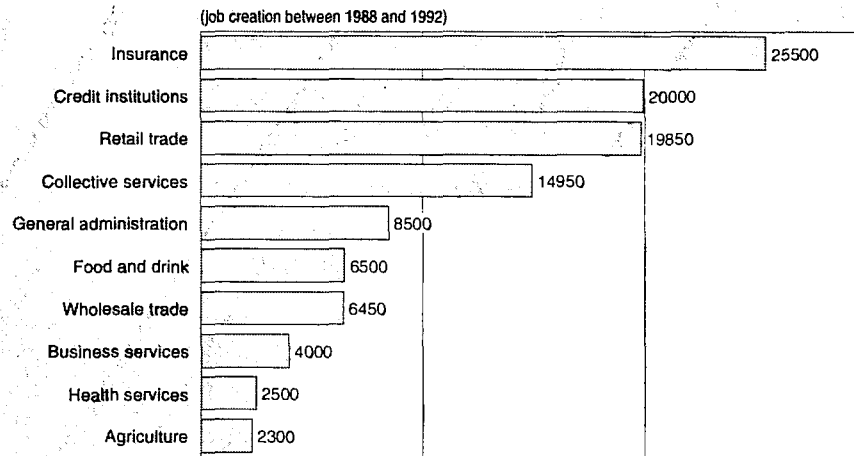
- one CMA in six belongs to the primary and secondary sectors (18.2 %) with the agricultural and agri-foodstuffs sectors predominating representing more than 13 % of the sample;

**Figure 8: Average employment per CMA - Higher than average sectors**



Source: SOFICATRA study

**Figure 9 : Number of jobs created by sector  
(job creation between 1988 and 1992)**



Source: SOFICATRA study

- another sixth of the entities comprises CMAs involved in commercial activities (essentially wholesale, to a lesser extent retail trade and marginally as middlemen);
- a quarter of the activities are in financial services and insurance (including financial subsidiaries);
- one CMA in ten operates in sectors closely related to general government (compulsory social security, research, education, etc.);
- the balance, i.e. almost one CMA in three, carries on an activity linked to health and community services (homes, day nurseries, home care, services to the disadvantaged,...).

The employment growth rate varies very considerably according to the activity involved:

- one sector beats all the records and outclasses the rest with a growth rate of almost 12 % per annum, namely business services, which in particular bring together computer and consultancy activities;
- the CMAs in three sectors show employment growth of approximately 8 % per annum (i.e. 1.4 % above the average), namely wholesale and retail businesses as well as

general administration departments (such as social security, education, research, etc.);

- the CMAs in two sectors have experienced below average employment growth: credit institutions, with slightly above 5 %, and health, with an annual rate of under 4 %.

As was already the case with categories and countries, the CMAs differ in size considerably according to the sector of activity involved.

Figure 8 shows the sectors in which the CMAs account for more employment than the general average (1 100 jobs in 1992).

Classification of the sectors according to the total number of jobs created differs considerably from that made according to the employment growth rate, in so far as this growth rate is, in this instance, weighted by both the number of CMAs and also the size of the CMAs. Therefore, the following movements are noted:

- the many large insurance and credit institutions, situated at the bottom of the first classification, are pulling themselves up to the top positions, which allows each of their sectors to create over 20 000 jobs,
- the corporate services activities, of which there are but a few, are relegated towards the bottom of the classification, together with health and agriculture; these three sectors each create far fewer than 5 000 jobs over the 5-year period.

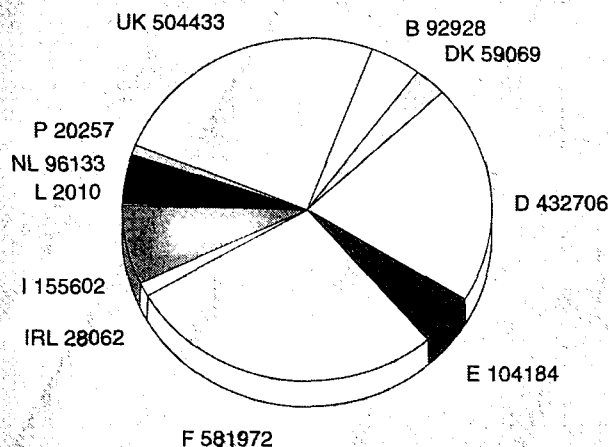
All these factors for analysing the results provide an initial approach to the average dynamic CMA, but nothing quite matches a more precise description of the CMAs which are included in the classification.

### PROFILES OF DYNAMIC CMAS

By taking the top 50 in the classification of the 500 most dynamic CMAs, and thus analysing the "front runners", it is noted that:

- there are 25 cooperatives, 17 mutual benefit societies and 8 associations (which are therefore considerably under-represented);
- in order of country they are as follows: 15 CMAs are classified for the United Kingdom, 12 for Germany, 6 for Italy and 5 for the Netherlands. Ireland, Spain and France each have 3 CMAs, Denmark has two CMAs, with Portugal having the last CMA needed to make up the 50, which means that neither Belgium nor Greece nor Luxembourg has any CMAs among the top 50 most dynamic ones.

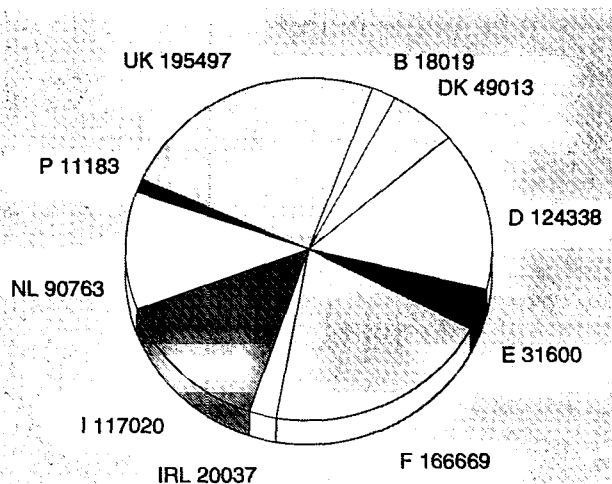
**Figure 10: Employment in the large CMAs by country**



Source: SOFICATRA study



**Figure 11: Employment in the large cooperatives by country**



Source: SOFICATRA study

- Dynamism seems to be consistent with a respectable size, in so far as out of the 50 most dynamic CMAs, 43 employ more than 1 000 people, and 5 CMAs even have more than 10 000 staff;
- Co-operative Wholesale Society (UK) ranked no. 1 because it creates 8 850 jobs (up from 20 000 jobs in 1988 to 28 850 in 1992);
- Rabobank Nederland (NL) comes 5th, creating over 5 000 jobs starting with 30 000 jobs in 1988;
- Hamburg-Mannheimer Versicherungsverein (Germany), in 7th place for adding 3 824 new jobs to the existing figure of 10 801 in 1988;
- Konsumgenossenschaft Dortmund-Kassel (Germany), which creates 1 867 jobs from 10 000 originally and comes in 22nd place.

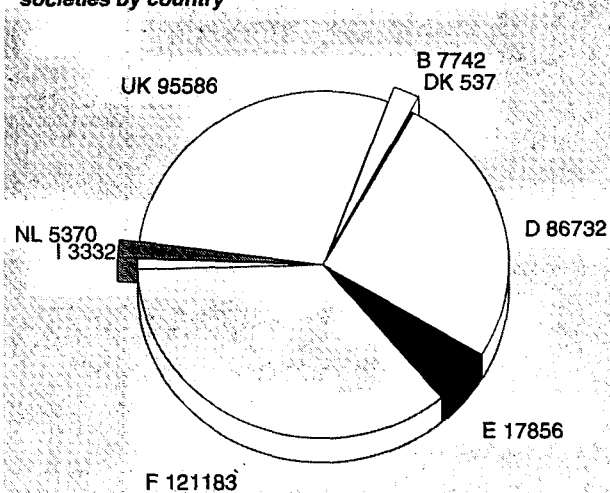
As regards the associations, the British would receive the crown for being dynamic: out of the 20 top associations classified using the Birch criterion, no less than 15 are British; some partial explanations will be sought in the following directions:

- the British government has outsourced a whole series of care services, which have been taken over and developed by the private sector as associations;
- the economic situation has been particularly severe in the United Kingdom, hence a sharp increase in forms of poverty, exclusion and marginalisation;
- Anglo-Saxon behavioural habits are more open to the marketing of charitable work and the publication of the results of this activity.

Here are a few examples of associations, among which the most significant are:

- London Lighthouse (UK) which is the first association in the classification (12th place) to help AIDS /HIV positive sufferers with a staff of 6 in 1988 and 150 in 1992;
- The Fédération Nationale Léo Lagrange (France) which is the second association (19th place) which has seen its workforce grow from 447 to 1 275 in five years;
- The other associations, mainly in the United Kingdom, particularly aim at helping families with a sick child (Acorns Children's Hospice up from 4 to 86 staff), and at sheltering, educating and putting handicapped people back to work

**Figure 12: Employment in the large mutual benefit societies by country**



Source: SOFICATRA study

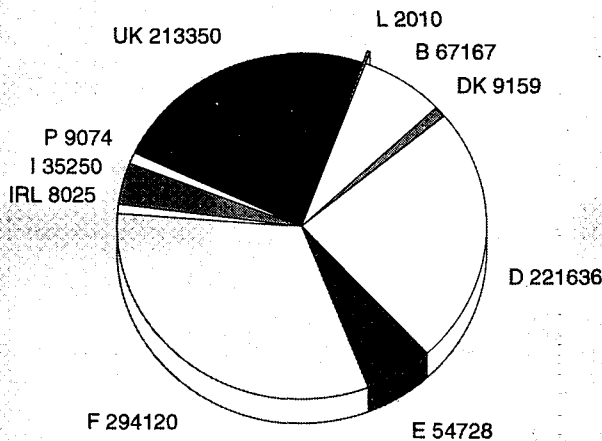
(Shaw Trust is up from 1 010 to 2 027 employees, and also Mac Intryre Care, up from 248 to 640 employees);

- Ass. Naz. Famiglie Fanciulli Subnormali (Italy) which pursues the same aims in Italy with 1 300 jobs in 1988, reaching 2 403 in 1992;
- Association des Paralysés de France (France) which is up from 5 336 to 6 272 jobs.

Among the thirty cooperatives best placed, are to be found:

- almost 15 cooperatives whose main activity involves being a commercial agency, mainly in agri-foodstuffs, but also in pharmaceuticals and more generally in bulk-buying such as, for example:
- Co-operative Wholesale Society (UK) which occupies first place in the classification with jobs up from 20 000 to 28 500;
- Kerry Co-operative Creameries Ltd. (Ireland) which occupies second place in the general classification, up from 2 615 to 6 279 employees;
- Eroski S. Coop (Spain) which distributes foodstuffs and which is up from 1 683 to 3 184 staff;
- Apothekers Co-operative (Netherlands) in 30th place, up from 1 381 to 2 398 people.
- in almost 10 cases, the cooperative owns a manufacturing or processing base in the agri-foodstuffs or stock farming sector, often together with an operation involved in marketing these products such as:
- Waterford Co-operative Society (Ireland) which is up from 1 166 to 3 224 people;
- Apofruit (Italy) whose horticultural produce business employs 792 people compared with 206 five years earlier;
- Vestjyske Slagterier (Denmark) whose main activity is animal slaughtering (5 777 as against 4 783 people).
- Surprisingly, in four out of the 25 leading cooperatives, mass catering is clearly expanding in Italy, creating more than 2 400 jobs from a starting figure of 2 456 in 1988:
- Coop Italiana di Ristorazione;
- Serist Servizi Tor Vergata;
- C.A.M.S.T.;
- Cooperativa di Lavoro "La Cascina".

Figure 13: Employment in the large associations by country



Source: SOFICATRA study

- in four other cases, enterprises are involved in banking, insurance activities or holding companies such as:
- Rabobank (Netherlands), lying in third position, alone creating more than 5 000 jobs;
- Confédération Nationale du Crédit Mutuel (France) which creates 1 000 jobs.

The mutual benefit societies sector is largely dominated by two countries, since among the 20 biggest job creators in this sector there are to be found:

- 10 German ones mainly operating in insurance activities:
- Debeka Krankenversicherungsverein a.G., up from 4 786 to 8 755 jobs;
- Hamburg-Mannheimer Versicherung, which creates 3 824 jobs;
- R + V Lebensversicherung a.G., which creates 3 569 jobs.
- 9 from the UK, where they very often take the form of building societies:
- Nationwide Building Society, up from 6 453 to 10 873 jobs;
- Norwich Union Life Insurance Society, which creates 2 692 jobs;
- Scottish Widows' Fund and Life Assurance Society, which creates 2 003 jobs;
- Standard Life Assurance Company, which creates 1 987 jobs.
- The leading French Mutual Benefit Society appears in 62nd place, i.e. M.A.C.I.F. (Mutuelle d'Assurance des Commerçants et Industriels de France).
- The leading Dutch Mutual Benefit Society is INTERPAIS N.V., occupying 67th position.
- A single Spanish Mutual Benefit Society: Asepeyo Mutua Patr De Accid De Trab. 151, up from 1 071 to 1 890 jobs.

#### Classifications available

Classifications of dynamic CMAs which are available on request are:

- a classification of the 500 most dynamic CMAs as per the D. Birch index;
- twelve classifications of the CMAs by country;

- three classifications according to whether they are cooperatives, mutual benefit societies or associations.

#### CLASSIFICATION OF THE LARGEST CMAs IN EUROPE

We have finally managed to take a census of 1 039 CMAs employing more than 500 equivalent full-time people. This information comes from our mail shots as well as from data banks which we have interrogated.

The motives and "cultural" behaviour behind the willingness to reply to financial questionnaires are fundamentally different from country to country.

We cannot therefore claim that the 1 039 sets of financial information which we received are exhaustive or even representative of the whole of the CMA population with more than 500 people which existed in the 12 countries of the EU in 1993.

Nevertheless, to our knowledge it is the most extensive study of its type carried out to date and therefore, bearing in mind our reservations, it can be considered as being the best and most faithful representation of the real situation in the world of the CMAs.

#### Analysis of the breakdown of employment in the CMAs

The 1 039 large CMAs have contributed a total of 2 077 356 jobs, i.e. an average of approximately 2 000 jobs per CMA. Let us recall that this relates merely to employment in the societies and that we have never taken into account employment in the group as a whole.

Based on the large CMAs only, the countries which take up most jobs are:

- France and UK with over half a million jobs each, i.e. one quarter of our sample each time;
- Germany with more than 430 000 jobs, i.e. over one fifth;
- Italy with 155 000 jobs;
- Spain, the Netherlands and Belgium with around 100 000 jobs in each country;
- Denmark with 60 000 jobs;
- Ireland and Portugal with over 20 000 jobs.

The 422 largest cooperatives account for 824 139 jobs which, in both cases, represents approximately 40 % of our total sample, which is a logical distribution, bearing in mind the fact that the cooperatives have 1 953 employees on average.

The countries are in relatively the same order as for all of the CMAs apart from Italy, which has a stronger presence, and France, which has fallen back:

- France, which now accounts for only 20 % of employment compared with 28 % for the bulk of the CMAs;
- Italy, whose share in employment moves from 7.5 % for the large CMAs to 14.2 % for the large cooperatives.

The 147 large mutual benefit societies represent less than 15 % of the CMA world, but the employment which they account for (338 338 people) pushes their share to 17 % of the sample because the average size of these large mutual benefit societies (2 302 people) is higher than the average for the CMAs.

The three large countries (France, the United Kingdom and Germany) are all better represented within the mutual benefit societies, since the three of them alone exceed nine tenths of the jobs in the mutual benefit societies of the sample, whereas these three large countries account for only seven tenths of employment for all the CMAs.

As far as the 470 large associations are concerned, it is seen that they are medium-sized consistent with the average CMA (1 946 employees) and that they represent 45 % of the sample both in terms of the number of CMAs and jobs. Again the three large countries (France, the UK and Germany) are over-represented.

### Analysis by country

The following are the main representative features of the various countries in our sample of large CMAs:

- France and Germany seem significantly more important within the large mutual benefit societies and associations than in the large cooperatives;
- The United Kingdom and Spain have a balanced presence within the three classifications;
- It is the large cooperatives above all which make up the bulk of employment in the large CMAs in Italy and in the Netherlands, whilst it is the associations which increase representation in Belgium.

The average size of the large CMAs differs significantly according to the country and these differences cannot be explained by the breakdown into CMA classifications:

- the large CMAs in the United Kingdom and the Netherlands on average employ more than 3 000 people, i.e. more than 50 % above the average of 2 000 jobs;
- the large CMAs in Italy, Portugal, Belgium and Luxembourg have less than 1 400 jobs, i.e. 30 % below the average;
- in the other five countries (France, Ireland, Germany, Denmark, Spain), the CMAs are of average size.

### Analysis of the breakdown of the CMAs by sector

Seven sectors of activity account for more than three quarters of the two million jobs of the large CMAs, namely:

- 337 402 jobs in the 146 credit institutions, each of which employs 2 311 people on average;
- 326 070 jobs in the 217 health institutions, which employ an average of 1 503 people;
- 265 124 jobs in the wholesale trade, retail trade or middlemen organisations, where 123 companies account for an average of 2 155 people.

Two other sectors each account for almost 200 000 jobs in our sample:

- other community services;
- insurance companies.

Two activities account for almost 100 000 jobs:

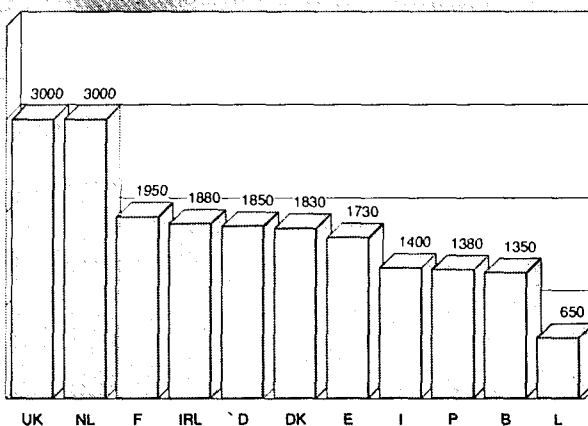
- agriculture and agri-foodstuffs;
- the construction sector.

### h. Descriptions of large groups and large CMAs

Among the 103 groups employing more than 500 people can be found:

- La Caisse Nationale de Crédit Agricole (France) with 73 750 people;
- The Co-operative Wholesale Society Ltd. (UK), comprising banking activities (Co-operative Bank Plc) which made over 3.5 billion £ in 1993 and has 40 200 employees;
- The Groupe des Banques Populaires (France) and its 25 805 jobs;
- Mondragon Corporación cooperativa (Spain), which is a diversified financial and industrial group employing 25 322 people in 1992 compared with 20 113 in 1987;

Figure 14: Average number of jobs per CMA by country



Source: SOFICATRA study

- The British United Provident Association (UK) or BUPA, with 10 000 people working in insurance and health-care;
- The Debeka group (Germany) with 9 000 people working in health insurance;
- Fagor (Spain) which creates 1 200 jobs, reaching a figure of 7 828 employees in 1992 particularly in the manufacture and marketing of domestic appliances;
- Eroski (Spain) with 6 938 people working in the distribution of foodstuffs and non-foodstuffs and which, like FAGOR, belongs to the Mondragon group;
- The Arco group (Belgium) whose banking and insurance activities employ 6 700 people;
- The commercial foodstuffs company, Kerry (Ireland) which started in 1974 from a small dairy cooperative and now, less than 20 years later, employs more than 6 250 people;
- The life assurance group IDUNA (Germany) which employs more than 6 000 people;
- Suiker Unie (Netherlands) whose industrial activities extend from the original sugar activity to include at the present time fruit and vegetables, spices and trade;
- Deutsches Jugendherbergswerk (Germany) where 4 000 people work in the travel sector and youth hostels.

As far as the CMAs themselves are concerned, we count 1 039 with more than 500 people. All of the top 100 CMAs each employ more than 4 000 people and if we had had knowledge about the groups in all these cases, we would certainly have counted even more jobs. The following can be quoted as among the large CMAs:

- the Rabobankorganisatie (Netherlands) which has created more than 6 000 jobs in 5 years, now has more than 36,000 and is continuing to expand in most of the large European countries;
- the commercial Co-operative FDB (Denmark) which owns different shop signs (Irma, Fakta, Merlin, Mac Coy) and employs almost 14 000 people. Its magazine, Samvirke, has 780 000 subscribers;
- the Konsumgenossenschaft Dortmund-Kassel (Germany) which basically markets foodstuffs and employs almost 12 000 people;

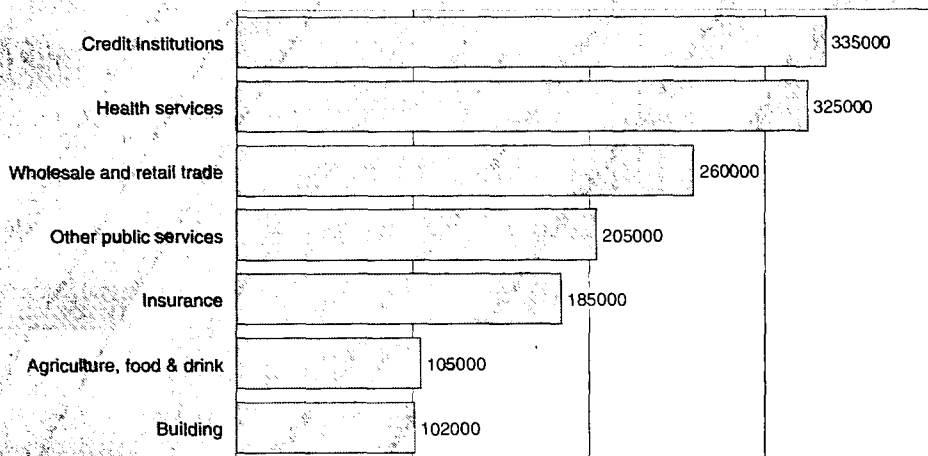
**Table 3: Ranking of the largest CMA groups according to employment**

Rank	Employment	Name	CMA	Country
1	73750	Caisse Nationale du Credit Agricole	1	F
2	57160	Gruppe Arbeiterwohlfahrt	3	D
3	40200	Group Cooperative Wholesale Society ltd	1	UK
4	25802	Groupe des Banques Populaires	1	F
5	25322	Mondragon Corporacion Cooperativa	1	E
6	17996	Norwich Union Insurance Group	2	UK
7	14065	Groupe Nationwide Building Society	2	UK
8	13905	Groupe FDB	1	DK
9	12500	Irish Dairy Board Co-operative	1	IRL
10	12350	Groupe Groupama	2	F
11	11576	Gruppe Colonia Konzern a.g.	2	D
12	9767	Group British United Provident Association	3	UK
13	8972	Gruppe Debeka	2	D
14	8078	Groupe Sistema Mapfre	2	E
15	7828	Fagor Oficinas Centrales, scl	1	E
16	6938	Grupo Eroski	1	E
17	6700	Groupe Arco	1	B
18	6679	Groupe Caisse Federale du Credit Mutuel Centre Est Europe	1	F
19	6400	Gruppe Gothaer Konzern	2	D
20	6100	Gruppe Iduna	2	D
21	5814	Groupe GMF	2	F
22	5364	Gruppe Huk Coburg Versicherung	2	D
23	5361	Gruppe Württembergische Versicherung	2	D
24	5000	Groupe les Mutuelles du Mans Assurances	2	F
25	4532	Group Scottish Widows Fund and Life Assurance	2	UK
26	4437	Gruppe Cooperatie Suiker	1	NL
27	4228	Avonmore Creameries ltd	1	IRL
28	4061	Gruppe HDI	2	D
29	4025	Gruppe Alte Leipziger ag	2	D
30	4000	Gruppe Deutsches Jugendherbergswerk Gesamtverband	3	D
31	3823	Groupe Compagnie Laitiere Europeenne	1	B
32	3746	Groupe Cana	1	F
33	3504	Groupe Cooperatie Avero	1	NL
34	3165	Groupe Coop Alsace	1	F
35	3151	Groupe Unicopa	1	F
36	3000	Groupe A.N.P.F.	1	F
37	2873	Groupe Limagrain	1	F
38	2806	Groupe Caixa Central de Credito Agricola Mutuo	1	P
39	2800	Centrale Coopérative Agricole Bretonne	1	F
40	2557	Gruppe DEVK Konzern	2	D
41	2528	Gruppo Coop Toscana Lazio	1	I
42	2368	Group Scottish Amicable Life Assurance Society	2	UK
43	2300	Groupe Intersport la Hutte	1	F
44	2200	Mouvement Pact Arim pour l'Amelioration de l'Habitat	3	F
45	2079	Gruppo Coop Estense	1	I
46	2048	Groupe Interpolis	2	NL
47	2022	Gruppe LVM Konzern	2	D
48	1973	Gruppe Vereinigte Haftpflichtversicherung	2	D
49	1901	Gruppo C.M.C	1	I
50	1794	Group DAT-Schaub	1	DK

Source: SOFICATRA study

- the Schleswig Holstein commercial co-operative (Germany) has created more than 2 500 jobs in five years to give a total of 7 000 in 1992;
- Saracoop EG Pharmazeutische (Germany) whose wholesale and retail trade in pharmaceutical products employs more than 6 000 people in Germany;
- MD Foods Amba (Denmark) which exports more than half of its dairy products and employs 5 684 people;
- Vestjyske Slagterier (Denmark) which employs 5 777 people in its abattoirs and on its production lines;
- CEBECO Handelsraad (Netherlands) employs 5 500 people in the agri-foodstuffs sector (chemicals, garden products, fruit and vegetables, meat and eggs, etc.);
- Anchor Housing Association (UK) with 5 000 employees engaged in helping elderly persons to find accommodation and to look after themselves;
- Avonmore Foods (Ireland) employs 4 228 people in order to produce and market dairy products;
- Halifax (UK), the largest building society in the world with 5.5 million members and which is in the process of becoming a mutual insurance company;
- Groupama (France), the leading major French mutual insurance company specialising in agricultural insurance and reinsurance;
- Remploy Ltd. established after the Second World War to provide work for the disabled and the Association des Para-

Figure 15: Number of jobs in the largest CMAs



Source: SOFICATRA study

lysés de France which is the largest French association after the Red Cross;

- John Lewis Partnership Plc, which is a chain of department stores belonging to its employees;
- The MGEN (Mutuelle Générale de l'Education Nationale) which is the leading provident mutual association in France;
- Organisations such as the Max Planck Gesellschaft, the Fraunhofer Gesellschaft, the Marie Curie Memorial Foundation, which are active in the sphere of scientific research.

i. Main conclusions

After consulting 534 federations and various data bases, we sent out 5 314 questionnaires. We received over 2 000 replies, including 950 questionnaires which had been completed over several years.

This self-proclaimed survey of Cooperatives, Mutual Benefit Societies and Associations which decided to reply voluntarily to our call means we are able to draw four main conclusions:

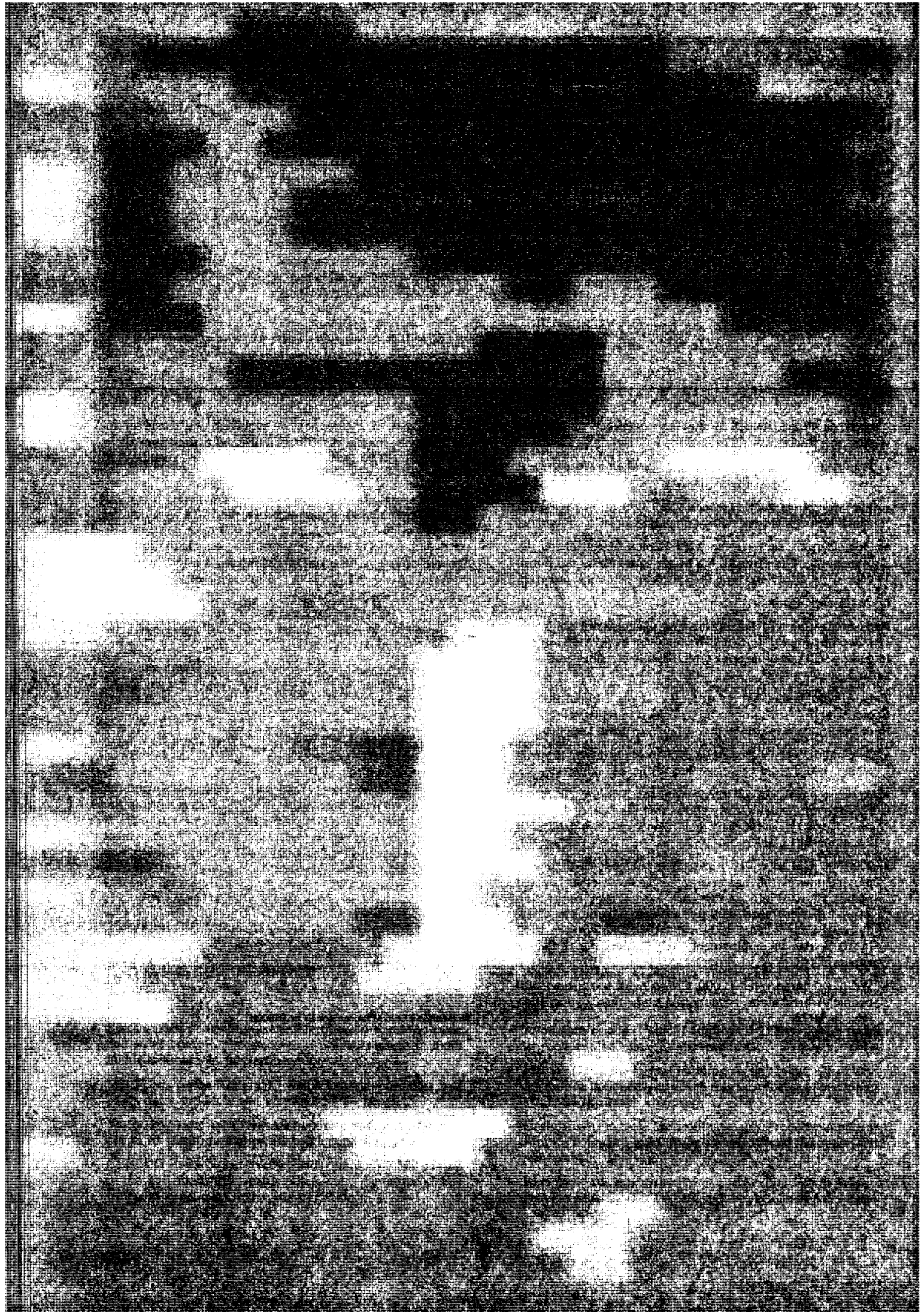
- Two out of every three CMAs declare development projects which, in 80 % of the cases are in the EU countries;
- At least one CMA in three expresses a future financing requirement, which clearly shows that the lack of financial resources is one of the main factors slowing down expansion for numerous CMAs;
- The 600 CMAs which indicate an increase in their employment over the last five years have together created almost 120 000 jobs. In fact, this is equivalent to creating an average net figure of 30 000 jobs per annum. The CMA dynamic sample had 1 800 jobs in 1988 and 2 000 in 1992 (a 10 % rise in employment over 5 years, i.e. 2 % per annum);
- We have found over 1 000 CMAs with more than 500 people, which alone account for more than two million jobs in 1992.

On the basis of the replies we received, the world of the cooperatives, mutual benefit societies and associations therefore seems particularly dynamic in terms of expanding activities and creating employment.

By extrapolating from the results obtained, it is easy to imagine the inherent capacity for growth that the CMAs yet conceal, since the majority indicate that they still have numerous development projects which they would be unable to implement because of a lack of financial resources.

Written by: SOFICATRA, on behalf of DGXXIII





## SMEs and employment

### INTRODUCTION

For the last few years, Member States of the European Union have been expressing serious concern about the weak performances of the European economy. On the request of the Copenhagen European Council, the European Commission presented a White Paper on Growth, Competitiveness and Employment in 1993. The White Paper marked a turning point in the preparations of concerted action towards employment creation within the EU. The Commission has recommended the setting of a target to create 15 million jobs by the year 2000 to be able to halve the actual level of unemployment. In order to achieve this, a huge increase in economic growth is essential. However, that growth has to be accompanied by a high rate of employment intensity. Global competitiveness plays a crucial role in achieving such sustainable job-creating growth. The White Paper proposes a number of measures to be taken by the Community and the Member States to improve the economic environment for European enterprises and by doing so, increase their competitiveness.

Much attention has been given to the job-creating capacity of small and medium-sized enterprises (SMEs). A great number of international surveys and analyses on this phenomenon have been carried out by different institutions. Some argue that SMEs are the greatest potential job creators, whilst others question the sustainability of the jobs created because of the relatively low survival rate of new firms.

The purpose of this article is to provide an overall view of the relationship between SMEs and employment creation and the measures proposed and taken by the Community and Mem-

ber States. Firstly, the situation of employment in Europe will be described. Secondly, a brief outline of SME characteristics will be presented. Then we will examine the role played by SMEs in employment creation. Finally, we will conclude by looking at the measures proposed and taken by both the Member States and the European Union in the field of SME policy.

The information, in particular the statistical material, used in this article was mainly drawn from the following sources:

- The Third Report (volume 1 & 2) of Enterprises in Europe compiled by Eurostat (1994);
- The Second and Third Annual Report of the European Observatory for SMEs compiled by the European Network for SME Research (ENSR) (1994/1995);
- Employment in Europe 1994 compiled by the European Commission.

### EMPLOYMENT IN EUROPE

#### A high level of unemployment in the European Union

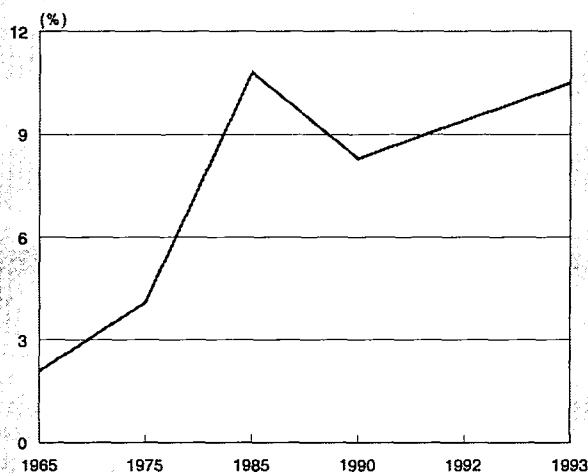
The most pertinent observation that can be made with reference to the employment situation in the European Union is the high level of unemployment across all Member States, particularly when compared with the Union's principal competitors.

Unemployment in the Union stood at 2.1 % in 1965. Since that time it rose consistently to a level of 10.8 % in 1985. Despite a considerable decrease in unemployment toward the end of the 1980s, unemployment has risen once more in the 1990s. The Union rate of unemployment increased from 8.3 % in 1991 to 11.2 % in 1994 (see Figure 1). Unemployment has also risen in Japan since 1990, but at a much lower rate than in the Union (2.5 %) due to Japanese companies' practice of job preservation. The rates of unemployment in the US and Japan in 1994 were respectively 6.1 % and 3.1 %.

#### Europe's employment rate now stands at less than 60 %

When considering the employment performance of an economy, the employment rate, (defined as the proportion of the population of working age in work), rather than the unemployment rate, often provides a more accurate reflection. A plurality of definitions exist for unemployment, itself a rather imprecise concept, such that a single accurate and comparable rate is practically impossible to find. For example, in the Union Labour Force Survey in 1992 the number of unemployed stood at 13 million whilst only 78 % of these people were actually registered as unemployed in the Member States. Comparisons of the employment rates indicate that Union performance on employment has not even come close to that of the US or Japan. The rate of employment in Europe has declined steadily since 1960 and is now less than 60 % of the population of working age, in sharp contrast to the US where

Figure 1: Community unemployment rate



Source: Employment in Europe

**Table 1: Breakdown of the change in employment according to size class in EUR16**

(%)	1988-1990	1990-1993	1993-1995	1988-1995
Micro	3.75	-0.5	-0.25	0.75
Small	1.75	-1	-0.25	0
Medium	1.25	-1.75	0	-0.5
Large	0.75	-1.75	0.25	-0.5

Source: European Observatory, Third Annual Report, 1995

it has steadily increased and now stands at over 70 %. The employment rate in Japan has remained stable in the 1990s despite poor output growth and equally exceeds 70 %. As for the EFTA countries, despite a higher rate of decrease in employment during the recession compared to the Union, the employment rate as a percentage of working age population remains significantly higher at 68 %.

**Low level of labour force participation of people of working age**

The European Union also differs from its main competitors with regard to the prospects for new entrants into the employment market - especially young people and women. Actual unemployment of young people stands (under 20 years old) at over 20 %, i.e. on average twice as high as that of adults (see Figure 2), in the EU compared to 13 % in the US and only 5 % in Japan. However, the situation confronting the Union is not only the high level of unemployment, but also the low level of labour force participation of people of working age, especially young people. Since 1960 the proportion of young people in or seeking employment has fallen sharply from 55 % to 30 % in the Union. The same trend, only to a greater extent, was observed in Japan, over the same period falling from 50 % to 20 %, but there has been little overall change in the US with the figure remaining around 40 % due to a higher participation of young women compensating for a lower participation of young men.

In May 1994 the Union unemployment rate of women stood at 13 % as compared to 10 % for men and is continuing to increase faster than that of men (see Figure 3). From 1960 to 1992 the rate of women's participation in the workforce increased from 30 % to just over 40 % only. In the US and Japan more equitable distribution of labour force growth has

been achieved between men and women. The participation of older people has also changed significantly in Europe in contrast to the US and Japan. In the Union there has been a substantial drop in the number of men over 65 remaining in the workforce compared to only a small decrease in the US and no change in Japan. Long term unemployment as a percentage of total unemployment reaches over 40 % in the EU as against 11 % in the US.

**Job creation performance of the European Union**

Between 1960 and 1990 for every 1 % rise in GNP in the EU employment growth of 0.12 % was achieved in contrast to the US, Canada and Australia where employment growth of between 0.56 % and 0.59 % was attained. In the Union the employment rate has followed the same path as the rate of growth of GDP - increases or decreases in GDP engendering respectively increases or decreases in employment. In the US the same general trend can be observed, but with larger fluctuations. There, the gap between output growth and employment growth has remained constantly smaller than in Europe enabling the US to sustain significant increases in employment for a given rate of GDP growth. However, if we look at Japan, a country that has experienced an even sharper overall drop in output growth than in the Union, employment numbers have continued to rise.

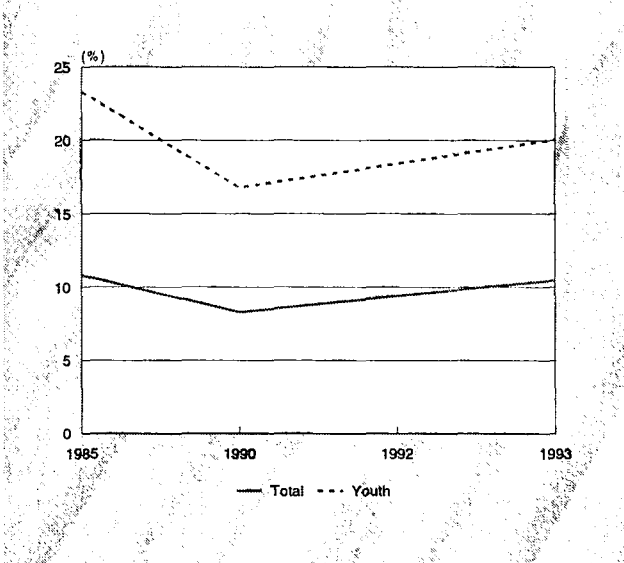
According to the European Commission the EU has failed to match Japanese increases in employment due to differences in the way that the given volume of employment is spread across the number of jobs and hours of work. Japan has attained a higher rate of employment through a narrower scale of distribution of revenues than the EU. It should be noted however, that the US has, in contrast, experienced a widening of the gap in the distribution of revenue through an increase in employment.

In general terms of employment growth the evidence clearly indicates that it is the same sector namely, services, in the Union, the EFTA countries, Japan and the US that has contributed the most to employment growth (see Figure 4). It should be noted that as SMEs account for much of the employment in the service sector in the Union the perception of SMEs as job creators is reinforced by this evidence.

**Decline in the Union's international competitiveness**

The high level of unemployment in the European Union is perceived as both the cause and result of the overall decline in the Union's international competitiveness. In national currency terms, there has been increase in Union nominal unit labour costs of nearly 7.5 % from 1970 to 1991. By contrast, the US has undergone a 4 % rise and Japan only 3 %. In addition, there are considerable differences between the Union, Japan and the US as regards employees' contributions and taxes on wages. In the Union these two charges together amounted to 20 % of labour costs in 1991, but in both the US and Japan they averaged only 10 to 15 %. Social security contributions are heavier on low incomes in eight of the Member States.

**Figure 2: Community unemployment rate - Total vs. Youth**



Source: Employment in Europe





**Table 2: Principal Member State actions in SME policy**

**Belgique/België**

- \* Introduction of a 'SME Barometer' to promote discussion on and generate ideas for SME policy.
- \* Increase in the availability and the amount of 'Overdracht Fonds' which facilitate enterprise transfer.
- \* Social security reforms e.g. reductions in employers' contributions.

**Danmark**

- \* Fiscal policy reforms - increase in public investment and tax reforms.
- \* Legislation on a state guarantee system available to private Development Companies (Udviklingselskaber) investing in promising SMEs.
- \* Introduction of a 'rebate card' offering start-up grants and advice to entrepreneurs.

**BR Deutschland**

- \* New legislation (Standortsicherungsgesetz) for SMEs allowing a reduction in corporate tax on profits.
- \* Reduction in income tax on business earnings and a provision for inheritance tax allowance.
- \* '30-Points-Programme' set up to consider the recommendations of the White Paper and to relaunch the 'Eigenkapitalhilfe Programm' to support start-ups.

**Hellas**

- \* Privatisation, tax and competition policy reform.
- \* Establishment of regional institutes providing support for medium-sized enterprises.

**España**

- \* Reform of the 'Reciprocal Guarantee System' to reduce the cost of guarantees.
- \* Introduction of subsidised loans available for investment purposes.
- \* Setting up of a 'Joint Venture Capital fund' by the 'Instituto de Crédito Oficial' for start-up firms.
- \* Easier SME access to the stock exchange, fiscal incentives and labour market reforms to increase flexibility.

**France**

- \* 'Plan Madelin' aimed at improving the economic environment of SMEs through fiscal reforms, easier access to credit, competition law reforms, easing of the burden of administrative procedures, promotion of inter-enterprise co-operation.
- \* Guarantee fund available to SMEs for investment purposes.

**Ireland**

- \* Network of 'County Enterprise Boards' established to support SMEs.
- \* Further development of the 'Business Expansion Scheme' to include tax relief on corporate gains.
- \* Introduction of a 'Seed Capital Scheme' to indirectly support start-ups with income tax advantages for entrepreneurs.

**Italia**

- \* Launch of 'Interventi per l'innovazione e lo sviluppo delle piccole imprese' with tax allowances and direct subsidies for SMEs. The eight sub-programmes of this scheme provide support for SMEs in such areas as R&D, loan guarantees etc.

**Nederland**

- \* Creation of a plan 'Meer werk, weer werk' to improve market flexibility.
- \* Improved access to subsidies for R&D costs.
- \* Development of apprenticeship schemes.
- \* Current investigation into the potential for easing taxation on SMEs.

**Portugal**

- \* 'Intercalary Programme' to facilitate SME access to finance, improve efficiency and foster growth.
- \* 'PEDIP II programme' - incorporates numerous aid measures for SMEs.
- \* Variety of support programmes to promote export and international trade.
- \* 'FRIE fund' to promote equity participation.

**United Kingdom**

- \* Establishment of 'Business Links' to foster co-operation and improve competitiveness.
- \* Improvement of 'The Small Enterprises Loan Guarantee Scheme' with an increase in the amount of loan available.
- \* Introduction of the 'Enterprises Investment Scheme' to improve access to equity funding.
- \* Provision for tax relief for those investing in unquoted companies.
- \* Creation of the 'Uniform Business Rate' which involves a reduction in the tax and social burden of SMEs.

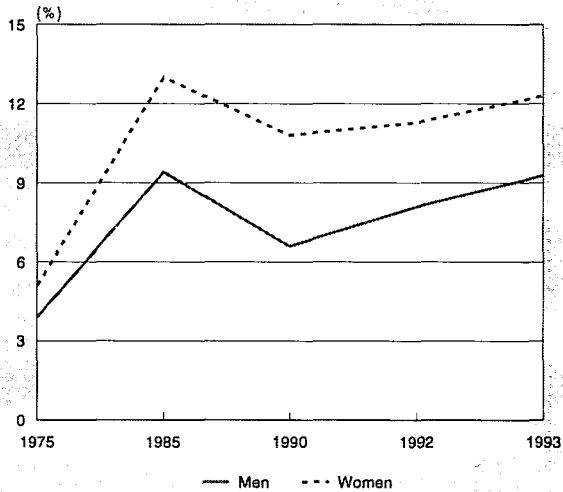
Source: Author

**European Commission target of creating 15 million jobs**

Just to keep Union unemployment stable an annual rate of increase of 0.5 % in employment is needed to compensate for the predicted 0.3 % rise in population of working age and estimated 0.7 % increase in participation. This implies that 5 million jobs will have to be created between now and

the year 2000 just to prevent any increase in unemployment. In order to attain the European Commission target of creating 15 million jobs between 1995 and 2000 to halve the level of unemployment a constant annual rise in employment of 2 % will be required. Certainly an ambitious target as it means outperforming the US economy between 1974 and 1990 when an average annual increase of 1.9 % was recorded. It is en-

**Figure 3: Community unemployment rate - Men vs. Women**



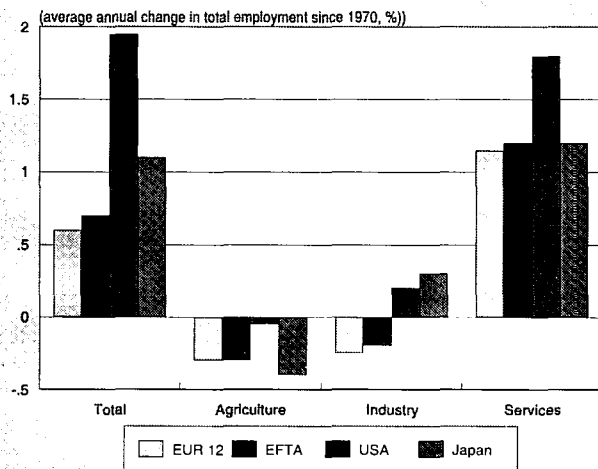
Source: *Employment in Europe*

visaged that this target increase in employment can be achieved if the Union is capable of combining a sustained annual economic growth rate of 3 % with an increase in the employment intensity of growth of at least 0.5 %.

#### The economic prospects of the Union have improved in 1994

The economic prospects of the Union have improved in 1994. In May 1995 the Commission forecast economic growth rates of 3.1 % for 1995 and 2.9 % for 1996 for the 15 Member States. This, however, does not in itself guarantee the targeted increase in employment. It is further predicted that employment will stabilise in 1995 at 18 million unemployed (or 11.6 % of the active population). Economic and social policies must be geared towards the long term in order to restore public

**Figure 4: Sector contribution to employment growth, 1970 to 1991**



Source: *Employment in Europe*

confidence and create jobs. There is a danger that, in the absence of new structural measures for employment creation, economic growth will not translate into higher employment, but will only offset productivity gains. These challenges must largely be taken up by the Member States although the European Union can, and indeed, must play a role.

#### SMEs ON THE THRESHOLD OF THE NINETIES

##### Diverging definitions for SMEs pose the risk of incoherence

The recognition of the importance of the SMEs has been stressed by the creation of a great number of actions in favour of SMEs, at Community as well as at national level. These actions use different definitions based on different criteria such as employment, turnover, balance sheet total and the degree of financial autonomy. The maximum number of employees, for instance, falls within a range of 50 to 500. These differences can cause incoherence between community and national policies. In order to minimise the risk of incoherence, the Commission is preparing, on the request of the 'Research' Council of 29 September 1994, a recommendation to Member States and a decision preparing a single definition for SMEs. This recommendation would set the employment threshold of the definition at 250 employees.

For the purposes of this article, the definition used until now by Eurostat and the European Observatory will be applied, unless otherwise specified. Therefore, the enterprises referred to in this article - all private enterprises except those in agriculture, hunting, forestry and fishing - will be divided in the following categories:

- micro-enterprises: less than 10 employees;
- small enterprises: between 10 and 99 employees;
- medium-sized enterprises: between 99 and 499 employees;
- large enterprises: more than 500 employees.

Where necessary a more detailed subdivision will be used.

##### SMEs outnumber large enterprises in number of enterprises and employment

There are about 15 million enterprises in the Community, employing 92 million people. SMEs account for 99.9 % of the total number of enterprises and almost 80 % of the employment. The share of micro enterprises outnumbers all others in both number and employment terms: 93.3 % of all enterprises are micro providing 31.8 % of total employment. Small enterprises account for 6.2 % of the total number of enterprises and have a share in employment of 24.9 %. Medium-sized enterprises are the least numerous of the SMEs: 0.5 % generating 15.1 % of the total employment. The large enterprises, however, show a relatively large share in employment: 28.1 % provided by only 0.1 % of the total number of enterprises in the twelve Member States (see Figures 5 and 6).

##### No positive correlation between the share in total number of enterprises and total turnover

When comparing the share in turnover by enterprise size, the most striking observation that can be made is that there is no apparent positive correlation between the share in the total number of enterprises and the share in total turnover. It can be derived from Figure 5 that a significant number of micro enterprises account for only 23.4 % of total turnover, whereas a very small number of large enterprises generate a share of 30.6 % in total turnover. It also becomes clear that medium-sized enterprises outperform micro and small enterprises, considering that one fifth of total turnover is generated by only half a percent of all enterprises (see Figure 5).

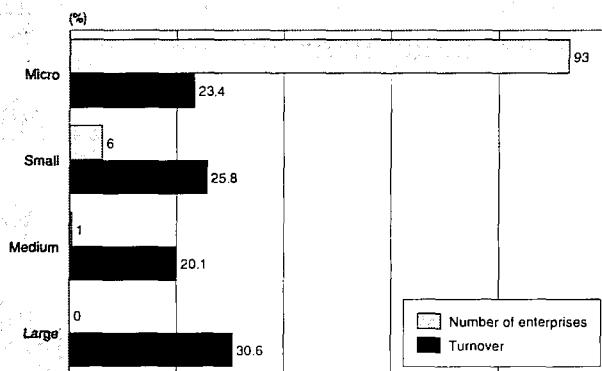
## SMEs highly represented in a large number of sectors

As mentioned before, the majority of employment growth during the period of 1970 to 1991, occurred in the service sector. In order to estimate the effects on SMEs caused by growth or decline of the different sectors, one has to examine the share of SME dominance within these sectors. In nearly all sectors, the majority of the enterprises are SMEs. There is, however, a significant dominance of either SMEs or large enterprises in certain sectors. Figure 7 shows the dominance of micro enterprises in the retail distribution and personal services sectors. Micro and small enterprises together represent a dominant position in the construction and wholesale sectors. The extraction and manufacturing sectors, together with the transport and communication sectors, can be described as large enterprise dominant sectors. This dominance is mainly due to very large-scale activities. Although the producer services sector (that is, services not particularly oriented towards the general public, but towards businesses, such as communication, supporting services to transport, R&D and so on) is dominated by large enterprises, micro enterprises account for a relatively large part of that sector.

## Enterprise sizes differ remarkably among Member States

The average enterprise in the Community employs 6 persons (including the entrepreneur). However, there are remarkably big differences in enterprise size among individual Member States. Enterprises in the southern countries are generally smaller than the ones in the northern states. This can partly be explained by the effects of per capita GDP and population density. The average enterprise size is positively correlated to per capita GDP. The reason for this could be the fact that higher GDP leads to an increase of demand and thus of the enterprise size. Figure 8 shows that, generally speaking, countries with a relatively high per capita GDP (e.g. Germany, Luxembourg and The Netherlands) have a higher average enterprise size. There is also a positive relation between population density and enterprise size. Especially in the distribution and personal services sectors, a high population density (e.g. in Denmark, Luxembourg and The Netherlands) causes an increase of the local demand and thus of the size of enterprises providing services within a certain area.

**Figure 5: Breakdown of number of enterprises and turnover according to size class, EUR 12, 1990**



Source: Eurostat/EIM

## EU is more oriented towards SMEs than the USA, Japan and EFTA countries

In order to make a comparison between the European Union, the United States and Japan, size-class 0 (self-employed category) has to be omitted. This omission will of course mean that the data shown here below (see also Figures 9 and 10), will diverge from that already shown above. The share of enterprises in the size-class 1-10 employees, is 84.7 % in the former twelve Member States as opposed to 77.1 % in the US. This size-class accounts for respectively 24.3 % and 12 % of the share in employment. The share of small firms is 14.1 % in the Community and 20.5 % in the US, accounting for respectively 27.8 % and 26.9 % of employment. No remarkable differences were found in the medium size-class: 1 % of Community firms belong to that band against 1.7 % of the US enterprises. Their share in employment differs not so much either: respectively 16.5 % and 14.5 %. Both the Community and the US show the largest share of employment in large enterprises: the 0.2 % and 0.7 % share of enterprises provide respectively 31.4 % and 46.6 % of the jobs. The average enterprise size in the former twelve Member States is 12.3 employees (double the aforementioned size, due to the exclusion of the self-employed category) and 18.4 employees in the US.

Although there is a lack of comparative material for Japan, it is still possible to depict an overall structure of its size distribution. Like the US, Japan shows an emphasis on medium and large sized companies (see Figure 11). Japanese micro enterprises account for 70.4 % of the total number of enterprises which is a relatively small share compared to the Community and even to the US. The 12.8 % share of Japanese enterprises with 20 to 99 employees, however, outnumbers both the US 9.3 % and the European 12.5 %.

The 1988 statistics show that 98 % of the total number of half a million enterprises in the EFTA countries (excluding Switzerland) are SMEs, which is significantly less than the 99.9 % of the twelve Member States of the Community. The average firm size in the non-primary private sector is 12 employees which is twice the Community average. This can partly be explained by a higher level of labour costs and per capita income in the EFTA countries. It becomes clear that the EFTA countries are less oriented towards micro and small enterprises than the Community. Only 43 % of employment is generated by micro and small enterprises as against 55 % for the Community. The share in employment of medium sized enterprises shows no significant difference, whereas the large firms in the EFTA countries account for a relatively large share in employment.

## THE ROLE OF SMEs IN EMPLOYMENT CREATION

### Controversy about the job creating capacity of SMEs

The net job creation potential of SMEs has prompted much controversy both at EU and international level. Recently, their contribution to employment has been questioned. This has resulted in the production of a number of studies. One of the first initiators of the debate was Birch (1979), who stated that during the period 1969 - 1976 in the US, firms with less than 100 employees accounted for 82 per cent of job creation. As concluded in Employment in Europe, small firms do account for many of the new jobs created, but due to the lack of reliable and consistent data, it is difficult to quantify their importance in employment growth. Therefore, it is necessary to recognise that SME research is faced with a number of data deficiencies, which may lead to misinterpretation and inaccurate depiction of the role they play in employment creation.

### Statistical data on SMEs are often unavailable and incomparable

The issue of diverging definitions of SMEs in both Member States and the EU has already been discussed in part 2 above. SMEs are also faced with the disadvantage of the availability of data which varies between Member States. Although most of the official data is received from the national statistical institutes, there are occasions when missing information must be estimated or obtained from other data sources. Data can also differ in the nature of population and sector coverage, the reference years and methods of computation.

### Widespread criticism of the studies conducted by Birch

As mentioned above the first studies conducted on employment change were performed by Birch in 1979, exploiting data collected by the American credit rating company Dun and Bradstreet. His headline statement, claiming that more than two-thirds of all jobs created between 1969 and 1976 in the United States came from firms employing less than 20 persons, was widely scrutinised and subsequently widely criticised. The main criticisms levelled at Birch's work were as follows. Firstly, it was argued that Birch's use of net job change as a measure of employment change was inappropriate, gross new job creation (i.e. the number of jobs created and excluding the number of jobs lost) provides a more accurate picture. Secondly, there was some confusion as to whether his data was based on establishments and enterprises rather than enterprises alone. A third criticism was made by Armington and Odle in 1982 who found that due to the numerous assumptions made by Birch in his research they were unable to replicate his results. Finally, it was alleged that the data supplied by Dun and Bradstreet was not sufficiently "clean" for the analytical purposes to which they were put as, for example, firms remained on the data base even after they had ceased trading.

### More careful analyses in US and UK produce more reliable results

In order to address these criticisms levelled against Birch and in an attempt to produce more reliable results the US Small Business Administration conducted an extensive rework of the Dun and Bradstreet data. Their results showed that between 1976 and 1988 American small firms employing less than 20 persons accounted for 19.4 % of total employment and approximately 37 % of net employment change. Although this figure is well removed from Birch's figure of 82 %, this

undoubtedly reflects the more careful analysis over time conducted by the Administration.

The Administration further concluded that small firms contribute more to job creation than large firms when the rate of new job change is lower and, conversely, large firms perform better than their smaller counterparts when the rate of new job change is higher. This would therefore suggest that small firms are more consistent creators of employment irrespective of the prevailing macroeconomic conditions, whereas large firms respond essentially only to fluctuations in the economy.

We can draw some broad comparisons between the Administration's results and the situation in the United Kingdom thanks to a further analysis undertaken by Colin Gallagher et al., using the Dun and Bradstreet files. UK data and the same methodology as the Small Business Administration. Gallagher and his colleagues noted broadly similar results in the UK, with 54 % of the increase in employment between 1987 and 1989 generated by firms with less than twenty employees who accounted for 32 % of base year employment. This supports the conclusion that small firms provide a disproportionately high share of new job creation.

### Employment growth in Community SMEs

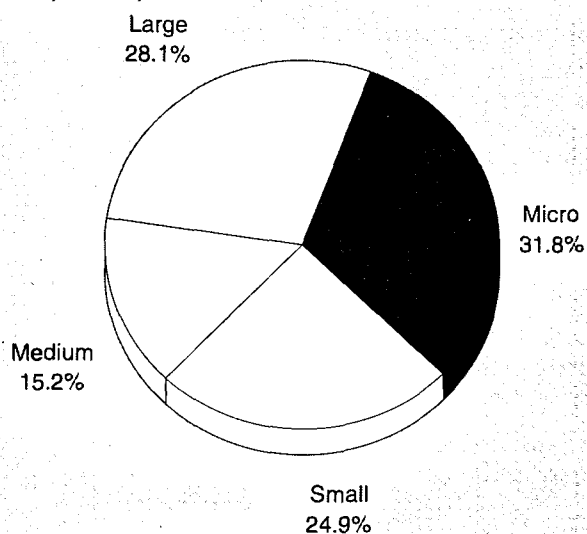
The European Observatory in its Third Report also noted positive results with regard to employment growth in Community SMEs from 1988 and 1995. During this period SMEs experienced an average annual increase in employment of 0.25 %, whereas LSEs displayed an average annual decrease in employment of 0.5 %. The data used for these conclusions has been drawn from Enterprises in Europe. By merging existing data, estimations could be made in order to fill the lack of material for some countries. The Observatory also uses the 'SME in Europe Accounting Scheme' which derives the development of employment by size-class from turnover developments and from wages and prices.

### David Storey concludes that small firms are more consistent job creators than large firms

In "Understanding the Small Business Sector" (1994) Storey concluded that small firms in both the US and the UK created jobs faster than large firms in the 1980s, and furthermore, that small firms are more consistent job creators than large firms because they are less affected by macroeconomic factors. However, he did stress that these affirmations were subject to several provisos. Firstly, the research that generated these conclusions was not wholly "clean". The data used for the first half of the 1980s lacked precision and were subject to political bias. It was only towards the end of the decade that reliable data became available. Secondly, although small firms have in the past proved to be significant job creators it would be entirely inappropriate to direct resources away from large firms and concentrate solely on their smaller counterparts. This argument is reinforced by the observation that, due to the extensive practice of outsourcing by large firms in the 1980s, SMEs cannot be always considered as independent motors for employment growth. Moreover, it is important to recognise that job creation in SMEs is often the result of productivity gains (often realised at the expense of employment) in large firms which through economic growth engender employment growth for SMEs in the service sector. As this is a natural process no policy implications are presented.

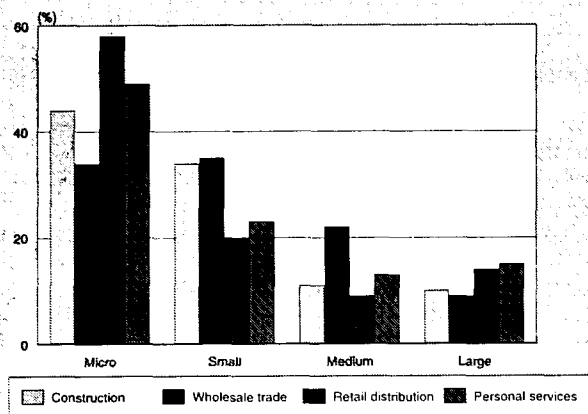
Throughout the 1980s so much attention was placed on quantifying the job creation potential of SMEs to the extent that the issue of the quality of the jobs created fell into obscurity. The research undertaken indicates that certain elements of jobs created in SMEs are less attractive in comparison with large firms. For example, wages tend to be lower, fringe benefits are less frequently offered and training is provided less often. However, it is important to note that, in certain areas, the quality of jobs provided by SMEs can be considered as higher than those provided by large firms as the individual

Figure 6: Breakdown of employment according to size class, EUR 12, 1990



Source: Enterprises in Europe

**Figure 7: Breakdown of employment according to size class and SME dominated sector, EUR 12, 1990**



Source: ENSR

employee of an SME may have wider responsibilities than in a large firm. Moreover, SMEs tend to be less unionised than large firms and there is often more workplace harmony and higher job satisfaction.

"The small firm sector is seen to be the way in which the local economy can create its own employment by pulling itself up by its own boot-straps"

Returning to the observation made by the US Small Business Administration that small firms are more consistent job creators than their larger counterparts who are more susceptible to fluctuations in the economy, we can find an explanation of this phenomenon in "Understanding the Small Business Sector". Storey states that "where major job shedding takes place, the small firm sector is seen to be the way in which the local economy can create its own employment by pulling

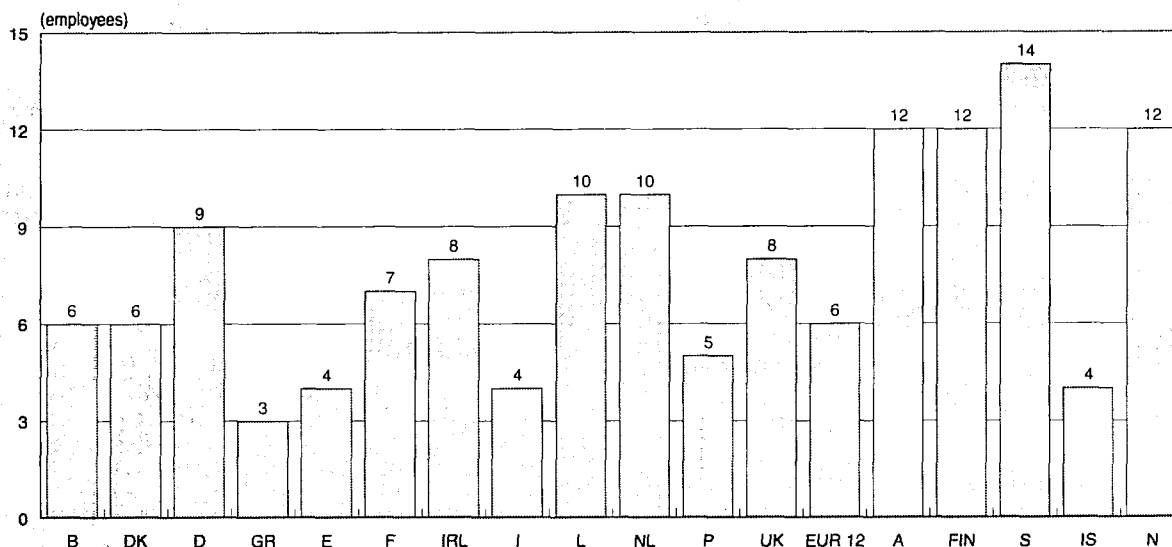
itself up by its own boot-straps". He notes that when a large employer shuts down redundant workers turn to the small firm sector for employment. The former unskilled workers turn to self-employed work as taxi-drivers, window cleaners, etc. and the skilled workers, computer experts, draughtsmen, etc., often set up independently in their own fields.

**Upward trend in the employment share of SMEs**

The European Observatory for SMEs in its Second Report advanced a number of arguments to explain the upward trend in the employment share of SMEs. Firstly, they point to the increasingly important role played by innovation in the 1980s and 1990s. SMEs have during this period benefited immensely from the process of innovation in infant industries, a sector that they dominate. The availability of new computerised technology engendered the creation of new SMEs. A second factor highlighted is the change in consumer taste experienced since the 1970s. Consumers have demonstrated an increased demand for specialised products as opposed to mass produced goods. SMEs can respond with greater flexibility to rapidly changing consumer preferences and ever shorter product life-cycles than larger capital intensive firms. It should be noted at this point that the increase in SME job creation may reflect the structural shift of employment from goods to services. The fast growing service sector creates more jobs in SMEs in particular due to their dominance in that sector (see Figure 7). A third argument presented in the Observatory concerns government SME policies, whereby government intervention in recent years to redress the perceived discrimination against smaller enterprises has brought more flexibility for SMEs through an easing of taxation and social obligations. Furthermore, it is maintained that the post-war baby-boom may well have led to the creation of new enterprises due to the associated increase in the labour supply accompanied by a stagnation in the growth of real wages.

Finally, it should be remembered that in any consideration of the job creation potential of SMEs, or of any size of firm for that matter, that it is not simply about the amount of jobs created or even the quality of those jobs created. To ensure that job creation ultimately leads to a reduction in unemployment, the jobs created must be capable of being filled by the unemployed.

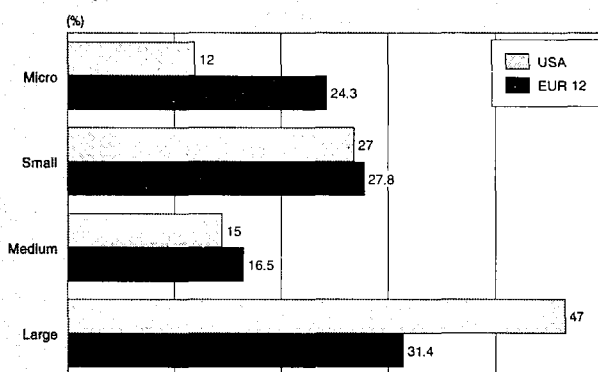
**Figure 8: Average enterprise size, 1990**



Source: ENSR



**Figure 9: Breakdown of employment according to size class, 1990**



Source: *Enterprises in Europe*

### The size distribution fallacy

As reported in *Employment Outlook* (OECD, 1994) a number of statistical biases tend to distort the contribution of firms, whether they be large or small, to job creation. One of the statistical problems is the size distribution fallacy. This issue is described in the study "Gross job flows in US. Manufacturing" (1994) by Davis, Haltiwanger and Schuh (henceforth Davis et al.). They examined the manufacturing employment changes in the US during the period 1972 - 1988. A distortion of the picture on sources of net growth is caused by the fact that as firms grow or decline they cross size boundaries. For instance, if an enterprise that employs 450 persons expands such that it takes on a further 100 employees it crosses the boundary from the medium size category to large size category. As a result, the LSE sector will gain 550 jobs with a new large sized enterprise, whereas the SME sector will have a loss of 450 jobs. Regardless of the fact that the overall net job gain is 100, such shifts distort the indication of whether job creation occurs through SMEs or larger firms. Davis et al. note that, especially during periods of sustained economic growth, upsizing of small firms into large ones is a common phenomenon. Conversely, during periods of slow employment growth, downsizing of large firms into small ones is likely to occur quite often, creating the appearance of a booming small-firm sector.

At this juncture it should be noted that some recent studies have shown that the work of Davis et al., while theoretically correct, may have overstated the effect of the size distribution fallacy. In his study "Small enterprises as job creators - Myth or Fact?", Davidsson shows that less than two out of one hundred enterprises in Sweden actually appear to cross size boundaries, which implies that the size distribution fallacy would only account for an error margin of 2 % in Swedish enterprises and thus be empirically virtually irrelevant. Unlike Davis et al., Davidsson included the smallest enterprises of the band of 1 to 4 employees. This allows a more precise view on job creation by SMEs, taking into account the importance of micro enterprises in the Community. Furthermore, a Canadian study on the manufacturing sector performed by Baldwin and Picot, using the same type of analysis as Davis et al., came to the conclusion that, irrespective of the weightings system chosen, small enterprises outperformed large enterprises in job creation. Finally, the European Observatory in its Third Report underlines the fact that the size distribution fallacy does not per se "benefit" SMEs, as the direction of

the bias is statistically accidental. Moreover, it developed a method which allowed to compensate for the size distribution fallacy, using a combination of several methods for analysing longitudinal data (see below).

### The need for a longitudinal database

A number of statistical deficiencies can be addressed with an analysis of longitudinal data on individual enterprises. Time series information will enhance the understanding of many aspects of the performance of firms. Following the individual employers through time results in the elimination of questions arising from the crossing boundaries by growing SMEs or downsizing large enterprises. However, Davis et al. argue that longitudinal studies that focus on the share of net job growth accounted for by small businesses grossly misrepresent the actual distribution of newly created jobs by size of the employer. In their opinion a more meaningful way to represent this distribution is to focus on the small-employer share of gross job creation. The Observatory states in its Third Report that the use of longitudinal datasets alone is not free from bias because they ignore natality and mortality of businesses. Nevertheless, the use of this instrument as one out of several analytic tools is recommended.

The development of a European Longitudinal database has been initiated by Eurostat within the framework of the evaluation of the impact of the Internal Market which will be presented in 1996. The main evaluation models of this pilot project are essentially based on job creation and destruction, competitiveness and growth. By following a sample of enterprises in the former twelve Member States, changes in economic performance can be measured at the level of individual enterprises. Furthermore, progress in the field of SME data collection has already been made by Eurostat. The Commission SME Project introduced by Enterprises in Europe intends to establish a biennial 'tabular data' component and 'SME indicators'. The collection of 'tabular data' concerns the figures on four variables: the number of enterprises, the number of persons employed, turnover and value added at factor cost. These figures are broken down by sector of activity and enterprise size in terms of employment. The 'SME indicators' component is still at an experimental stage. The aim is to create short term indicators on SMEs such as the number of enterprises set up or closed down and a short term indication of number of persons employed, turnover, value added and investment. In order to prevent an increase of administrative burden for SMEs by launching additional surveys, Eurostat seeks to collect data from national registers and surveys that already exist.

A longitudinal study on a sample of Dutch businesses over a period of 5 years, is presented in the Third Report of the Observatory. After comparing five different methods of analyses it is concluded that the most accurate way to assess job creation, is to use longitudinal data on enterprises and using average employment as the base year for the computations. By using this method plus a correction for the net crossing of the size boundary, the Observatory seems to have eliminated the size distribution fallacy and mastered other methodological pitfalls.

### MEASURES TO ASSIST SMEs IN EMPLOYMENT CREATION

#### The challenge facing the European Union

The challenge facing the European Union in the 1990s was highlighted in article 2 of the Treaty establishing the European Community as amended by the Treaty on European Union signed in Maastricht that defined the following objective:

"To promote throughout the Community a harmonised and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of convergence of economic performance, a high level

of employment and social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States."

The European Commission has repeatedly emphasised that economic growth alone is not enough to create the amount of jobs required, and that urgent action is required by the Member States on jobs. Following the publication of the White Paper on Growth, Competitiveness and Employment, the European Council of Brussels made seven recommendations to Member States in 1994 as follows:

- to improve education and training systems, especially further training;
- to improve the flexibility within enterprises and on the job market;
- to reorganise work within enterprises;
- to implement targeted cuts in the indirect costs of the work force (compulsory contributions), especially for non skilled workers;
- to make better use of public money intended to combat unemployment;
- to adopt specific measures geared to poorly trained young people;
- to develop employment taking account of new needs.

### Commission action on employment for SMEs

With special reference to SMEs, the Commission's Integrated Programme in favour of SMEs and the Craft Sector (COM (94) 207) established in 1994 aims to improve the administrative and legal environment of SMEs, in recognition of the fact that SMEs are widely perceived as new job creators. To promote a sustainable growth in industry, one of the requirements, as noted by the Commission, is to "underpin the dynamism" of SMEs. The need for this Integrated Programme became apparent from both the economic assessment contained in the White Paper and from the Council Resolution of 22 November 1993. The Integrated Programme finds its legal basis in article 130 of the Treaty on European Union whereby:

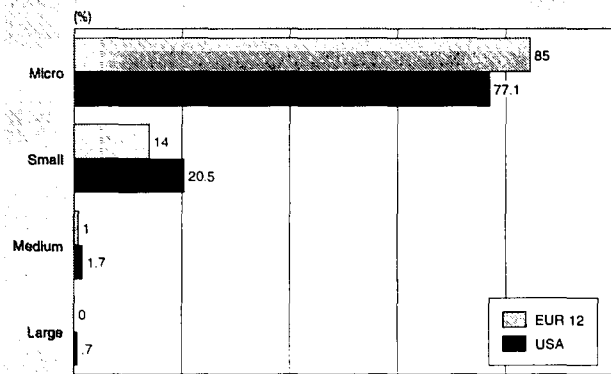
"The Community and the Member States shall ensure that the conditions necessary for the competitiveness of the Community's industry exist. For that purpose, in accordance with a system of open and competitive markets, their action shall be aimed at ... encouraging an environment favourable to initiative and to the development of undertakings throughout the Community, particularly small and medium-sized undertakings ... "

The Integrated Programme aims to assemble all existing and new initiatives derived from the objectives outlined in the White Paper within a more coherent framework. Its innovative approach lies in its provision for closer partnership between all parties concerned with the development of SMEs - at Community, national and regional levels - in order to achieve greater convergence of measures proposed and adopted. The Programme therefore provides for two different types of measures:

- concerted actions i.e. measures to promote mutual consultation and co-ordination between Member States;
- contributions the Union intends to make to the development of SMEs with its own policies.

The concerted actions relate first of all to the improvement and simplification of the business environment with a view to reducing burdens on businesses and unlocking their potential to create jobs. To this end a committee to improve and simplify the business environment was set up in December 1994 with the task of identifying best practices in the simplification of business formalities and the improvement of the legislative framework of businesses. The second field targeted by con-

**Figure 10: Breakdown of number of enterprises according to size class, 1990**



Source: *Enterprises in Europe*

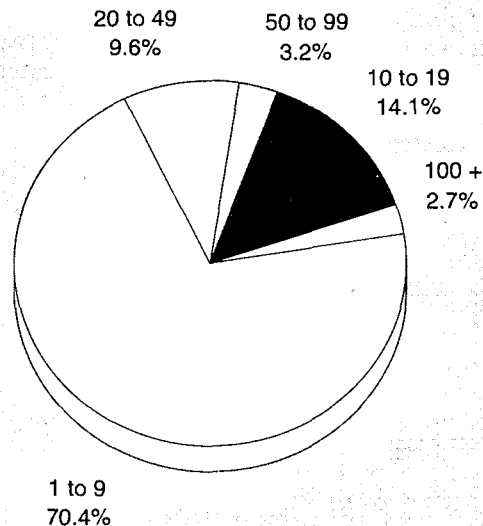
certed actions concerns support measures for businesses at national and regional levels. In this context, the Commission has proposed the creation of concertation forums to stimulate exchanges of best practices between Member States in terms of support provision for SMEs.

The Commission is organising two major conferences which will take place in June and September 1995 with participants from all Member States, government representatives, SME representatives and SME entrepreneurs. The conferences aimed at start-up and young businesses will deal respectively with measures to improve and simplify the business environment through an exchange of best practices and with support measures for SMEs.

The contributions of the Union to the development of SMEs relate to action taken specifically within the framework of enterprise policy and other Union policies. The Commission has presented several proposals for action concerning the improvement of the business environment which should benefit SMEs. In 1994 the Commission produced a number of recommendations addressed to the Member States with the intention of improving the legislative and fiscal environment of SMEs. By highlighting existing best practices in the Union the Commission hopes to inspire Member States who may be lagging behind and encourage them to adopt the appropriate measures. These recommendations concern the taxation of SMEs, the transfer of enterprises from one generation to the next and late payments in business transactions. With reference to improving the financing of SMEs a number of advances were made in 1994. Firstly, the interest subsidy mechanism for the European Investment Bank global loans available to SMEs was implemented in twelve Member States. This mechanism was introduced to reduce the cost of access to credit and to increase the amount of loans for job creating SMEs. Secondly, three SME specific projects with Community funding of 150 million ECU were approved last year within the framework of the European Investment Fund. These projects will assist SMEs in accessing bank loans through the provision of guarantees.

With regard to support measures for SMEs the Commission has introduced new instruments and programmes directly geared towards SMEs. In order to encourage collaboration between both large and small enterprises, the Commission has conceived European networks such as BRE (Bureau de Rapprochement des Entreprises) and BC-Net (Business Co-operation Network). The Commission also assists SMEs

**Figure 11: Breakdown of number of enterprises according to number of employees, Japan, 1991**



Source: *Enterprises in Europe*

through EURO INFO CENTRES, a business information network, EUROPARTENARIAT and INTERPRISE programmes for sub-contracting, and pilot schemes such as EUROMANAGEMENT, Venture Capital and Commerce 2000 aimed at improving SME management, financing and know-how.

The ADAPT Community initiative was conceived in conjunction with the SME Community initiative to address the need identified in the Integrated Programme to improve the quality of SME management. With Community funding of 1400 million ECU, it will assist the work force through vocational training and the development of new jobs and activities to adapt to industrial changes largely brought about by the implementation of the Single Market. The SME initiative, benefiting from an appropriation of 1 billion ECU, is designed to assist SMEs in the manufacturing and services industries. Support is provided in particular to under-developed or changing regions to enable SMEs to take up the challenge of the Single Market and become more internationally competitive through improvements in co-operation, financing and management of SMEs.

Finally, the Commission action plan following the Bangemann Report on the Information Society was adopted in September 1994. The plan makes specific reference to SMEs to raise their awareness - and thus their demand - for the new concepts, products and services brought about with the onset of the Information Society in fields such as telematics and teleworking.

### Progress to date

Within the last few years all Member States have undertaken reforms to their employment systems. For instance, current efforts abound on the part of the Member States to stabilise or reduce the cost of statutory labour charges as a proportion of GDP. Upon closer examination of recent Member State SME policy two distinct trends become apparent. Firstly, in all Member States the focus of recent attempts to stimulate job creation via SMEs has been in supporting start-ups and existing enterprises with financing and improved access to R&D. In the majority of Member States there is also an increasing emphasis in SME policy placed on alleviating current constraints. For example, tax reforms to facilitate enterprise transfer are widespread. Secondly, a wealth of new programmes, financial schemes and measures for SMEs has been introduced in order to foster growth, employment and com-

petitiveness. For a short summary of the main actions taken in SME policy in the Member States subsequent to the publication of the White Paper refer to Table 2.

However, in the Commission's view, the Member States have not gone far enough to meet the challenge of employment in the 1990s.

The White Paper emphasises the need to widen the access to the job market and to create a new spirit of utilising productivity gains to create new jobs as opposed to simply raising the income of those already in employment. Furthermore, progress must be made in the area of equal opportunities with higher participation of women. More attention must be accorded to promising new sectors with high potential for employment creation. The Commission stresses that the Union must maximise its capacity to create and maintain non-skilled and semi-skilled jobs and facilitate job creation by lowering the relative cost of non-skilled and semi-skilled workers. Studies show that reducing the social security contributions of low wage earners would engender a rise in employment of 2 %.

The Commission has called for a more coherent national and European framework for action to be put in to place in order to realise the job creation potential in 17 key areas. In this context four proposals designed to encourage local development initiatives were submitted to the Council of Essen. The proposals concern actions with regard to creating a local framework favourable to development and employment initiatives, to the implementation of a range of financial instruments for local development, to adapting training and education with a view to guaranteeing new jobs, and to renewing the legal framework. The 17 key areas identified as having a high potential for employment creation, in that they are sectors that correspond to the current and future needs of European citizens, are as follows: domestic services, child minding, new information and communication technologies, assistance for young people experiencing difficulties in social integration, improvement of housing, security, local public transport, revaluation of urban public spaces, local shops, tourism, audiovisual technology, cultural heritage, local cultural development, rubbish management, water management, protection and upkeep of areas of natural beauty, and control and regulation of pollution and polluting installations.

However, despite the recent efforts of Member States to modify their employment policies, a fragmented approach still pervades with complex national regulations still in force in many Member States. The reforms implemented to date still appear incomplete and hence the global effect is difficult to evaluate. Considerable progress is still required at enterprise level namely, simplification and harmonisation of market regulations across the Union, better provision of information for SMEs to benefit from the advantages of the Single market, promotion of the information society. To guarantee the adoption and implementation of further reaching reforms, greater public awareness and acceptance of the short term adjustments will also be necessary. Inter governmental co-operation has to be seen as one of the first priorities here. A detailed examination of the workings of the different national systems would enable the spread of best practice in employment creation.

### Future role of the European Commission

The Commission will continue to support the Member States in adopting the solutions proposed by the White Paper. Work will continue on the elaboration of a medium term plan for employment in co-operation with the Member States with the involvement of all Commission directorates concerned with employment. The Commission also proposes to extend its annual reporting on employment issues in order to evaluate the impact of current economic policies. Better comparative statistics on the structure of employment will be sought in



co-operation with the Member States. The European employment service EURES, set up to assist job seekers throughout Europe, will be developed. Furthermore, the Commission will continue to assess the usefulness of employment aid programmes and will also examine the impact of Union and national employment legislation on employment. In 1995 a series of new community initiatives (ADAPT, EMPLOYMENT, and the second phase of LEADER) will be launched.

## CONCLUSION

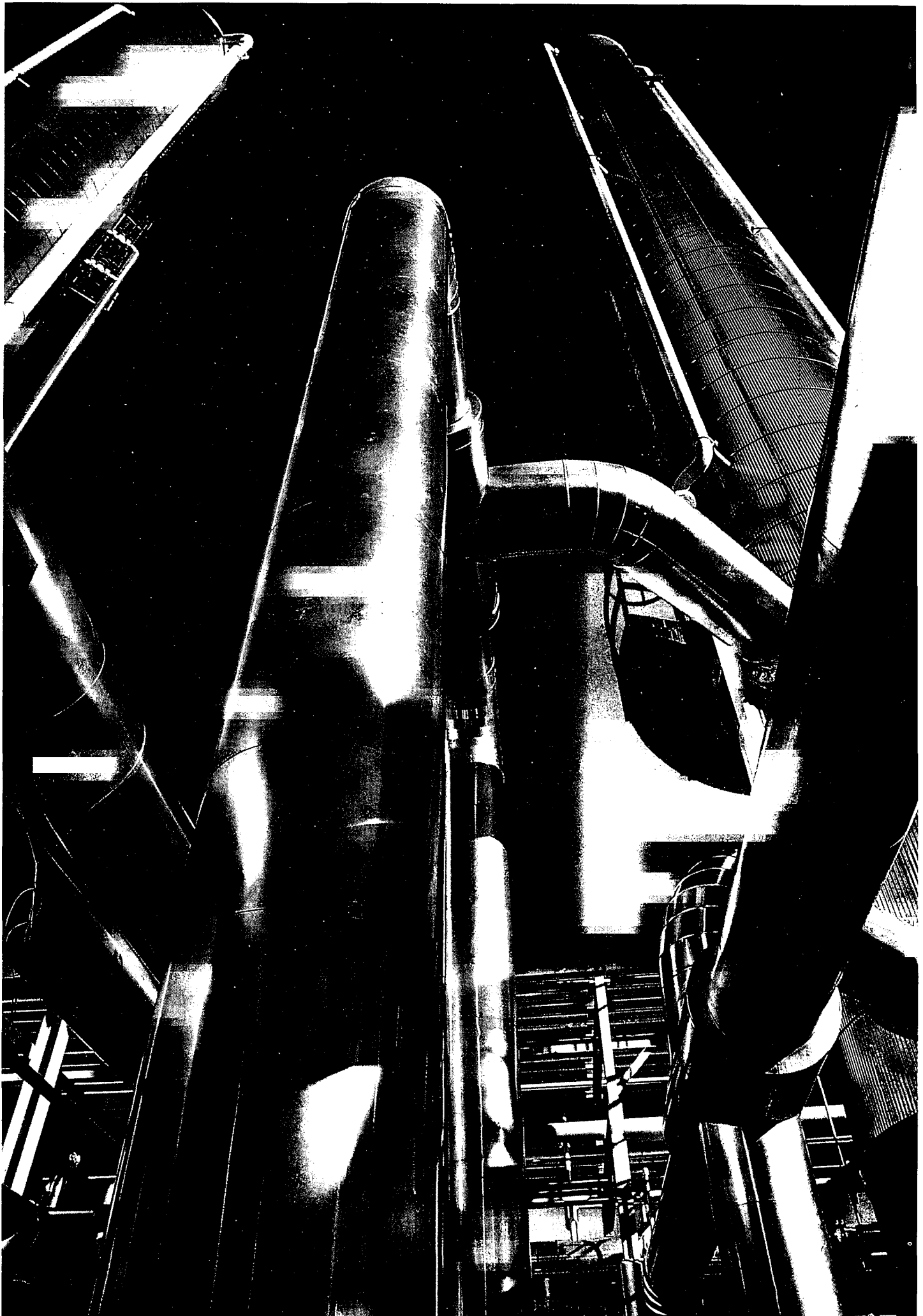
The need to improve structural employment growth and the competitiveness of European businesses is widely recognised. Many steps have already been taken at both Community and national level in order to increase the job creating capacity of European enterprises. A great number of support measures are aimed at small and medium-sized enterprises which account for the largest share of both the total number of enterprises and employment. The current absence of a single and clear definition for SMEs, however, can result in inconsequential and discriminatory implementation of these support measures. It is therefore important to determine a single definition for SMEs within a short period of time.

There has been a lot of debate about whether the contribution of SMEs to job creation is correctly estimated. Numerous international surveys have been dedicated to this issue. However, the European Observatory seems to have found a method using longitudinal data plus a correction of the net effect of crossing size class boundaries that avoids methodological pitfalls. It concludes in its Third Report that, "despite the validity of methodological criticism of studies alleging a dominant role for small enterprises in the job generation process, implying that the job creation prowess of SMEs is overstated, prevailing evidence shows that SMEs still out-perform LSEs with regard to job creation".

Written by: European Commission, DGXXIII/A/1



# Reviews and Forecasts: Industrial Sectors



## Overview

NACE 11, 12, 13, 14, 15, 16

In 1993, inland primary energy consumption in the EU totalled just under 1.2 billion tonnes of oil equivalent (toe), a level of consumption almost unchanged from the previous year. The EU was 50 % self-sufficient in energy supplies, mainly due to North Sea production of oil and gas, gas production in the Netherlands and coal production in the United Kingdom, Germany and Spain. The United Kingdom contributes over 33 % to EU primary energy production.

The primary energy mix is still dominated by oil, which accounts for almost 44 % of gross inland primary energy demand. Natural gas consumption is increasing fast. By the year 2000, gas is expected to account for about 23 % of EU primary energy requirements, from 16 % in 1993, overtaking coal to become the second largest energy source in the demand mix. Over this period coal's share is expected to drop from 20 % to 18 % of EU primary energy consumption. A rising share of coal consumption will be met by imports, as the coal industries of Germany, Spain and the United Kingdom are phased down.

The energy sector is at the heart of the current debate on environmental issues and policy. Strategies to reduce the threat of global climate change, and to reduce other harmful emissions depend largely on the level of energy demand, the fuel mix, and the quality of fuels burned. The implementation of some of the measures proposed to reduce harmful impacts on the environment could have significant consequences for the energy industry over the next decade.

### INDUSTRY PROFILE

#### Description of the sector

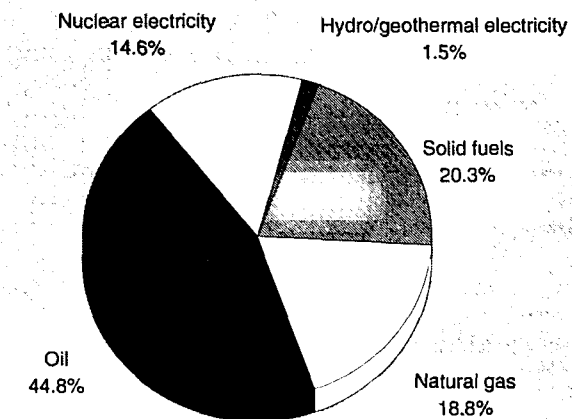
The activities covered by the energy industry in the EU are classified according to the following standard NACE classifications: extraction and briquetting of solid fuels (NACE 11); coke ovens (NACE 12); extraction of petroleum and natural gas (NACE 13); mineral oil refining (NACE 14); nuclear fuels industry (NACE 15); and the production and distribution of electricity, gas, steam and hot water (NACE 16). These activities are dealt with in the following specific chapters:

- Solid fuels (covering NACE 11 and 12)
- Exploration and production of crude oil and natural gas (covering NACE 13)
- Nuclear fuels (covering NACE 15)
- Refining and distribution of oil products (covering NACE 14)
- Electricity generation and distribution (covering NACE 161)
- Transmission and distribution of natural gas (covering NACE 162)

In addition, a description of the renewable energy industry (not defined by NACE) is given. For the purposes of this chapter renewable energy includes small-scale hydro, wind, biomass, tidal, and waste incineration. Large-scale hydro is included in the chapter on electricity generation and distribution.

The following conventions and definitions are extensively used. Energy consumption is referred to at two different levels

**Figure 1: Energy**  
Fuel shares of primary energy demand, 1993

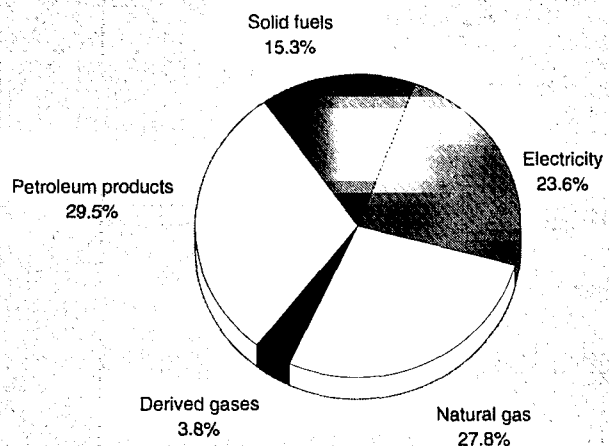


Source: DRI Europe

- primary and final. Primary energy consumption refers to the sum of all energies either used by consumers or used as an input to the production of other energy forms. For example, the production of electricity requires the input of such fuels as coal, natural gas and heavy fuel oil. Gross inland energy consumption refers to primary consumption of fuels for inland uses, i.e. excluding marine and aviation transport fuels. Final energy consumption refers to the sum of all energy used by consumers, including electricity produced from other fuels, and thus excludes transformation and distribution losses.

Energy intensity is defined as the amount of primary energy consumed per unit of gross domestic product (GDP). Energy intensities vary from country to country and over time depending on the economic background, national energy policies and sectoral and industrial structures. For mature energy economies, such as prevail in the EU, they tend to decline over

**Figure 2: Energy**  
Fuel shares of final industrial energy demand, 1993



Source: DRI Europe

**Table 1: Energy**  
**Main indicators in volume (1)**

(million toe)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Final energy consumption	656	676	689	703	707	713	724	786	784	N/A
Gross inland consumption	991	1 029	1 044	1 063	1 077	1 099	1 114	1 213	1 206	1 190
Net imports	458	457	480	490	511	552	573	617	630	596
Primary production	534	589	601	601	591	576	573	629	622	624
Employment (thousands)	1 967	1 915	1 870	1 797	N/A	N/A	N/A	N/A	N/A	N/A

(1) Excluding Portugal; employment figures are for energy and water. Including former East Germany from 1991 onwards.  
Source: Eurostat

time as energy efficient technologies enter the equipment stock, and as consumers invest in energy conservation.

It should also be noted that all references to the EU Member States refer to the 12 countries which were Member States in 1994. At the time of writing these chapters, Austria, Finland and Sweden had ratified their decision to join the EU from 1st January 1995, while the referendum in Norway had not yet been held. Should Norway have confirmed its intention to join by the time these chapters are published, this would add significant reserves and production of oil and natural gas to EU energy resources, and correspondingly reduce the EU's import requirements for these energy forms. Norway is also a significant producer of hydro-electricity for its own electric power needs.

#### Recent trends

In the 10 years between 1984 and 1993, EU gross inland primary energy consumption increased by 20 %, an average annual increase of 1.9 %. In 1993, gross inland primary energy consumption in the EU totalled 1190 million toe. In the decade to 1993, primary energy production also increased, but by only 17 %, with regular increases in oil and gas production partially offset by a decline in solid fuels production. There has thus been an overall increase of 30 % in net imports of energy into the EU between 1984 and 1993.

The mix of fuel consumption has also evolved, with natural gas and nuclear electricity substantially increasing their share at the expense of solid fuels and, to some extent, oil. The use of oil is becoming increasingly concentrated in the transport sector, which has shown growth, but this has been offset by its loss of share in the other sectors to gas and electricity. In 1993, oil represented almost 44 % of total gross inland primary energy consumption, with solid fuels, natural gas

and primary electricity each contributing 20 % or less. Renewable energy contributed 1.5 % of consumption.

Over the whole of the EU, energy intensity has declined over the past decade. This results from the stage of maturity of EU energy markets, where growth has been primarily in sectors with low energy intensity, while energy intensive industry has tended to decline. The main exception to this trend was in 1991 following German reunification, when the statistics reflect the predominance of energy intensive industry in the former East Germany.

Generally speaking, the countries which have shown the smallest decreases (or even increases) in energy intensity are those with rapidly growing industrial sectors (e.g. Portugal and Spain). Those countries showing significant decreases in energy intensity are those which have undergone extensive industrial restructuring (e.g. the Netherlands, Belgium and Germany, prior to reunification).

Comprehensive statistics on employment in the energy sector of the EU are not currently available, due to the great diversity of sectors of activity and organisations involved. However, the energy industry tends to be less labour intensive than other traditional industrial sectors, therefore the impact on changes in activity on overall employment levels is not significant, compared to the total level of employment in the economies of EU Member States.

#### International comparison

In 1993, gross inland primary energy consumption in the EU was just under 1.2 billion toe, approximately the same as in 1992. This level of consumption represents about 15 % of total world primary energy consumption, making the EU one of the most important energy markets in the world, after North America and Asia. The USA is still the largest energy con-

**Table 2: Energy**  
**Primary production by fuel type**

(thousand toe)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Hard coal	107 639	133 627	139 496	133 938	129 460	125 839	118 828	115 777	110 090	94 936
Lignite and peat	37 618	35 634	33 854	32 404	32 397	34 303	33 854	70 593	62 581	57 777
Crude oil and feedstocks	141 680	144 765	145 697	144 082	136 319	113 260	113 899	114 582	117 733	120 128
Petroleum products	5 546	5 860	6 239	5 725	4 591	4 213	2 059	2 170	2 375	4 945
Natural gas	119 952	127 117	124 565	129 101	120 203	125 296	129 791	144 534	145 556	156 431
Other fuels	1 562	1 664	1 660	2 169	2 622	2 456	2 662	3 142	1 592	3 258
Nuclear/geothermal heat	104 443	125 711	132 888	138 583	148 768	158 883	159 170	163 929	168 702	172 200
Electrical energy	15 042	14 581	14 246	15 189	16 532	11 336	12 484	13 788	13 911	14 670
Total	533 482	588 959	598 645	601 191	591 254	575 554	572 747	628 515	622 540	624 345

Source: Eurostat

suming country in the world, accounting for about 24 % of total world primary energy consumption. Asia is the fastest growing area of energy demand in the world, including the relatively mature energy economy of Japan, but also the high-growth economies of China and the South-East Asian newly industrialising countries. Asia now represents almost 24 % of world energy demand, but has substantial potential for future growth since annual energy consumption per capita, at 0.8 toe, lags well behind Western Europe (3.3 toe) and North America (7.9 toe), and the economies of the region, with the exception of Japan, are booming.

### Foreign trade

The EU is a net importer of energy. Net imports reached 596 million toe in 1993, or 50 % of gross inland primary energy consumption.

Imports of oil, natural gas and coal have all risen over the past ten years as rising demand has outstripped production growth. The Middle East and Norway have been the principal sources of crude oil imports, Algeria, Norway and the former USSR are the most important natural gas suppliers from outside the EU, while coal imports are dominated by supplies from the USA, Australia and South Africa.

## MARKET FORCES

### Demand

#### Final energy demand by sector

The principal sectors of final energy demand are industry, transport and residential/commercial, (the power generation sector, included in gross inland primary energy demand is a transformation sector, whose output is included in final energy demand).

While all three main end-use sectors have shown growth in energy demand over the last 10 years, the mix of demand between sectors has been modified over this period. The residential/commercial sector has remained stable at around 40 % of the total, but the share of industry has declined as energy intensive industry has been restructured and growth has been concentrated in light industry. The transport sector has increased its share, in line with the increase in personal mobility allied with rising living standards, and increased freight transport by truck with the development of intra-EU trade. The transport sector has now overtaken industry to become the second most important end-use sector for energy.

Energy consumption in the residential and commercial sector is dominated by heating applications for which electricity, natural gas and petroleum products are the main competitors. Other energy uses open to inter-fuel competition are cooking, and provision of hot water, while lighting and appliances are almost exclusively powered by electricity.

There are many different uses for energy in industry, from space-heating and lighting, steam-raising in industrial boilers, drying and many specific process applications. In the latter

category, there is a shift towards electricity use as many new industrial processes are exclusively powered by electricity. The other fuels compete for more traditional steam-raising, heating and process uses, with natural gas gaining market share at the expense of coal and oil.

Transport is dominated by oil, since, as yet, no alternative fuels have made a significant penetration on the market. Consumer choice is thus focused almost exclusively on gasolines and diesel fuels refined from oil. In the long term, alternative fuelled vehicles, using electricity or compressed natural gas are likely to become more available, but are unlikely to make significant inroads into the dominant position held by oil.

#### Energy demand by fuel

Oil still accounts for 44 % of Europe's energy requirements, a level which is little changed since 1985. Loss of markets for oil in the residential/commercial and industrial sectors, where natural gas and electricity have become more competitive, have been offset by continuing growth in the transport sector, where the opportunities for fuel substitution are extremely limited. For this reason, many regions now have an oil demand which is relatively captive.

Natural gas now represents 20.5 % of EU energy demand, up from 18 % in 1985. Although the development of natural gas has been extremely uneven across the EU, with resource-rich countries, such as the Netherlands and the United Kingdom, developing important gas markets much earlier than other EU countries, natural gas is now becoming a major component of energy markets right across the EU. Portugal and Greece, the last countries to introduce natural gas, both have major plans to develop natural gas import and distribution infrastructure over the next few years to facilitate gas availability. It is worth pointing out that Spain will show the biggest volume increase of the newly gasified countries. The attractiveness of gas in the power generation sector means that the already developed markets in Northern Europe (Belgium/Luxembourg, France, Germany, the Netherlands and the United Kingdom) plus Italy will still see substantial future growth in demand for gas: these markets will account together for over three quarters of the volume growth in demand for gas over the next 15 years or so.

The share of nuclear and hydro-electricity in gross inland primary energy consumption has now reached almost 16 %, following the extensive programme of development of nuclear power in France in the 1980s. France now exports electricity to its neighbouring countries. The current share enjoyed by nuclear and hydro-electricity is not now expected to increase further, since the nuclear programme in France has been considerably slowed down, and other countries are making different choices for their power sector development programmes. There are also very few opportunities left in the EU for the development of new large-scale hydro-electric power plants.

Coal and other solid fuels (lignite and peat) account for 19 % of gross inland primary energy consumption, a share which has declined from 23 % in 1985. The increasing availability

**Table 3: Energy  
Evolution of energy intensity (1)**

(1985=100)	1986	1987	1988	1989	1990	1991	1992
EU	99	98	96	94	92	97	95
Belgique/België	102	101	98	95	94	97	97
Danmark	97	99	93	87	85	92	88
BR Deutschland	97	96	94	90	87	98	93
Hellas	97	103	106	113	113	110	112
España	98	96	99	98	97	100	101

Source: Eurostat



of natural gas, and regulations to limit harmful emissions, have contributed to a large reduction in coal's share of energy use in the industrial sector. It is now primarily used as a fuel input to power generation, where large-scale plants have been able to fit emissions abatement equipment. Future coal demand is expected to be increasingly concentrated in this sector.

### Supply and competition

The contribution of EU indigenous energy production to EU energy demand has remained virtually unchanged over the past 10 years at around 52 %, but there have been some modifications in the relative contribution of production of different forms of energy.

EU oil production has declined by 15 % in the 10 years between 1984 and 1993. The principal source of oil production in the EU is the United Kingdom sector of the North Sea, where output dropped in the late 1980s following loss of capacity after the Piper Alpha disaster, but production has now stabilised and is expected to regain an upward trend until the late 1990s, before declining after the year 2000. This will be a consequence of the recovery from Piper Alpha, and particularly because of technology advances and cost reductions in exploration and production.

EU natural gas production has increased by 30 % in the 10 years since 1984, as more exploration and development investment has been focused on natural gas, particularly offshore in the Netherlands and the United Kingdom, in response to the anticipated higher growth opportunities for natural gas demand than for oil.

EU coal and solid fuel output has also increased since 1984, up by 5 %. This is entirely due to German reunification which added significant production of lignite to EU output. The underlying trend is, however, one of decline. Hard coal production has dropped by 12 % since 1984, while lignite production has declined by 18 % since 1991. The reasons for this are twofold. Firstly traditional markets for coal are declining as industry switches to natural gas and electricity for environmental reasons. Secondly, the major coal-producing regions of the EU (Germany, the United Kingdom, Spain and France) are all restructuring their coal industries, since production costs for European deep-mined coal are above world coal-price levels. In addition, production subsidies, combined with guaranteed purchase contracts with the power sector, which have been the means to maintain indigenous production, are now beginning to be phased out, which will lead to cuts in production capacity.

Output from nuclear and hydro-electricity production has increased by over 50 % since 1984, mainly due to the contribution from new nuclear power stations in France.

Competition between fuels is well-established in the EU, for all applications for which fuel substitution is technically possible. The only exceptions to this have been the special purchase arrangements for coal into the power sector in the main coal-producing countries, whose governments have in the past sponsored contracts guaranteeing a price and a quantity of coal. These arrangements are now being phased out, and fuel choice based on competitive and economic criteria should now be generalised.

The degree of competition between suppliers of a particular fuel varies considerably. In the oil markets, there is a high degree of competition throughout the EU, as each country is served by a sufficient number of refining and marketing companies to ensure competition. In addition price transparency is the norm, and there are very few barriers to trade. The natural gas and electricity transmission and distribution industries have traditionally been the domain of state-owned public service companies with national or regional monopolies. However, this pattern is beginning to change. The United Kingdom has pioneered the opening up of these sectors to

competition, with its programme of privatisation and liberalisation, while the European Commission is continuing to promote the introduction of a framework for more competition in the rest of the EU, via proposals for Third Party Access (TPA) to electricity and natural gas transmission grids and other supporting measures. The coal supply industry is generally competitive for most sectors, with access to imported sources of coal becoming more available.

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## INDUSTRY STRUCTURE

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### Companies

There is a great diversity of companies involved in the energy production and distribution industries in the EU, including giant state-owned energy companies such as ENEL and ENI of Italy, EdF and GdF of France, or Repsol of Spain; large privately-owned multinational energy companies headquartered in the EU, such as Royal Dutch/Shell (NL/UK), British Petroleum (UK), Elf (F), Total (F) or British Gas (UK); non-EU based multinationals with significant activities in the EU, such as Exxon or Texaco (USA); large privately-owned national energy companies such as RuhrGas (D), RWE (D), or National Power (UK); and a multitude of medium-sized or small companies involved in producing, transporting or selling all the forms of energy discussed here.

The major trend in industry structure over the past 10 years has been the ongoing reduction in the role of the state. Privatisations of state ownership or shareholdings in energy companies have occurred in practically every country in the EU, and are still continuing.

### Impact of the Single Market

Although some specific elements of the Internal Market programme have had some impact on the energy sector, more far-reaching effects are expected to come from the completion of the Internal Energy Market, which is still under discussion. Both in the electricity generation and distribution sector and in the transmission and distribution of natural gas sector, the type of Third Party Access (TPA) mechanism that will be introduced will have a critical influence on the structure of competition, and on prices. At present, energy prices still vary significantly across countries, despite strong inter-fuel competition. These price differences reflect both differences in taxation across Member States, and the persisting fragmentation of markets along national lines.

Among the measures which were part of the Internal Market programme and which were of direct relevance to the energy sector were the opening up of public procurement markets, the harmonisation of excise taxes on petroleum products, and, mainly, a number of environmental policy measures, including the Large Combustion Plant Directive. In addition, some positive impact on demand was felt from the overall improvement in the economic situation. Priorities for the future include the completion of the Internal Energy Market, and a harmonisation of environmental and fiscal legislation, which currently varies significantly across Member States and are a source of market distortions.

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## REGIONAL DISTRIBUTION

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Energy demand in the EU is distributed according to the economic activity of each country or region. By and large, most regions have access to all the forms of energy supply available. Where this is not the case, there are projects being undertaken to ensure that new energy supplies will be made more widely available over the next few years. This is the case with respect to the development of new gas supply infrastructure to Portugal, Spain and Greece, and the connection of electricity networks in Greece and Ireland to those of other EU countries.



Apart from the production of nuclear electricity, technically possible in many locations, the regional distribution of production of other energy forms depends on the geological resource endowment of each region. EU oil and gas production is concentrated in the United Kingdom and the Netherlands, with smaller endowments in Denmark, France, Germany and Italy. Coal production is mainly in the United Kingdom, Germany, Spain and France.

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## ENVIRONMENT

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Environmental considerations have been at the forefront of energy policy-making for the past several years, both at EU level and within individual Member States.

For example, in the framework of the debate on global warming, the EU has committed itself to stabilising CO<sub>2</sub> emissions at the 1990 level by the year 2000, and has instituted a monitoring programme to assess the contributions of national programmes of Member States towards meeting this goal. The energy sector has a very important role to play in meeting this target, through improvements in energy efficiency and the promotion of fuels containing less carbon (such as natural gas or nuclear and hydro-electricity), at the expense of fuels with higher carbon content (such as coal or oil). The EU is debating whether the introduction of energy taxation, partially based on a fuel's carbon content, should be applied as a strategy to help meet the emission stabilisation goal. In the meantime some countries, such as Denmark and the Netherlands, have introduced this type of tax.

The EU has also moved to limit other sources of harmful emissions, particularly SO<sub>2</sub>. In 1988 the EU passed the Large Combustion Plant Directive (LCPD), which applied to all existing and new industrial plants above 50 MW (Megawatt) capacity. Its objective was for plants to achieve a phased reduction of SO<sub>2</sub> emissions from 1990 levels totalling 60 % by 2003, by limiting the amount of SO<sub>2</sub> present in flue gas emissions. To meet these targets, industrial plants and power generation facilities have been obliged to choose between burning lower sulphur fuels in their boilers, or to invest in flue-gas clean-up technology, such as FGD (flue gas desulphurisation). The LCPD will soon be due for review and revision.

Other EU initiatives to control emissions involve modifications to the specifications of petroleum products, and regulations to introduce technology to limit emissions of volatile organic compounds during the storage and distribution of petroleum products. These are discussed more fully in the chapter on refining and distribution of petroleum products. Here, reference ought to be made to the important tripartite EPEFEE (European Programme on Emissions, Fuels and European Technologies) joint Commission / automotive industry / oil industry programme.

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## REGULATIONS

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There is a well-developed regulatory framework covering the energy industry in the EU, both at the national level, and at the level of the EU. Regulations can have specific provisions for the energy industry covering such aspects as the environment, health and safety, competition and fiscality, as well as including the application of provisions affecting all industrial or business enterprises, such as planning regulations or the obligation to publish audited accounts.

Since the introduction of the Single Market within the EU, the thrust of EU policy towards the energy sector has included proposals for the development of a new regulatory framework which will assist development of a single energy market. There are two main aspects to this effort. On the one hand, the European Commission is enforcing existing EU legislation and treaty obligations, including the free trade provisions of

the EEC treaty as well as competition and state aid provisions. On the other hand, a strategy involving regulatory changes and new EU legislation has been in progress since the late 1980s. A three-stage approach is being implemented.

The first stage is largely completed. It involved the adoption of Directives on the transit of electricity and natural gas, and on price transparency in the gas and electricity sectors. Measures were also taken to harmonise technical rules and standards, and to define minimum levels for excise taxes and VAT on petroleum products.

The second stage is still under discussion within the European Commission, and has involved long debate with national governments and energy companies. It is supposed to include such measures as the removal of exclusive rights for electricity generation and for the construction of electricity and gas distribution infrastructures, the unbundling of the management and accounts of vertically integrated electric and gas utilities and the introduction of TPA to electricity and gas transmission and distribution networks serving large industrial users and some distribution companies.

The third stage has not yet been specified in detail, its scope being partially dependent on lessons learnt from the implementation of the first two stages. However it is expected to include, inter alia, the extension of electricity and gas TPA rights to all distributors and small consumers.

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## OUTLOOK

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As the major EU economies renew their path to growth through the mid 1990s, energy demand is also expected to pick up, albeit at a slower rate than GDP growth, as energy efficiency improvements and conservation investments continue to put downward pressure on the energy intensity of EU countries. Total final inland energy consumption in the EU is expected to be almost 12 % over 1993 levels by the year 2000, and to increase by a further 15 %, or 0.9 % per year, by 2015.

The future EU primary energy mix will be characterised by the continued dominance of oil, with its share remaining at over 40 % through 2010, although its share could dip marginally below 40 % by 2015. Oil will, however, remain the largest single contributor to the primary energy mix.

Natural gas consumption is expected to increase at the fastest rate of all fuels, at 2.7 % per year between 1993 and 2015 in primary energy demand, and at 2.0 % per year over the same period in final energy demand in the EU. This will result in natural gas occupying the second largest share in the fuel mix. In 2005, natural gas is expected to have a share of over 24 % of primary energy demand, rising to over 26.5 % in 2015. This rapid increase reflects the growing attractiveness of this fuel in terms of environmental and economic considerations, and its increasing penetration of the power generation sector.

Solid fuels consumption is expected to stabilise over the remainder of the 1990s, and then to increase after the year 2000, as stable international coal prices help coal regain its competitiveness in the power generation sector while oil and gas prices rise. Coal should thus retain its share of just under 20 % of EU primary energy demand.

On the production side, prospects are less favourable, relative to recent years. Oil production from the EU 12 countries is expected to decline quite sharply after the turn of the century as existing reserves are depleted, although this decline could be partially offset by the results of new exploration programmes. Natural gas production is expected to stabilise over a longer period, since gas reserves have hitherto been relatively less exploited than oil ones. However, a slow decline in output is expected to begin after the year 2000. With regard to solid fuels, hard coal production levels are expected to decline appreciably as state aid supporting high-cost mines is phased

out, while lignite production is also expected to fall as environmental considerations continue to induce fuel-switching to cleaner forms of energy.

A small increase in nuclear electricity production is expected by the year 2000 as those plants currently under construction in the United Kingdom and France come on stream. However after the year 2000, in the absence of major changes in policy by EU electricity generating companies, it is anticipated that retirements will outstrip capacity additions, and thus nuclear output will begin a period of decline.

Written by: DRI Europe

# Solid fuels

## NACE 11

*Despite the contraction in the production of hard coal, the share of total primary energy requirements met by solid fuels was around 19 % in 1993, falling from 23 % in 1980. Reductions in EU production of hard coal have been largely offset by increased imports, and the inclusion of the former East Germany into the EU in 1991 gave a substantial boost to lignite production.*

*However, the outlook for the hard coal production industry is for a continued decline for at least the medium term. Governments are increasingly coming under pressure to reduce subsidies to uneconomic production, and this will lead to a reduction in production capacity. Improvements in productivity will help to improve the profitability of remaining EU hard coal production.*

*Consumption of solid fuels is also expected to decline. The main reason for this is an increase in gas use in the power generation sector due to environmental and economic pressures. This phenomenon will be the most marked in the UK, at the expense of indigenous coal production. In the longer term, the development of fuel prices may revive the attractiveness of coal in this market.*

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### INDUSTRY PROFILE

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#### Description of the sector

This chapter covers the extraction, as well as the associated washing, grading and ranking processes, of all types of coal, including:

- brown coal or lignite (NACE 112.2);
- black lignite and sub-bituminous coal (NACE 112.1); and,
- hard coal, including bituminous coal and anthracite (NACE 111.1).

It also covers the production of patent solid fuels (NACE 111.2) and lignite briquettes (NACE 112.3).

Although reference will be made to all solid fuels, the emphasis in this chapter is on hard coal, which represents 75 % of total solid fuels consumption on an energy equivalent basis. The chapter also covers to some extent the coking industry (NACE 12), which is closely related to the hard coal industry and which is not covered elsewhere in the energy section.

#### Recent trends

The production of hard coal in the EU has fallen steadily since 1987, largely as a result of cut backs in production capacity in the UK and Germany, but also reflecting the complete phase out of coal production in Belgium. This leaves just four countries with significant coal industries, France, Germany, Spain and the UK.

However, whilst the level of EU production has fallen, the level of imports has risen, and the impact on the share of indigenous solid fuels in gross inland consumption for 1993 has been a 3.5 % decrease since 1980. Until 1978, the two main suppliers of coal imports to the EU were the USA and Poland. As of 1993, the USA remains the leading supplier to the EU (31.4 million tonnes) followed now by South Africa (26.4 million tonnes) and Australia.

The key reason for the reduction in EU hard coal output is the divergence between the cost of EU production and the price in the expanding international coal market. This has required governments to subsidise hard coal production, either through direct grants or through imposing market restrictions

which guarantee a market for higher priced indigenous production. In the interests of promoting growth and free trade, and in accordance with EU legislation, governments have increasingly sought to reduce these subsidies, which has led to closures of high-cost production capacity.

The difficult situation for the hard coal industry was further exacerbated in 1986 by the fall in the price of oil and particularly heavy fuel oil, with which coal competes in its main market, power generation. Until this time, governments had been encouraging industry to switch away from high cost imported oil, by providing grants for the construction of coal fired boilers. However, the fall in the cost of oil reduced the incentive to switch fuels and the share of coal in industrial and commercial markets was eroded by more convenient fuels such as gas and heating oil. In addition, the abrogation in March 1991 of a 1975 Community restriction on the use of natural gas for electricity generation resulted in a shift towards gas-fired power stations. The depreciation of the US dollar compared to EU currencies in the late 1980s has rendered imported coal even cheaper.

In contrast, the production of lignite is largely carried out on a commercial basis, and is even more concentrated than that of hard coal. Only three countries (Germany, Greece and Spain) produce significant quantities of lignite, and Germany accounts for around 75 % of EU production on an energy equivalent basis. The production of lignite in the EU was dramatically increased as a result of German re-unification in 1991. Indeed at that time the former East Germany accounted for nearly half of EU lignite production, although its share has since fallen back due to the economic re-structuring of its industry and environmental concerns.

The impact of the re-structuring and cut-backs on employment in the hard coal and lignite industries has been quite severe. Employment underground has fallen by 68 %, from 387 100 in 1980 to 125 000 in 1993. This trend is continuing, and further large cut-backs in employment have been made in 1994 in both the UK and Germany, the largest producers in the EU.

#### International comparison

Most EU hard coal production comes from underground mines, and with relatively narrow and deep seams, and more complex geology, production costs are substantially higher than those of the world's major coal exporting countries. Coal output in EU countries is typically between 3 and 10 t/man-shift, whereas output for some open-cast mines can be in excess of 100 t/man-shift. Such a comparison however is inadequate because the production costs structure is totally different. Less than 10 % of European coal is extracted from surface mines, compared to 50 % in Australia, 60 % in the USA and 85 % in Canada. German production costs are particularly high with hard coal deposits at an average depth of 900m.

#### Foreign trade

The EU ranks with Japan as one of the two foremost importers of hard coal. Indigenous hard coal production accounted for 58 % of gross hard coal consumption in 1993, with the remainder being covered by imports. The share of imported hard coal has risen from around 20 % in the early 1980s, increasing from around 70 million tonnes to over 130 million tonnes in 1992. However, in 1993, coal imports fell 16 % from 1992 levels as a result of the recession and the high level of existing coal stocks.

Within the EU, only the UK and Germany export significant quantities of coal, and the vast majority of this is sold to other EU countries. Germany exports anthracite, and its main markets are in France, Belgium, Italy and the Netherlands. UK exports are almost exclusively steam coal and its main markets are in Denmark, France, Germany, Ireland and Spain. Both countries also export some coal to EFTA countries. Be-

**Table 1: Solid fuels**  
**Main indicators - Hard coal (1)**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Gross inland consumption	285.6	322.1	319.7	323.9	311.7	314.1	318.1	327.6	308.8	275.5
Net exports	-85.8	-96.5	-92.5	-91.3	-93.4	-101.1	-114.7	-131.5	-133.7	-111.5
Production	172.9	217.4	227.9	221.7	214.6	208.7	197.2	194.4	185.0	158.8
Employment (thousands)	504.3	464.4	420.8	378.4	367.0	297.1	270.1	245.8	215.4	175.3
of which, underground	331.4	311.4	285.0	255.3	230.0	209.1	187.5	169.3	153.4	125.1

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 2: Solid fuels**  
**Main indicators: Lignite (1)**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Gross inland consumption	196.0	194.4	186.6	179.6	183.1	190.9	188.4	359.4	322.7	298.6
Net exports	-3.3	-2.7	-2.9	-2.5	-2.1	-2.3	-2.3	-3.3	-3.8	-3.0
Production	196.6	186.9	183.1	179.8	179.8	188.7	186.2	356.6	319.0	295.1

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 3: Solid fuels**  
**Share of solid fuels in gross inland energy consumption**

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	23.1	23.3	22.2	21.8	21.0	21.0	20.9	22.6	21.5	19.6
Belgique/België	24.0	22.7	19.7	19.0	19.0	20.6	21.6	20.0	18.7	16.0
Danmark	30.6	39.6	38.5	39.2	38.5	33.2	35.7	44.2	37.8	39.1
BR Deutschland (1)	29.7	30.9	29.5	28.1	27.6	28.1	27.6	33.7	31.4	29.9
Hellas	20.9	34.8	36.8	37.4	38.3	37.5	38.0	36.0	38.1	37.9
España	21.5	28.0	25.8	24.0	19.6	22.5	22.2	22.0	23.4	21.5
France	16.9	12.6	10.3	9.4	9.1	9.6	9.4	9.3	8.9	6.8
Ireland	20.7	29.5	30.8	38.1	39.1	38.1	35.1	32.9	33.0	30.7
Italia	8.6	11.5	10.6	10.5	9.7	9.2	9.7	9.1	7.9	6.8
Luxembourg	50.7	45.3	42.1	34.5	34.8	34.0	31.9	28.3	27.0	26.3
Nederland	6.3	11.5	10.2	10.5	12.7	12.6	13.7	11.6	11.6	12.2
Portugal	4.6	6.4	10.0	14.4	15.5	16.3	17.1	19.2	18.2	19.8
United Kingdom	35.0	31.0	31.8	33.0	31.6	30.5	30.0	29.1	28.1	24.3

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 4: Solid fuels**  
**Production, trade and consumption by sector - Hard coal (1)**

(million tonnes)	1980	1989	1990	1991	1992	1993
Production	260.3	208.7	197.2	194.4	185.0	158.8
Imports	97.7	111.5	126.0	140.7	139.5	117.1
Exports	16.9	10.4	11.3	9.2	5.7	5.6
Gross domestic consumption	330.9	314.0	318.2	327.6	308.8	275.5
Transformation, of which	293.3	273.5	280.6	285.1	269.4	241.2
Electric power stations	194.2	200.4	210.2	218.3	207.1	185.1
Coking plants	93.8	71.1	68.4	64.6	60.4	53.8
Final consumption, of which	36.0	40.9	39.4	42.0	40.3	34.7
Industrial	16.9	28.5	28.5	29.8	29.9	24.9
Domestic	18.9	12.4	10.8	12.2	10.5	9.8

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 5: Solid fuels  
Production by country - Hard coal**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	172.9	217.4	227.9	221.7	214.6	208.7	197.2	194.4	185	158.8
Belgique/België	6.3	6.2	5.6	4.3	2.5	1.9	1.0	0.6	0.2	0
BR Deutschland (1)	84.9	88.8	87.1	82.4	79.3	77.5	76.6	72.7	72.2	64.17
España	15.3	16.1	15.9	19.3	19.0	19.2	19.4	17.9	18.6	18.12
France	16.6	15.1	14.4	13.7	12.1	11.5	10.5	10.1	9.5	8.57
United Kingdom	49.5	90.8	104.6	101.6	101.4	98.3	89.3	92.7	84.2	67.6

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

tween 1980 and 1993, intra-EU trade fell from 17.2 to 2.9 million tonnes, mainly due to the deterioration in the price competitiveness of EU coal versus coal originating from third countries.

The USA supplies the greatest volume of imports to the EU, providing 31.3 million tonnes, 27.5 % of total extra-EU imports in 1993. Imports from South Africa and Australia accounted for 24.3 % and 15.8 %, respectively. The remaining 32.4 % was made up largely by imports from Colombia, Poland, the former USSR, Canada and China.

The level of foreign trade in hard coal has risen considerably over the last decade. In total, world trade in hard coal stood at about 200 million tonnes in 1980, the majority of which was coking coal. Since then the market has grown to 384.2 million tonnes in 1993, with coking coal accounting for 173 million tonnes and steam coal representing 211 million tonnes. The key factors in the recent development of the market has been the growing demand in the EU and increasingly from Asia (Japan, South Korea, Taiwan and Hong Kong).

The development of a large international trade in coal has significant benefits for importing countries, since it provides a wider range of suppliers, including a growing spot market to meet short term requirements, and a competitive market in which suppliers have to face downwards pressure on prices.

International trade in other solid fuels is very limited, and given that the vast majority of lignite production is directly integrated with electricity generation, it is difficult to draw meaningful comparisons with industries outside the EU.

## MARKET FORCES

### Demand

#### Hard coal

By far the most important market for hard coal is power generation which, in 1993, accounted for 66 % of gross consumption. A further 20 % was accounted for by the production of coke. Most of the final consumption of coal is in energy

intensive industries, and where plants are typically large scale, such iron and steel, chemicals and cement.

The reason for the high concentration of demand is the high cost of combustion equipment and the greater difficulty of transportation (for coal) compared with liquid or gaseous fuels. Coal is therefore only an attractive option when economies of scale can be achieved, and where the cost of transportation can be limited, such as in the power station market. In small scale markets, e.g. commercial and domestic boilers, coal has difficulty competing with gas and heating oil due to their greater convenience and lower cost.

The concentration of coal consumption into so few end uses poses significant risk to the industry, since it ties the industry's prospects to the prospects of these consumers and to technical developments within them. In the power generation market, the rapid penetration of gas-fired power plants in some countries will increasingly limit the market share for hard coal. At the same time the changing industrial structure, away from heavy energy intensive industries such as iron and steel, has reduced the size of its main industrial market. In the iron and steel industry, the position of coal has been further undermined by the development of pulverised coal injection technology, reducing the need for coke and hence higher value coking coal, as well as the move towards a greater proportion of steel production coming from recycled scrap steel produced in electric arc furnaces.

#### Lignite

Lignite consumption is concentrated in the power generation sector, which in 1993 accounted for 78 % of consumption. Most lignite used in the power sector is burned in power stations located next to the lignite deposits. It is generally uneconomic to transport lignite over long distances.

The other significant markets for lignite are briquetting plants and gas manufacture in the former East Germany. However, due to the environmental impact of manufacturing gas from lignite, and the availability of natural gas following German re-unification, the quantity of lignite used for this purpose is falling.

**Table 6: Solid fuels  
Output per man/hour underground - Hard coal**

(kg per man/hour)	1988	1989	1990	1991	1992	1993
EU (1)	578	603	628	665	703	762
Belgique/België	320	328	361	383	268	N/A
BR Deutschland (1)	630	645	673	681	698	707
España	333	329	341	315	328	396
France	534	589	634	727	743	711
United Kingdom	633	680	704	801	919	1 239

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 7: Solid fuels**  
**Investment in the coal industry - Coal extraction and preparation**

(million ECU)	1990	1991	1992	1993 (1)	1994 (1)
EU	1 030.7	875.1	652.9	769.6	671.0
Belgique/België	2.0	N/A	N/A	N/A	N/A
BR Deutschland	274.7	232.4	180.2	337.3	384.4
España	201.8	255.8	226.0	208.7	137.9
France	45.1	42.2	31.3	29.7	28.5
Italia	54.8	0.1	1.9	4.7	4.2
Portugal	0.8	0.5	0.5	N/A	N/A
United Kingdom	451.5	344.1	213.0	189.2	116.0

(1) Forecast.

Source: European Commission, DG XVIII

## Supply and competition

Coal is the most abundant fossil fuel in the world and within the EU. European proven hard coal reserves are estimated to have stood at 29 billion tonnes at the end of 1993. At current rates of production, this means that hard coal reserves would last about 160 years. France, Germany and the United Kingdom are estimated to account for 93 % of Europe's hard coal reserves, with Germany alone accounting for 82 % of the European reserves.

Although the EU is reasonably well-endowed with coal, the majority of remaining reserves are deep deposits that require working at very great depths, sometimes in excess of 1 000 metres with heavy-duty, sophisticated equipment, both for technical and safety reasons. This has led to high production costs and has undermined the financial situation of the coal production industry.

Due to the high cost of transportation and handling, and its relatively low calorific value, historically coal industries have developed along national lines, and were built to serve the regional market which grew up around producing areas. The coal industry was therefore characterised by a low level of international trade, and regional industries were relatively isolated from competitive pressures from either other fuels or other coal producers.

During the 1970s the fact that coal production in Europe was becoming increasingly expensive was hidden by the rapid increase in the price of oil, and the consequent desire to improve security and diversity of energy supplies. In addition, governments saw a need to maintain coal production in order to support regional economies.

However, from the early 1980s onwards, with a growing availability of cheap coal from exporting countries, together with a desire to improve economic performance by reducing trade barriers, governments in the EU began to seek to reduce subsidies. This gained momentum during the 1980s as oil prices fell and coal became available from a wide range of countries, particularly OECD countries, which reduced concerns over supply security.

Whilst the ECSC Treaty, under Article 4(c), prohibits all "subsidies or aids granted by States, or special charges imposed by States, in any form whatsoever", the critical state of the Community coal industry from the early 1960s onwards led to the Commission establishing, in 1965, a temporary framework for State aid to the Community coal industry under the provisions of Article 95 of the ECSC Treaty. The continuing problems in the industry have led to successive Commission decisions establishing Community rules for State aid to the coal industry, the most recent of which is Decision No. 3632/93/ECSC. This Commission Decision, which will last until the expiry of the ECSC Treaty in the year 2002, establishes that aid may be considered compatible with the proper func-

tioning of the common market provided that it helps to achieve at least one of the following objectives:

- to make, in light of coal prices on international markets, further progress towards economic viability with the aim of achieving a degression of aids;
- to solve the social and regional problems created by the total or partial reductions in the activity of production units;
- to help the coal industry adjust to environmental protection standards.

The Decision also contains provisions designed to make existing aid schemes more transparent. After a transitional period not exceeding three years (therefore ending on 31st December 1996), aid would only be authorised if it was entered in the national, regional or local public budgets of Member States or channelled through strictly equivalent mechanisms. In addition, from the beginning of 1994, all aid received by undertakings has to be shown together with their profit-and-loss accounts as a separate item of revenue, distinct from turnover.

Member States intending to grant aid to coal undertakings during the period 1994 to 2002 are required to subject to the Commission in advance a modernisation, rationalisation and restructuring plan to improve the economic viability of the undertakings concerned by reducing production costs. For undertakings unable to achieve this, aid will only be considered if they are subject to a closure plan with a deadline occurring before the expiry of Decision No 3632/93/ECSC or, in exceptional social and regional circumstances, if the closure occurs after the expiry of the Decision.

European reserves of sub-bituminous coal and lignite are believed to have stood at about 68 billion tonnes. Some 83 % of these reserves were in Germany. Europe has 13 % of world reserves of sub-bituminous coal and lignite. Most lignite mined in the EU is extracted by surface or "open cast" methods, which allow higher productivity than underground mining and yield a fuel that is competitive with other fuels used for electricity generation.

## Production process

There are two principal methods of extracting solid fuels from the ground, these are open-cast or under-ground mines. Most coal in the EU is extracted from under-ground mines, whilst lignite is generally only economic if accessible using an open-cast pit.

Open-cast mining is possible if the coal reserves lie relatively close to the surface, and can be accessed by removing the over-burden of top-soil and sub-soil. This is usually carried out using large scale machinery and productivity can be very high.

Where deposits are much deeper, under-ground mining is necessary, requiring a shaft to be sunk and tunnels to be con-

structured in order for coal faces to be developed. For underground mines the degree of mechanisation will depend on the thickness of the coal seam, and on the geological conditions, i.e. the extent of faulting and the inclination of the seam. The two main technologies are longwall and continuous mining machines. Longwall technology can be used for thicker seams and where the coal seam is not highly faulted. Longwall cutters remove a coal seam by taking slices across the coal face, and then automatically advancing to make a new cut. Alternatively, continuous mining machines, together with a "room-and-pillar" extraction method, can be used when the seam requires more flexible methods.

Following extraction, most coal is then washed in order to remove non-combustible material extracted with the coal, and then graded.

Overland transportation of coal is usually by rail, although smaller quantities can be transported by road, and dedicated transport systems, such as slurry pipelines and conveyors which are sometimes used over very short distances. Coal delivery to power stations, where these are not located directly on the mine, is usually by rail, and may involve a dedicated rail link. Barges are used for transport on waterways, or in coastal waters, and international seaborne trade can involve ship sizes of up to 200 000 dwt.

### Research and development

Investment in the EU coal industry has fallen from 1 billion ECU in 1990 to an estimated 770 million ECU in 1993, and is expected to fall further to 670 million ECU in 1994. This has been mainly due to the reduction in the overall size of the industry. It has been high in areas of health and safety concerns.

Two key areas of technical research have been in mining technology and product upgrading. Research in mining technology is concerned with improvement of roadway support techniques (particularly in light of ever greater working depths), monitoring of ventilation, automatic steering of mining machines, and more efficient and safer transport systems for both personnel and materials. Research is also being made into remote control, data processing and modern communication systems, to examine whether and how they can contribute to increased safety, improved working conditions and more efficient mining operations.

Research into product upgrading concerns efficiency and environmental considerations of coal preparation, handling and coking. Both fundamental and applied research is being carried out by mining institutes, universities and laboratories, often on an international level, with ECSC financial support amounting to some 60 % of total costs.

After the first oil crisis, in 1974, interest grew in the conversion of hard coal and lignite into other materials as a way of reducing dependence on imported hydrocarbons. As a result, several pilot and demonstration programmes were launched by the EU into:

- gasification and liquefaction of solid fuels (including underground gasification);
- substitution of hydrocarbons by solid fuels with fluidised bed combustion, coal-liquid mixtures and combined cycles as key areas of research;
- utilisation of solid fuels within the framework of the EU JOULE 2 R&D programme into non-nuclear energy and rational use of energy which took over from Joule in 1992;
- energy production from fossil fuels based on advanced technologies, notably combined cycles, within the recent "Framework programme" (1990-94); and
- new and improved clean combustion methods for solid fuels such as fluidised bed combustion, underground coal gasi-

fication and use and treatment or enhancement of wastes arising as a result of the use of solid fuels, all within the new demonstration "Thermie" Programme (European Technologies for Energy Management) which was proposed by the Commission and ran from 1990-94. THERMIE II is now on the table as part of the "Fourth Framework Programme."

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## INDUSTRY STRUCTURE

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### Companies

The bulk of French coal production is the responsibility of the nationalised company, Charbonnages de France (CdF). A few small mines are operated by Electricité de France or are privately held. The Technical Association for Coal Imports (ATIC) co-ordinates coal imports. All coal and lignite mining in France is due to cease by 2005.

In Germany, the main coal mining companies are Ruhrkohle, Saarbergwerke, and Preussag, which produce hard coal, and Rheinbraun, Mibrag and Laubag for lignite. The lignite companies are mostly owned by electricity companies or have power plants associated with their mines. Indeed, Rheinbraun is a subsidiary of RWE, and owns a large share in Laubag, the remainder of which is owned directly by power companies. A new subsidy programme was announced at the start of this year which fixed the amount of money to be made available to the hard coal industry. The figure has been set at DM 7 billion between 1997 and 2000, and is likely to lead to further rationalisation. In addition, legal action has resulted in some liberalisation in the supply of coke and coking coal to the steel industry, which has allowed further imports and forced cut-backs in coking capacity.

The major producer of lignite in Greece is the publicly-owned Public Power Corporation (PPC). Additionally, there are some small privately-owned mines in northern Greece. Greek lignite is burned almost exclusively in PPC's power plants.

In Ireland, coal mining at Arigna Coelieris was stopped in 1990. However, the production of peat for use in power stations and other low grade heating applications still continues. The Electricity Supply Board consumes about 3 million tonnes/year of peat, and a smaller quantity is turned into peat briquettes.

Italy's modest lignite output is found in Tuscany and Umbria. There is also sub-bituminous coal production in Sardinia. Coal imports are made by ENEL, ENI and Finsider, the steel company.

In Portugal, solid fuel production is limited to one anthracite mine, the output from which is used to fire a mine-mouth power station. The mine is due to be closed at the beginning of 1995.

Coal in Spain is produced by a large number of companies, more than 100 in total. The leading company, Hunosa, is publicly owned, while most of the rest are held privately. Sales of coal to power stations are made under the auspices of a contract between Carbuñion, the association of coal producing companies, and UNESA, the association of electricity utilities. The coal industry in Spain receives significant subsidies, both directly from the government and via its contracts with the electricity industry.

Finally, in the United Kingdom, British Coal has seen very substantial rationalisation of its capacity over the last two years, and has now been broken into a number of regional companies which are being sold to the private sector. RJB mining is expected to take over the vast majority of remaining production, and the privatisation process should be completed by the end of 1994.

## Strategies

The strategies of companies in the EU solid fuels sector are largely shaped by the foreseen decline in indigenous output, caused by the EU drive for increased competitiveness within the context of the EU state aid policy. Producing companies will have to rationalise capacity and increase productivity in order to gain or maintain profitability.

In the UK, the privatisation and re-structuring of British Coal is intended to remove any further need for state aid to the industry. The main protection mechanism in place in the UK has been a large contract for coal sales to the electricity industry. For 1993/94 the volume of this contract was cut to 40 million tonnes and for 1994/95 it is already down to 30 million tonnes per year. Contract volumes will remain at this level for the next three years. These volumes are a reduction from 70 million tonnes per year prior to privatisation of the electricity industry.

In Germany, hard coal production capacity has also seen substantial rationalisation and productivity improvements. Production has been cut by about 33 % and employment by 43 % since the early 1980s. Further rationalisation will result from the recent reduction in subsidies, and this will include coking capacity. Lignite production has also been falling as a result of the economic re-structuring in the former East Germany, and in response to environmental pressures. This will require further cuts in production before stabilisation and will result in a further concentration of demand in the power sector.

Charbonnages de France has recently reached agreement with its employees on a programme which will lead to the ending of coal and lignite production in France. CdF is liable by law for the livelihood of its mining employees, and thus is investing in developing alternative employment for them. CdF will continue to operate its coal fired power stations, but will increasingly fire them on imported coal.

The Spanish coal industry has accepted to implement a re-structuring plan which will result in the closure of the uneconomic underground pits and, hence, a further reduction of the underground workforce.

In order to cope with the employment effects of the restructuring process and in order to reinforce the reconversion process in the mining regions affected by pit closures, the European Commission established the Community initiative, RECHARII (to last until the end of 1997), which is additional to other Community financial instruments.

### Impact of the Single Market

The coal industry in Europe has undergone profound restructuring and downsizing over the past 15 years. This process is continuing in an effort to improve the sector's competitiveness and reduce its reliance on state aid. This process has not, however, been mainly due to the creation of the European Single Market. A framework for European co-ordination of development and aid for the coal industry has existed since the setting up of the European Coal and Steel Community in 1953, and rules for state intervention have been periodically defined within the framework of this treaty (the latest rules were published in January 1994, and define the criteria for authorising state aid up to 2002).

Coal trade in Europe, both within the Community and with third countries, is not subject to any particular technical or fiscal barriers. The preponderance of high-cost coal within Europe's remaining coal-producing countries has meant that only very small quantities are traded, the fuel being largely uncompetitive outside national markets subject to state aid or protected contracts. Conversely, the Union is open to imports of coal from third countries.

Coal markets in the European Union, particularly in the power generation and industrial sectors, have been adversely affected by EU environmental legislation (particularly the Large Com-

bustion Plant Directive). Deregulation and privatisation of the power sector in certain countries, notably the UK, have also reduced the market for coal.

## REGIONAL DISTRIBUTION

Hard coal is currently mined in significant quantities in four EU countries: the United Kingdom (67.6 million tonnes), Germany (64.2 million tonnes), Spain (18.1 million tonnes), and France (8.6 million tonnes). Small quantities are also produced in Portugal and in Italy.

Lignite is mined in four EU countries: Germany (222 million tonnes), Greece (51 million tonnes), Spain (13 million tonnes), and Italy (1 million tonnes). The three biggest producers accounted for over 98 % of total output in 1993. In addition 6 million tonnes of peat is produced in Ireland. Lignite production in France was terminated in 1992.

Within each producing country there is a further regional concentration of production. In Germany lignite is produced in the former East Germany and the Rheinland district, and hard coal is produced in the Ruhr and Saar coalfields. In the UK the majority of production comes from mines in Nottinghamshire and Yorkshire, although other areas, particularly South Wales and the Northeast have been more important in the past. In Spain the main producing regions are Asturias and Leon, while in France hard coal mining is mostly concentrated in the underground mines in Lorraine and in the South of France.

Traditionally coal mining areas have also been areas associated with heavy industry, and the regional effects of reduced coal mining together with re-structuring of heavy industries has had a big impact on unemployment and regional development.

## ENVIRONMENT

As with any fossil-fuel, the production, transformation and use of solid fuels have an impact on the environment. Hard coal and lignite are used mainly for large scale power and heat generation, processes which offer cost effective environmental protection measures. In particular, major efforts have been undertaken since the mid-1970s to reduce particulate, SO<sub>2</sub>, and NO<sub>x</sub> emissions from coal and lignite-burning power plants, albeit at the expense of conversion efficiency and the relative cost of coal-generated electricity. As a result of the installation of flue gas desulphurisation and NO<sub>x</sub> removal units, significant reductions in the emissions of pollutants have already been achieved. Further improvements are expected over the balance of this decade with the development of a large number of pilot plants that employ advanced methods of clean coal utilisation such as fluidised bed combustion. These will help to maintain a market for coal in the power generation and large boiler sectors.

Compared to other fossil fuels, solid fuels emit the highest amount of CO<sub>2</sub> per unit of energy. In order to ensure that the greenhouse gas emissions from coal use are minimised, it is important that, wherever possible, the efficiency of coal utilisation continues to improve. So far this century, the efficiency of coal-fired power generation has doubled due to technological improvements. Further efficiency gains are expected as combined cycle systems are developed and widely deployed. CO<sub>2</sub> emissions from such plants are as much as 20 % lower than from conventional plants. Furthermore, the development of combined heat and power plants offers potential CO<sub>2</sub> emissions reductions of more than over 50 %.

## REGULATIONS

The coal and lignite mining industries operate under strict health and safety regulations. These particularly concern underground mines, where dust, methane, subsidence and water



**Table 8: Solid fuels  
Forecasts**

(million tonnes)	1993	1995	2000
<b>Hard coal</b>			
Production	160	136	106
Consumption	286	290	302
<b>Lignite</b>			
Production	262	232	225
Consumption	265	232	225

Source: DRI Europe

all present considerable health and safety risks. Such regulations are generally developed and monitored by national institutions.

With respect to the EU, the key regulations are those concerning the issue of subsidies and environment. The issue of subsidies is covered by the ECSC Treaty (since 1952), which completely prohibits State aid under Article 4(c), and rules agreed subsequently. The most recent reform, Decision No 3632/93/ECSC, is detailed under "Supply and Competition" of this monograph. These new rules, agreed in an attempt to reduce the level of subsidies and open coal markets, allow aid provided it meets one of three criteria: it is intended to make the industry more efficient with the aim of achieving a depression of aids; it is intended to off-set social and regional problems; it is intended to help the industry meet environmental standards. Furthermore, after 1996, aid will only be allowed if it is recorded transparently in national and/or regional government accounts, and in the accounts of the receiving company.

The Treaty also encourages, under Article 55, the promotion of technical and economic research relating to the production and increased use of coal and to occupational safety in the coal industry. The ECSC Treaty will expire in June 2002, when the coal and steel sectors will be integrated into the EC Treaty.

The main environmental measure currently in place, and which impacts on the cost of coal combustion, is the Large Combustion Plant Directive (LCPD) which places emission limits on large scale boilers (over 50 MWt) as well as specifying maximum emission levels for each country. This legislation effectively requires the use of flue-gas-desulphurisation and NOx reduction plant to be fitted to all new coal plants, and for a reduction of emissions from existing plants by retrofitting flue gas cleaning plant or switching to non-polluting fuels, e.g. gas.

## OUTLOOK

Solid fuels face a declining share in both the domestic and industrial sectors. This is largely due to consumer preference, with competing fuels offering greater convenience, less local environmental impact and lower investment costs in capital equipment. This trend is not expected to be significantly altered by differential fuel prices.

Coal does, however, have a future in power generation where its share of the fuel mix should rise into the next century. Currently the share of coal is declining in this sector as countries respond to emission legislation, and low gas and oil prices offer lower cost electricity. However, as oil and gas prices are expected to rise more quickly than coal prices, the competitive position of coal should improve.

Competition from extra-EU coal exporting countries and the general effort to lessen national subsidies means that, by the year 2000, 65 % of hard coal consumption will be serviced by imports compared with about 42 % in 1993. Meanwhile, hard coal production should fall by around 34 % by the year 2000, compared to 1993. Although indigenous energy production can play an important role in terms of security of supply, the stability of the world market for coal with abundant supplies from a wide variety of geographical sources leads to the conclusion that, even in the long term, the risk of persistent interruption of coal supplies is minimal, although it cannot be ruled out completely.

Consequently, major developments are expected in the British, Spanish and German coal markets. In the United Kingdom, coal sales to the power generation market will probably fall below 30 million tonnes by the end of the decade, as a result of the expansion of gas-fired power. In Germany, the reduction in coal subsidies will reduce output, and in particular liberalise the coking coal and coke markets. Meanwhile, in Spain, a major restructuring of the industry is anticipated.

Written by: DRI Europe

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# Exploration and production of crude oil and natural gas

## NACE 13

*In 1993, 280 million tonnes of oil and natural gas were produced in the EU, 6.7 % higher than in 1992. The United Kingdom is the leading oil and gas producer within the EU, producing 54 % of total EU output in 1993. The Netherlands accounted for slightly over half of the remainder of EU oil and gas production.*

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### INDUSTRY PROFILE

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#### Description of the sector

NACE 13 comprises three main activities:

- exploration for crude oil and natural gas;
- production of liquid hydrocarbons (i.e. crude oil), condensates and other liquids resulting from gas processing operations; and
- production of natural gas.

#### Recent trends

Production of hydrocarbons in the EU increased steadily up until the middle of the 1980s, stimulated by rising oil prices. The 1986 oil price collapse reduced the attractiveness of upstream investment and set output on a downward trend. By 1989, hydrocarbon production had fallen to pre-1983 levels at 238.5 million toe (tonnes of oil equivalent). Since then, hydrocarbon output has increased to 280 million toe in 1993, principally due to growth in natural gas production.

Crude oil production contracted by 22 % between 1986 and 1989 due to lower prices. Since then, output has grown slowly such that in 1993, crude oil output was 9.2 % higher than in 1989 at 123.6 million tonnes. The increase was largely due to a 10.3 % increase in UK crude oil production which took UK oil production to 99.5 million tonnes in 1993. Other increases in output within the EU came from Denmark, Italy and Greece. Production remained constant in the Netherlands and fell in the other oil producing Member States.

The UK has maintained its position as the most important hydrocarbon producer in the EU over recent years. Its share of total EU hydrocarbon output increased from 53 % in 1992 to 55 % in 1993 as new gas fields came on stream. Meanwhile, the Netherlands (the second largest hydrocarbon producer in the EU) saw its share of EU production fall from 25 % to 24 %.

Natural gas output in the EU boomed in 1993 to stand at 156.4 million toe, up 8.2 % compared to 1992. The rise was principally a result of the "dash for gas" which took place in the United Kingdom. In 1993, natural gas production in the UK (which accounts for 35 % of EU total), rose by 20.1 %, as a number of combined cycle plants were brought into line. The EU's second largest gas producer, the Netherlands experienced only a 1.7 % increase in production while the third ranking Italy increased its output by 11 %.

Employment in the hydrocarbon industry has also followed movements in the price of oil. The 1986 price collapse led to cutbacks which saw employment in the sector contract by 30-35 %. In 1989, overall employment within the sector was estimated at 95 000 people. Employment did rise during 1990

and the beginning of 1991, but has since fallen back under the weight of economic slowdowns.

#### International comparison

##### Crude oil

Total world production of crude oil was 3.2 billion tonnes, in 1993, down 0.1 % from 1992. Increases in production from the Middle East (+5 %) and from Western Europe outside the EU (+4.7 %), were just sufficient to compensate for a 11.9 % fall in production in the former USSR and Eastern Europe. Other than the former USSR and Eastern Europe, production fell slightly in North America and in the New Zealand & Australia region.

Proven world oil reserves rose to 136.7 billion tonnes at the end of 1993, little changed from a year earlier but only 100 million tonnes short of the all-time high of 1989. The EU's share of total proven world reserves at the start of 1993, was 872.3 million tonnes or 0.6 % of the world total, up from 847.1 million tonnes at the start of 1992. The EU reserves to production ratio currently stands at seven years.

##### Natural gas

Total proven world gas reserves climbed by 2.6 % to 142 trillion cubic metres (134.9 billion toe) at the start of 1993. EU gas reserves account for around 2.7 % of the world total.

#### Foreign trade

##### Crude oil

The EU produces only about 22 % of the oil that it consumes compared to the OECD average of 43 %. Thus, the EU is relatively dependent upon crude imports to meet demand and, since the oil price collapse in 1986, crude oil imports have risen steadily.

Intra-EU trade is quite limited, and takes the form of crude oil originating in the United Kingdom North Sea exported to the rest of the EU.

Extra-EU imports of crude oil stood at 464.8 million tonnes in 1993, 1.5 % higher than in 1992. Growth in EU imports was lower than the previous year due to higher EU production and sluggish demand. The Middle East is by far the most important supplier of crude oil. Its share had been falling since the Gulf war, so that in 1992 the share of Middle East crude in total crude imports had fallen to 37 %. In 1993, however, the share had returned to the pre-Gulf war level of 40 % of total imports. Norway has steadily increased its market share between 1990 and 1993 as the proximity of the EU market provided an obvious destination for rising Norwegian exports. After marginally increasing its share in the EU import slate in 1991 to 33 %, imports from Africa have fallen to 25 % in 1993.

##### Natural gas

The share of natural gas demand met by indigenous production fell steadily over the 1980s to a low point of 60 % in 1989. As larger quantities of gas, mainly from the UK, have been brought on stream, this figure has risen to 61 % in 1993. Natural gas imports to the EU totalled 4.2 million TJ (terajoule) (89.8 million toe) in 1993, 1 % up on 1992. The greatest proportion of imports, 45 %, came from the former Soviet Union, followed by Algeria and Norway with 30 % and 24 %, respectively. Germany accounted for the greatest proportion of gas imports into the EU in 1993, taking 31.5 % of the total; Italy and France were placed second and third, accounting for 25.6 % and 24.5 %, respectively.

Intra-EU trade, in the form of gas exports from the Netherlands to the rest of the EU, fell slightly to 1.47 million TJ in 1993. A steep fall in exports to France was partially compensated by an increase to Belgium, Italy and Luxembourg. Around 60 % of Dutch exports are to Germany, the volume of which

**Table 1: Crude oil  
Production by Member State, 1992-1993**

(million tonnes)	1992	1993	Share of 1993 (%)	Change 1992/93 (%)
EU	118.0	123.6	100.0	4.7
Belgique/België, Luxembourg	0.0	0.0	0.0	0.0
Danmark	7.8	8.3	6.7	6.4
BR Deutschland	3.3	3.1	2.5	-6.1
Hellas	0.7	1.0	0.8	42.9
España	1.4	1.2	1.0	-14.3
France	3.3	3.1	2.5	-6.1
Ireland	0.0	0.0	0.0	0.0
Italia	4.5	4.6	3.7	2.2
Nederland	3.3	3.3	2.7	0.0
Portugal	0.0	0.0	0.0	0.0
United Kingdom	94.3	99.5	80.5	5.5

Source: Eurostat

**Table 2: Natural gas  
Production by Member State (1)**

(million toe)	1992	1993	Share of 1993 (%)	Change 1992/93 (%)
EU (2)	144.5	156.4	100.0	8.2
Danmark	3.3	3.8	2.4	15.2
BR Deutschland (2)	13.7	13.6	8.7	-0.7
Hellas	0.1	0.1	0.1	0.0
España	1.1	0.6	0.4	-46.9
France	2.7	2.8	1.8	4.8
Ireland	1.9	2.2	1.4	13.2
Italia	14.8	16.4	10.5	11.0
Nederland	61.6	62.7	40.1	1.7
United Kingdom	45.2	54.3	34.7	20.1

(1) toe: Tonnes oil equivalent.

(2) Including former East Germany.

Source: Eurostat

**Table 3: Crude oil  
World production**

(million tonnes)	1992	1993	Share of 1993 (%)	Change 1992/93 (%)
EU	118.0	123.6	3.9	4.7
Rest of Western Europe	112.6	119.9	3.8	6.5
Former USSR & Eastern Europe	461.0	406.1	12.8	-11.9
North America	515.6	504.1	15.9	-2.2
Latin America	398.4	406.5	12.8	2.0
Asia	304.3	304.3	9.6	0.0
Africa	332.0	330.7	10.4	-0.4
Middle East	900.0	944.7	29.8	5.0
Australia & New Zealand	26.8	25.0	0.8	-6.7
World	3 168.7	3 164.9	100.0	-0.1

Source: BP Statistical Review of World Energy, Eurostat



**Table 4: Natural gas  
World production (1)**

(million toe)	1992	1993	Share of 1993 (%)	Change 1992/93 (%)
EU	144.5	156.4	8.3	8.2
Rest of Western Europe	34.5	32.9	1.7	-4.6
Former USSR & Eastern Europe	681.3	665.5	35.2	-2.3
North America	567.6	592.6	31.4	4.4
Latin America	88.9	91.0	4.8	2.4
Asia	136.5	143.9	7.6	5.4
Africa	66.1	69.1	3.7	4.5
Middle East	104.3	110.4	5.8	5.8
Australia & New Zealand	25.5	26.6	1.4	4.3
World	1 849.2	1 888.4	100.0	2.1

(1) toe: Tonnes oil equivalent.

Source: BP Statistical Review of World Energy, Eurostat

remained stable in 1993 at around 872 million TJ. Germany chose to take additional quantities of natural gas from Denmark in 1993, to meet growing domestic demand. As a consequence, trade in natural gas between Denmark and Germany rose by 31.3 % in 1993 compared to 1992. Exports to Denmark's other trading partners remained steady.

## MARKET FORCES

### Demand

Crude oil and natural gas are key energy sources, used to generate power and/or heat. They are used widely in everyday life throughout the power generating, industrial, commercial, domestic and transport sectors. Demand for crude oil and natural gas is characterised by low price and income elasticities because of the lack of competitive alternatives for many applications, particularly in the transport sector. In recent years, natural gas has tended to replace petroleum products in power generation, industry and domestic heating applications, due to its cost competitiveness and its relatively favourable impact on the environment.

### Supply and competition

80 % of EU crude oil production originates from fields on the UK continental shelf. The Netherlands provides 40 % of total EU natural gas production, 79 % of which is from on-

shore fields (principally from the Groningen gas giant). Since natural gas consumer prices are linked to oil prices, however, the economics makes off-shore natural gas production favourable. Despite relatively high production costs, EU hydrocarbon exploration and production benefits from lower costs of transportation. This transportation cost advantage, along with OPEC's policy of maintaining artificially high prices, enable EU crude producers to compete with other crude producers which profit from lower production costs.

The number of wells drilled in the EU peaked in 1985 (just before the oil price collapse) before falling to a low in 1989 at 590 wells. A more favourable fiscal regime in the UK attracted exploration at the beginning of the 1990s, but since 1992 the number of wells drilled in the EU has been declining to reach 444 wells in 1993, well below the 1989 level. This represents 0.7 % of the total number of wells drilled in the world, compared to a share of 1.3 % in 1989.

In the USA, drilling was similarly sensitive to oil prices. The number of wells drilled have been on the decline since 1985. However, in 1993 their number, in the USA, increased for the first time since then to stand at 26 078 wells. The number of wells drilled in the world in 1993 increased by 9.8 % at 61 758 wells.

### Production process

Exploration and production of oil and gas requires a highly skilled and experienced work force. The fact that exploration in the EU takes place offshore only heightens these requirements. By the same token, the EU is in a position to export highly trained and skilled labour in this sector.

R&D activity in the industry has traditionally been high. The nature of R&D programmes reflect the significant proportion of offshore operations undertaken in the upstream oil and gas sector. The high price of crude oil during the first half of the 1980s encouraged research into enhanced recovery methods. To reduce costs, improvements were made in the tools and operating efficiencies of exploration and production. Most of these programmes produced excellent results and generated significant growth in terms of services and equipment installation within the EU. However, the 1986 fall in crude prices put a damper on much of this research as many players in the industry divested much of their upstream interests and became more integrated with their downstream businesses. Even so, the depth and the sometimes harsh operational environment of the North Sea has assisted EU companies involved in oil exploration and production to acquire unparalleled offshore operational experience.

Since the late 1980s, the increased emphasis on the development of smaller and deeper fields has led to further technological developments, many of which streamline or increase

**Table 5: Crude oil  
Imports by Member State (1)**

(million tonnes)	1992	1993
EU (2)	499.4	504.7
Belgique/België	32.5	32.6
Danmark	5.6	5.6
BR Deutschland (2)	98.3	99.1
Hellas	16.3	16.3
España	55.0	55.0
France	75.1	76.3
Ireland	2.0	2.0
Italia	88.6	89.3
Luxembourg	0.0	0.0
Nederland	56.2	59.3
Portugal	11.8	11.3
United Kingdom	58.0	58.0

(1) Including feedstocks.

(2) Including former East Germany.

Source: Eurostat

**Table 6: Natural gas  
EU imports by country of origin, 1993 (1)**

(thousand TJ - GCV)	Former USSR	Algeria	Norway	Lybia	Total
Belgique/België	0.0	175.3	82.2	0.0	257.5
BR Deutschland	938.6	0.0	385.0	0.0	1 323.6
España	0.0	174.6	7.8	54.5	236.9
France	420.3	365.0	242.0	0.0	1 027.3
Italia	530.8	543.3	0.0	0.0	1 074.1
Nederland	0.0	0.0	104.6	0.0	104.6
United Kingdom	0.0	0.0	174.7	0.0	174.7
EU	1 889.7	1258.2	996.3	54.5	4 198.7
Share in total EU imports (%)	45.0	30.0	23.7	1.3	100.0

(1) TJ: Terajoule; GCV: Gross calorific value.  
Source: Eurostat

the efficiency of production. Some of the important technological advances made in the North Sea include: improved and streamlined platform designs; development of sophisticated floating production systems; improved platform safety systems such as interlocking fireproofing panels, multimedia on-platform safety monitoring systems and offshore escape systems; more efficient sub-sea completion systems such as highly flexible and durable flowline swivel joints; the development of dynamically positioned drilling vessels capable of operating at depths of 2 000 metres; the completion of the first commercial horizontal drilling operation; the development of deep-diving techniques and submarine vessels for underwater activities; improved measurement of static and dynamic statistics; the development of sophisticated pigs such as high friction reversible safety pigs; improved pigging techniques; and better geophysical data acquisition systems such as real-time processing of short offset 3D data.

## INDUSTRY STRUCTURE

### Companies

Since the early 1980s, the participation of governments in the upstream oil and gas sector has steadily decreased. In June 1992, the French state sold 12.4 % of Total's shares which left it with a direct holding of 12.6 % and an indirect holding of 2.3 %. The government also sold its 6.7 % share of the company's capital in the form of petroleum certificates. The French state is expected to sell a further 3 % in late 1994 or early 1995. In February 1994, Elf Aquitaine was privatised, raising 5.4 billion ECU for the French state. The government retained a "golden share" to protect it from hostile take-over bids.

In Spain too, the oil industry has been completely restructured over the past decade. It has developed from a state monopoly, with all sides of the business tightly controlled, to a liberalised and disaggregated system. In June 1992, the Spanish government announced that it would give up its majority stake in Repsol through two share sales. The first took place in autumn 1992 and was worth some 604 million ECU. The second phase of the sell-off took place in 1993 and reduced the government's stake in Repsol to about 41 %. In the long run the government has indicated that it intends to reduce its stake to 33 %.

In Italy, ENI, which includes oil and gas groups AGIP and SNAM, is due to be privatised at some stage over the next couple of years. The structure and timing of the privatisation has not yet been finalised. Selected non-strategic assets have been, or are in the process of, being sold off.

Competition to obtain exploration licences grew during the 1980s, with increasingly smaller areas being allocated to a growing number of companies, many of which included small independent operators. Nonetheless, the major companies did not relinquish their dominant position in exploration and production. Though this was not entirely due to their own efforts but was also, in part, due to the damage wrought on many small players by the 1986 price collapse. That led to a concentration of exploration and operating licences, particularly in the North Sea. The majors in the EU include Shell, Exxon and BP, all three of which are very active in the United Kingdom North Sea (with Shell and Esso splitting many joint ventures 50/50), NAM in the Netherlands (50 % state controlled with the remained split evenly between Shell and Exxon), and BEB in Germany.

**Table 7: Natural gas  
Intra-EU trade (1)**

(thousand TJ - GCV)	1992		1993	
	From NL	From DK	From NL	From DK
EU (2)	1 480.5	30.0	1 465.4	31.3
Belgique/België	170.2	0.0	182.9	0.0
BR Deutschland (2)	874.0	30.0	871.8	31.3
France	187.5	0.0	150.1	0.0
Italia	227.1	0.0	238.1	0.0
Luxembourg	21.7	0.0	22.5	0.0

(1) TJ: Terajoule; GCV: Gross calorific value.  
(2) Including former East Germany.  
Source: Eurostat

**Table 8: Crude oil and natural gas  
Number of wells drilled**

(units)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	780	880	1 000	850	720	790	590	716	860	663	444
Share in World total (%)	0.9	0.8	1.0	1.4	1.3	1.5	1.3	1.4	1.3	1.2	0.7
USA	67 100	83 600	69 700	39 400	34 500	33 700	31 252	27 019	26 571	23 998	26 078
Share in World total (%)	76.6	78.0	72.2	65.6	60.4	63.8	66.8	53.5	40.7	42.7	42.2
World (1)	87 600	107 200	96 600	60 100	57 100	52 800	46 800	50 517	65 357	56 263	61 758

(1) Includes former USSR and other Eastern European countries from 1991 onwards.  
Source: CPDP

### Impact of the Single Market

The main impact of the Internal Market programme on the exploration and production of crude oil and natural gas to date has been an indirect effect on demand. The impact on the sector as a whole is mixed, however, as increased economic activity within the EU has provided a positive stimulus to energy demand and consumption, while measures taken in the environmental field have changed the energy mix and provided new incentives for energy conservation.

### REGIONAL DISTRIBUTION

The production of crude oil and natural gas in the EU is extremely polarised. The United Kingdom dominates EU crude oil output, accounting for 80 % of total EU oil production in 1993. As for natural gas, the Netherlands accounts for 40 % of EU production, while the United Kingdom accounts for 35 %. Italy, Germany and Denmark also contribute in a more limited way to EU oil and gas output.

### ENVIRONMENT

Stringent regulations are applied to all offshore operations in the EU. These include regulations concerning oil spills and discharges of cuttings and oil mud. Work is also being undertaken to define rules and standards for the abandonment of disused offshore installations and structures. Safety regulations are also very strict, having been tightened in the wake of several accidents that occurred in the North Sea at the end of the 1980s.

### REGULATIONS

Progress towards implementation of the Single European Market brought to light several significant obstacles to the free movement of goods and services in the EU. Most of the barriers to trade that were addressed by the Commission were regulations that favoured state-owned companies (i.e. compulsory government participation, reserved areas, local landing obligation) and requirements to procure goods and services locally. On 30 May 1994 the Council adopted Directive 94/22/EC of the European Parliament and of the Council on the conditions for granting and using authorisations for the prospection, exploration and production of hydrocarbons (the Hydrocarbons Licensing Directive 'HLD'). This Directive entered into force on 30 June 1994. It sets up common rules for ensuring that the procedures for granting authorisations for the prospection, exploration and production of hydrocarbons must be open to all entities possessing the necessary capabilities. Authorisations must be granted on the basis of objective and published criteria. The conditions under which authorisations are granted must likewise be known in advance by all entities taking part in the procedure.

### OUTLOOK

EU crude oil production is expected to reflect developments in the United Kingdom sector of the North Sea. Output is expected to peak towards the middle of the 1990s at some 127 million toe as enhanced recovery techniques are applied and small fields are brought on line in the North Sea. Later in the decade and into the next century, crude oil production in the EU is forecast to decline steadily with falling United Kingdom production. By the end of the century, total EU crude oil output should slip to 100 million toe. Moving through the early years of the next century, EU output is expected to drop off even more steeply, falling to just 68 million toe in 2005. Although modestly higher prices should lead to an upturn in exploration activity over the next few years, new finds are considered most unlikely to arrest the long term declining trend in United Kingdom oil output.

The outlook for natural gas production is more optimistic. EU production should rise by 9 % by 2000 compared to 1993, but decline by 4 % over the following decade. By the year 2000, Dutch output is expected to have risen 14 % from 1993 to 68.4 million toe, while United Kingdom output is forecast to climb by 6 % to 59 million toe. During the decade after 2000, Dutch output is expected to rise a further 15 %, while production in the United Kingdom is expected to fall by 18 %.

Written by: DRI Europe

# Nuclear fuels

## NACE 15

*The slowdown in the development of nuclear power that has been experienced in the EU since the late 1980s has continued to have an impact on the nuclear fuels industry, and output has remained relatively flat in the front end, while capacities are expanding in the back end. The main developments in the sector in recent years were an increased use of imported uranium, and a further concentration in the production and reprocessing of fuel elements for light water reactors (LWR).*

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### INDUSTRY PROFILE

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#### Description of the sector

NACE 15 covers all activities relating to the nuclear fuel cycle. Specifically, NACE 151 covers the extraction of ore containing fissionable and fertile materials, and NACE 152 covers the production and processing of fissionable and fertile materials.

The key activities involved in the industry are:

- the mining of uranium and shipment to processing facilities;
- the conversion of natural uranium to uranium hexafluoride;
- the enrichment to increase the concentration of uranium 235;
- the production of nuclear fuel elements for use in power stations (all previous four activities form the front end);
- the re-processing of spent fuel elements and other nuclear waste (the so-called back end).

Companies active in the field of nuclear fuel cycle involve both dedicated nuclear companies and those providing a wide range of engineering services. The most important nuclear fuel companies in the EU are BNFL (UK), which is state-owned, and COGEMA (F), which is owned by the French State and the private oil company Total.

#### Recent trends

Capacity in the nuclear fuel supply industry has grown modestly, reflecting the rapid slowdown in the construction of nuclear power plants from the mid-1980s.

The main impact of the slowdown in the fuel supply industry has been felt by producers of uranium ore and service companies. In real terms, uranium prices for short term contracts have fallen from a peak of 52 ECU/kg in 1975 to 25 ECU/kg in 1990. During the 1980s, real prices fell steadily due to over-optimistic forecasts of demand for electricity from nuclear sources which resulted in a build-up of uranium stocks. The mining industry continues to find itself in a situation of over-capacity, with the likelihood of continuing low prices.

In the back end, after the opening of new facilities in France and the UK, reprocessing is rapidly reaching its nominal capacity.

#### International comparison

The EU accounted for 14 % of OECD production of natural uranium in 1993 with 1 994 tU (tonnes of uranium). Canada is the largest uranium producer with 9 150 tU, and remains the world's largest exporter. The EU produces 12 % of its annual uranium requirements, and production is concentrated in France which accounts for 80 % of the EU total.

France also has the largest conversion capacity of the OECD countries, with EU countries accounting for over 50 % of

the OECD total. Two-thirds of this is in France and the rest in the United Kingdom.

The EU had a total enrichment capacity in 1993 of 13 600 tonnes of separative work units (tSWU per year, which is a measure of a plant's enrichment capacity), 80 % of which was by the diffusion process (in France) and the remainder by gas centrifuge (the UK, The Netherlands and Germany). The USA, with the world's largest enrichment capacity at 19 300 tSWU/yr in 1993, produces enriched uranium solely by the diffusion process. The EU, therefore, has a slight technological edge over the USA in the enrichment process when it comes to higher electricity prices.

The EU has a number of world class companies providing a complete range of fuel fabrication capabilities. These include fuel elements for gas cooled reactors, and fast breeder reactors, as well as a growing mixed oxide fuel (MOX) capability.

#### Foreign trade

In the EU, Euratom, pursuant to the Euratom treaty has to ensure the principle of equal access to sources of supply and in this frame, is involved in both imports and exports of nuclear material.

The EU imports a considerable amount of its natural uranium requirements, nearly 88 % in 1993. However, the EU has a strong commercial position in the conversion and enrichment business, where it is a net exporter with significant market share in the Far East. Spent fuel from nuclear reactors bound for reprocessing is also traded. France and the United Kingdom being the world leaders in the reprocessing trade.

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### MARKET FORCES

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#### Demand

The demand for nuclear fuel services is totally driven by the use of nuclear power in the production of electricity. With the exception of France, and the UK (Sizewell B) on a smaller scale, there has been no expansion in nuclear power plants in the EU since the mid-1980s. Furthermore, during this period Italy has banned the use of nuclear power, resulting in the cancellation of a number of nuclear power plants, mostly at the construction stage. There has therefore been little growth in the demand for nuclear fuel within the EU.

Demand from other regions of the world has also been restricted. There has been little growth in the installed capacity of nuclear plants in North America since the mid 1980s. Japan, South Korea and Taiwan are the major export markets where the capacity of nuclear plants continues to rise.

The demand for different types of fuel elements stems from the different types of nuclear reactors. The main reactor designs currently in large scale use in Europe are:

- PWR (Pressurised Water Reactor), the most common reactor type which uses enriched uranium or MOX fuel;
- BWR (Boiling Water Reactor), which uses enriched uranium fuel or MOX fuel;
- AGR (Advanced Gas cooled Reactor), in use in the UK only and requires enriched uranium fuel;
- GCR/MAGNOX (Gas Cooled Reactor) now only used in the UK (MAGNOX), and uses natural uranium fuel;
- FR (Fast Reactor), not yet commercially available, but one large scale plant is in operation in France (another large FR is operating in Japan). FRs use plutonium fuel, which is separated from spent fuel from other reactor types.

**Table 1: Nuclear fuels**  
**Natural uranium production**

(tonnes)	Actual production 1992	Actual production 1993	Theoretical capacity 1995	Theoretical capacity 2000
EU	2 641	1 994	3 499	1 905
Belgique/België (1)	45	45	45	45
BR Deutschland (1)	232	116	150	.0
España (1)	186	183	254	810
France	2 150	1 600	3 000	1 000
Portugal	28	50	50	50
Canada	9 337	9 150	8 300	11 800
USA	2 171	1 180	2 312	2 500

(1) NEA secretariat estimates for the year 2000.

Source: NEA

**Table 2: Nuclear fuels**  
**Conversion capacities and requirements in the EU**

(thousand tonnes)	1991	1992	1993	1995	2000
Capacities					
Comurhex (F)	14.0	14.0	14.0	14.0	15.5
BNFL (UK) (1)	6.8	6.8	6.0	6.0	6.8
Total	20.8	20.8	20.0	20.0	22.3
Requirements	15.2	14.5	14.9	16.0	16.5

(1) NEA secretariat estimates for the years 1993, 1995 and 2000.

Source: NEA

**Table 3: Nuclear fuels**  
**Enrichment capacities and requirements in the EU**

(tonnes SWU/year) (1)	1991	1992	1993	1995	2000
Capacities					
Eurodif (F)	10 800	10 800	10 800	10 800	10 800
Urenco (UK, NL, D) (2)	2 550	2 750	2 800	3 200	4 500
Total	13 350	13 550	13 600	14 000	15 300
Requirements	9 623	9 599	9 932	9 885	9 725

(1) SWU: separative work unit.

(2) NEA secretariat estimates for the years 1993, 1995 and 2000.

Source: NEA

**Table 4: Nuclear fuels**  
**Capacities and requirements for the fabrication of LWR fuel elements in the EU (1)**

(tonnes HM/year) (2)	1991	1992	1993	1995	2000
Capacities					
FBFC (F/B)	1 650	1 650	1 650	1 650	1 650
Siemens (D)	1 000	850	850	850	850
Agip (I)	0	-	-	-	-
ENUSA (E)	250	250	250	250	250
BNFL (UK) (3)	320	320	320	320	320
Total	3 220	3 070	3 070	3 070	3 070
Requirements	2 724	2 991	3 070	3 264	2 830

(1) LWR: light water reactor.

(2) HM: heavy metal.

(3) NEA secretariat estimates for the years 1993, 1995 and 2000.

Source: NEA



**Table 5: Nuclear fuels**  
**Nominal reprocessing capacities of uranium oxide in the EU**

(tonnes HM/year) (1)	1991	1992	1993	1995	2000
Cogema (F)	600	1 200	1 200	1 600	1 600
BNFL - Thorp (UK)	0	0	0	223	633
Total	600	1 200	1 200	1 823	2 233

(1) HM: heavy metal.  
Source: NEA

## Supply and competition

### Uranium production

The EU itself has an annual uranium production of about 2 000 tU, with the remainder of its requirements being imported. Electricity producing companies have tended to diversify their sources of supply in order to guard against unexpected interruptions. They have also built-up stockpiles which can vary from two to four years' worth of consumption.

Within the EU, uranium is produced by few Member States, with 80 % coming from France. The EU now accounts for 14 % of OECD uranium production and around 12 % of world production outside of CPEs (centrally planned economies) and former CPEs. This contribution has declined steadily as economic resources of uranium in the EU have been depleted.

France is by far the leading EU producer, with annual production of 1 600 tU in 1993. However, production has been declining rapidly, and the only producer COGEMA is increasingly looking elsewhere for uranium resources in the higher ore grades.

Spain is the second most important producer in the EU, and production is owned and managed by the government organisation, Empresa Nacional de Uranio SA (ENUSA). Almost all the uranium produced in Spain comes from the Sealices el Chico mine works at Ciudad Rodrigo from ore extracted from the uranium deposits at Fe. The remainder was produced by the small Haba experimental mine situated at Don Benito (which has an annual output capacity of around 30 tU).

About 116 tU were produced in Germany in 1993 from the underground mine at Ellweiler and from Menzenschwand and Grobschlophen, which are both open cast. Production capacity is about 150 tU per annum, but limited ore supplies means that capacity is under-utilised. There are no plans to increase uranium production in Germany.

In the eastern Laender of Germany, there are an estimated 100-500 tU reserves. Production was centred on the Erzgebirge, which straddles the border with the former Czechoslovakia in the south-eastern part of Germany. Production was undertaken by SDAG Wismut Uranium Combine, which was reportedly once the third largest uranium producer in the world. All output went to the former Soviet Union under an agreement dating back to the immediate post-war period, where the uranium was enriched and made into fuel. Since the beginning of 1991, SDAG has practically stopped mining, with the company's only output coming from slag.

Also production in Portugal and Belgium has been stopped during the 1992-93 period.

The lack of growth in demand for nuclear fuel and the release of military stocks has led to a considerable excess offer on the uranium supply market, which has depressed prices for uranium. Widespread use of plutonium in mixed oxide fuel (MOX) for Light Water Reactors will also reduce the net requirements in that stage of the fuel cycle.

### Conversion of uranium

The EU's requirement for conversion is about 15 000 tU/yr. This figure is anticipated to increase by around 2 000 tU by 1995 with the membership of Sweden and Finland. However, at the European level demand will be stagnant.

At present, two companies carry out conversion operations in the EU, BNFL in the United Kingdom and Comurhex, a wholly-owned subsidiary of COGEMA in France. The EU conversion capacity is currently around 21 300 tU/yr, and therefore has a utilisation rate of around 75 %. The only other OECD region with significant conversion capacity is North America, where there is approximately the same capacity as in the EU.

The main importing region is north-east Asia, where between Japan and Korea there is a demand for nearly 10 000 tU/yr, and no significant conversion capacity.

Despite strong competition, BNFL (UK) and Comurhex (F) have been able to obtain a significant proportion of non-EU European markets and have thus been able to ensure adequate utilisation of their facilities.

### Uranium enrichment

Uranium enrichment accounts for about 25 % of the cost of the nuclear fuel cycle. The process increases the content of U<sub>235</sub> (fissile uranium) in the fuel from about 0.5 % to 3.0 %. Most modern reactors (PWRs, BWRs and AGRs) require enriched uranium fuel. A standard pressurised water reactor (PWR) with a capacity of 1 GW, has a requirement of about 25 t/yr of enriched uranium, which in turn requires about 150 tonnes of natural uranium.

Currently there are two commercial processes used for uranium enrichment, firstly gas diffusion and secondly centrifugal separation. Of the two, gas diffusion is the more widely used technology, but is more energy intensive.

Production in the EU is in the hands of two multinational groups, Eurodif (F) and Urenco (UK, NL, D). The Eurodif consortium has a large diffusion plant at Tricastin in France, with a nominal capacity of 10 800 SWU.

Urenco Ltd (UK) was formed on the basis of an equal equity split between Uranit GmbH (D), British Nuclear Fuels Plc (UK) and Ultracentrifuge Nederland (NL). The company was established to develop and apply, on an industrial scale, the centrifugal enrichment technique.

The present output of the Urenco group of plants is around 2 750 tSWU/yr, although a number of projects are currently being undertaken to increase this output to 4 500 tSWU/yr by the end of the decade.

### Fabrication

Within the EU, most countries are self-sufficient in fuel element fabrication. Only the Netherlands has no fabrication facilities of its own. For the EU as a whole, fuel requirements in 1993 were just over 3 000 tonnes, compared with a capacity of over 4 500 tonnes.

The largest producer of fuel elements for light water reactors (LWR) within the EU is FBFC, a subsidiary of the French companies Framatome and COGEMA, with plants in Belgium (Dessel) and France (Romans and Pierrelatte). Other producers include, Siemens (D), ENUSA (E), and BNFL (UK). BNFL produces fuel assemblies for both LWR and GCR (MAGNOX and AGR).

The production capacity of fuel elements has been relatively stable, and is expected to remain so. However, there is at present a changing mix in the assembly capacity. This is due to the reduction in demand for fuel elements for GCR and an increase in demand of mixed oxide fuel (MOX), mostly fabricated by Belgonucleaire and COGEMA. A new plant called MELOX was opened in France in 1994.

#### *Storage and reprocessing of discharged fuels*

The majority of EU countries (France, the United Kingdom, Germany, Belgium, Italy and The Netherlands) reprocess spent fuel elements in order to recover unburnt uranium and plutonium and minimise the volumes to be stored. Reprocessing usually takes place after an interim period of storing the fuel on the power station site, either in special dry storage facilities or in under-water storage tanks. COGEMA (F) and BNFL (UK) operate reprocessing facilities in the EU, and have both recently opened new ones: UP2 800 at La Hague and Thorp in Sellafield.

Fuel reprocessing and waste management represent a considerable proportion of the fuel cost, almost 20 % if account is taken of the credit of the recovered uranium and plutonium, and 30 % if this is not taken into account.

#### **Production process**

Uranium is mined from both open-cast and underground mines, and the natural ore is then refined by milling and using a leaching processes.

The conversion process converts natural uranium into uranium-hexafluoride, which lends itself to subsequent processing (enrichment and fabrication) and which possesses the required chemical purity. Conversion represents only about 3 % of the total cost of the fuel.

Enrichment is the process in the fuel cycle where the fissile isotope content of the uranium is increased. This stage is necessary in the case of fuel destined for light water reactors (either PWR or BWR) and for advanced gas cooled reactors (AGR). Three processes used for uranium enrichment exist. Two are currently commercially used. The technology based on gas diffusion is the sole process used in France. In the United Kingdom, Germany and The Netherlands, centrifuge technology is used. Since this technology uses far less power, it is the cheapest based on marginal costs. However, since centrifugal shops have a small capacity, this technology does not benefit of the scale effect of the much larger diffusion plants.

A new process now exists, known as atomic vapour laser isotope separation (AVLIS) which could cut costs even further, although this is not yet available commercially. This technology is being developed in France and in the USA, where the diffusion methods are also used.

Fabrication of the fuel elements comprises the operations during which uranium fluoride, enriched or otherwise, is used to produce the final fuel elements to be placed into the reactors. This stage represents about 11 % of the total fuel cost.

Reprocessing is a complex chemical operation performed on spent fuel discharged from nuclear power stations. This fuel is a mixture of reusable products (unspent uranium and plutonium created during the fuel irradiation in the power station's reactor) and fission products which are highly radioactive and are akin to the ashes from using fissile material.

The reprocessing operation enables the various products to be separated. Recycling uranium and plutonium recovered from thermal nuclear power stations in the reprocessing process reduces the amount of natural uranium needed by a nuclear power station. Plutonium may be recycled in LWR as MOX, or in fast breeder reactors.

The only OECD countries with reprocessing capabilities are France, the UK and Japan. Reprocessing is also practised for industrial purposes by Russia.

#### **Impact of the Single Market**

The nuclear fuels industry is regulated by a series of international agreements and organisations such as the Euratom Treaty, the International Atomic Energy Agency and the Nuclear Non-Proliferation Treaty, which are perceived as having a much greater impact on the structure and activities of the industry than the measures introduced to support the European Single Market. Issues of direct relevance to competition and trade in nuclear fuels tend to be governed by these wider international forums.

Compared to other industrial sectors, the nuclear fuels industry has relatively few suppliers and customers, and operates in only a limited number of countries, both within the EU and in the broader international context. Additionally, the industry is currently in a phase of very low growth, with the slowdown in growth of electricity demand and the limited number of new nuclear power plants being planned or built. The scope for increasing competition and reducing costs via current or proposed measures related to the Single Market is thus perceived as very limited.

The principal issues on which the industry would wish to promote international agreement are related to the definition of standards for the treatment and disposal of low-level radioactive material, the harmonisation of operating standards for nuclear power plants and the updating of international treaty obligations to promote a long-term stable framework for the development of the industry.

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## **ENVIRONMENT**

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Environmental considerations of the nuclear fuel cycle mainly stem from radioactive waste from nuclear installations. At this stage, it should be noted that the volumes generated by the nuclear energy are negligible compared to both the volume of ashes from fossil fuels combustion, or to the volume of industrial waste

In the attempt to limit the volumes of waste material is concentrated into solid and solidified forms. Solid waste materials arising from the nuclear fuel cycle are then stored on land. There are three main categories of waste: low level, intermediate and highly active wastes.

Low-level waste (LLW) forms the vast bulk of waste material. The material is either held in surface or near surface installations where the composition of the waste is controlled over a maximum period of 300 years. Prior to 1982, some of the low-level waste was dumped in special containers at sea. However, following the adoption of the Convention on the Prevention of Marine Pollution from the Dumping of Waste and Other Matters, the practice was curtailed in the OECD.

Intermediate level waste (ILW) can be divided into: a) material that has been contaminated by radionuclides which have a long half-life (the period of time taken for the level of radioactivity to fall to half of its initial level) but produce little heat because of their moderate concentration of radioactive elements, and b) material containing and emitters only, but containing intermediate levels of radioactivity that produce no significant amount of heat.

High-level waste (HLW) consists of irradiated fuel discharged from a nuclear reactor (when it is not intended to reprocess

and recycle them), and vitrified waste produced after the re-processing of spent fuel. This waste has a very high radioactive toxicity which can persist over thousands of years. At present this waste is kept in either storage ponds or dry storage facilities located at nuclear plants. It is likely that this kind of storage facility will be used for a period of 15 to 20 years, while permanent repositories can be developed.

However, given the length of time that containment of such material will require, final disposal systems have to be passive, with the long-term safety not dependent on human control or surveillance. Currently, investigations are being concentrated on the burial of high level waste in deep stable geological formations, which offer adequate isolation capabilities. On-land sites are the only ones currently under investigation, although research has also been carried out into the possibility of burial in sub-seabed formations or other geologically stable formations.

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## REGULATIONS

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The nuclear fuel industry operates under an extremely tight system of safety regulations. These have largely been developed on a national basis, but with a considerable amount of international co-operation through a number of institutions including the International Atomic Energy Agency, the Nuclear Energy Agency (OECD), and the EU. Regulations cover all aspects of the industry including such factors as the emissions of nuclear particles to the environment (air, land and water), the exposure of the public and employees to radiation and the control of plant construction and operation through licensing procedures.

Apart from regulations covering the civil use of radioactive materials the nuclear fuel industry is also subject to measures to control the spread of nuclear materials for military applications. Of particular concern is the illegal trade of nuclear materials.

Within Europe, Euratom was established in 1957, with its general objective being inter alia to ensure that nuclear materials do not get diverted to purposes other than those for which they were intended. The Euratom safeguards system is founded in European law, with strong sanctions for infringements. It applies to all nuclear materials from the moment they are mined on EU territory or are imported into the EU. Aside from ensuring that the material is not being diverted from the declared uses, Euratom also checks to see that declarations of specific use are correct and that the suppliers obligations are being respected.

It can be noted that since its foundation, no diversion of material, or no illegal trade has taken place.

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## OUTLOOK

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The long term future of the nuclear fuel industry is linked to that of the use of nuclear power in electricity generation, and to the energy markets as a whole. Since no new capacity of electricity has been required, there has been no strong incentive for new nuclear plants in recent times.

Since 1983, two thirds of the electricity capacity increase of the major OECD countries (USA, Japan, Germany and France) is due to nuclear energy. Today France and the UK are continuing to build new nuclear power plants. The only other countries where additional nuclear power plants may be built in the period up to 2010 are Germany and Belgium. However the prospects for nuclear power in the UK will depend on the outcome of the governments nuclear review. In Germany, whilst there is no moratorium, power companies have found it impossible to gain the necessary consents to build and operate new plants due to environmental objections. With the breakdown of the cross-party talks aimed at achieving a consensus

on the future of nuclear power, it seems increasingly unlikely that new plants will be built in Germany in the foreseeable future.

Without new construction, the number of operating plants will begin to fall increasingly after 2010 when existing plants reach the end of the operating life. This will have a direct impact on the demand for nuclear fuel services.

In the shorter term, the EU's annual nuclear fuel requirement is expected to edge slightly higher from its current level of 3 000 tHM (tonnes of heavy metal) before falling back over the balance of the decade. Uranium production is forecast to fall to around 1 905 tU by the turn of the century, a decline of 45 % from the 1992 level.

An increase in total output of MOX fuel will gradually increase during the 1990s. MOX annual production is expected to reach 255 tonnes from capacity increases in Belgium, France and the United Kingdom in order to satisfy the requirements of the plutonium thermal recycling programmes. Total fuel requirements are forecast to peak in the mid-1990s, falling to around 2 500 tonnes by the year 2000.

Current expansion plans for reprocessing facilities are set to raise capacity to over 2 225 tonnes in the EU by the turn of the century. This should ensure sufficient capacity to reduce the backlog of material that has been in storage. Taking account of quantities to be reprocessed from countries outside the EU, it is estimated that interim storage requirements could be about 20 000 tU from 1995 to 2000. The necessary storage capacity to cover these requirements is already in place.

It is anticipated that rationalisation of the fuel production industry will increase utilisation rates. Better use of fuel elements by the nuclear power industry will also have an impact on the demand for nuclear fuel services.

It is therefore likely that the demand for natural uranium will decrease more sharply than that for nuclear fuel services in general.

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# Refining and distribution of oil products

## NACE 14

EU demand for petroleum products dropped back slightly in 1993 in the wake of the economic downturn, but is expected to resume slow growth as economies move into a recovery phase from 1994 onwards. Structural changes in demand will continue, however, acting as a brake on future demand growth, as natural gas continues to substitute for petroleum products in the heating, industrial and power generation sectors. Future trends in demand show an increasing proportion of middle distillate, as dieselisation of the transport fleet, and increasing air travel, boost consumption of diesel fuel and jet fuel. EU refineries will have to continue to invest to meet these changing market requirements.

The other major challenge for the refining and distribution sector in the mid-1990s comes from requirements for investment to meet changing environmental standards, both in the quality of fuels produced, and emissions from the refineries. Standards may be subject to significant change over the next few years, and refiners will have to carefully position themselves to optimise investment and maintain viability of their operations.

EU refinery capacity is currently roughly in balance with demand, in overall terms, although specific products are traded with other regions. The EU is open to this trade, ensuring a truly competitive environment for refined petroleum products.

### INDUSTRY PROFILE

#### Description of the sector

NACE 14 includes the activities of petroleum refining and the processing of petroleum derivatives, with the exception of petrochemicals. Inputs to this process are crude oil and semi-finished petroleum feedstocks. The main final products of this activity which are widely marketed are liquefied petroleum gases (LPG), naphtha, motor gasoline, aviation fuels, kerosene, gasoil (diesel fuel and heating oil), residual fuel oils and lubricants. The classification also includes distribution of refined petroleum products to consumers, including the operation of storage facilities, transport and retail outlets.

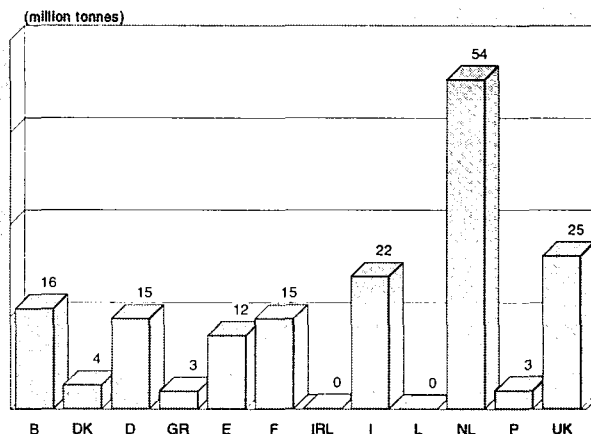
The refining and distribution sector is not a major source of employment in the EU. Over recent years, increased automation of refinery and distribution operations, and the widespread trend towards self-service in gasoline retailing at service-stations, has limited the potential of the sector to increase employment possibilities.

#### Recent trends

Total EU petroleum product demand in 1993 was 522 million tonnes (excluding refineries own consumption). This total represented a 1.2 % decline versus 1992. Of total deliveries, 35 million tonnes was consumed in the marine bunker market, and the remainder inland, in industry, transport, power generation and residential and commercial uses.

The share of oil in total primary energy demand in the EU was just under 45 % in 1993, unchanged from 1992, after falling to about 42 % in 1989, as other fuels were substituted for oil, and energy conservation and efficiency investments reduced the scope for oil demand. The only sector where petroleum products do not face widespread substitution is the transport sector, where demand has shown steady growth over the last ten years.

Figure 1: Refining and distribution of oil products  
Extra-EU exports of refined oil products, 1993



Source: Eurostat

These long term trends in energy and oil use have significantly modified the structure of oil demand, with lighter products taking a larger share, and heavy residual products a declining share of demand since the early 1980s. The share of residual fuel oil in total EU oil demand has declined from 25 % in 1984, to 18 % in 1993. This trend is similar when considering just inland demand. Over the same period, residual fuel oil's share of inland demand declined from 23 % to 14 %. The share of light products (refinery gases, LPG, naphtha and gasoline) in total petroleum products demand in the EU has increased from 31 % in 1984 to almost 34 % in 1993.

Consumption of middle distillates (jet fuel, kerosene and gasoil) declined in the second half of the 1970s, but then remained virtually stable through the 1980s. The share of middle distillates in inland oil demand seems now to be on a rising trend with dieselisation of the motor vehicle fleet and continuing growth in jet fuel demand. As a share of total petroleum product demand, the proportion of middle distillates has risen from 38 % in 1984 to 42 % in 1993. Excluding marine bunker demand, the middle distillate share has risen from 38 % in 1984 to 43 % in 1993.

Trends in production from EU refineries have generally followed the pattern of demand, with output volume and output structure adapting to the changing needs of the market. Since the early 1980s, the EU refining industry has shown considerable flexibility and ability to position its activities to respond to the needs of the market and the changing regulatory environment through a dual process of bringing total production capacity into line with demand, and investing in new production processes to ensure the mix of products corresponds to the structure of consumption.

Refinery production, net of feedstocks destined for further processing, has actually increased over the period 1984 to 1993, as refineries have been able to structure their output closer to market needs and thus increase capacity utilisation. In 1984, EU refinery output was 485 million tonnes (including Greece, Spain and Portugal); by 1993 this had increased to 518 million tonnes, an increase of 0.6 % per year. The proportion of residual fuel oil in EU refinery output declined from 24 % in 1984 to 19 % in 1993, leaving a small surplus of residual fuel oil for export.

#### International comparison

Demand for refined products in the EU, currently standing at about 560 million tonnes in total, remains significantly lower than in the USA. With demand for refined products

**Table 1: Refining and distribution of oil products**  
**Main indicators in volume**

(million tonnes)	1992	1993	Change 1992/93 (%)
Imports of crude oil and feedstocks	499	500	0.2
Net production of refineries	514	518	0.8
Total imports of refined products (1)	172	172	0.0
Total exports of refined products (1)	164	168	2.4
Foreign trade balance of refined products	-8	-4	-50.0
Inland deliveries	494	487	-1.4
Bunkers	34	35	2.9

(1) Includes intra-EU trade.  
 Source: Eurostat

**Table 2: Refining and distribution of oil products**  
**Imports of petroleum products, 1993**

(million tonnes)	Total imports	Change 1992/93 (%)	Extra-EU imports	Change 1992/93 (%)	Intra-EU imports	Change 1992/93 (%)	Total inland deliveries
EU	171.8	-0.2	79.9	-2.3	91.7	1.7	487.1
Belgique/België	12.6	-1.6	3.0	0.0	9.7	0.0	18.3
Danmark	4.9	16.7	3.5	12.9	1.3	18.2	8.0
BR Deutschland	46.6	1.5	14.0	0.7	32.6	1.9	129.1
Hellas	5.8	7.4	5.2	4.0	0.5	25.0	12.1
España	6.6	4.8	4.2	-14.3	2.4	71.4	39.8
France	21.9	-8.0	8.1	-23.6	13.6	7.1	81.9
Ireland	3.7	5.7	0.0	0.0	3.7	5.7	4.7
Italia	22.8	-1.7	13.5	-14.6	9.3	25.7	83.7
Luxembourg	1.9	0.0	N/A	0.0	1.9	0.0	1.9
Nederland	31.8	1.6	22.0	9.5	9.8	-12.5	20.7
Portugal	4.2	-16.0	0.6	50.0	3.6	-20.0	11.6
United Kingdom	9.2	-1.1	5.8	16.0	3.3	-25.0	75.3

Source: Eurostat

**Table 3: Refining and distribution of oil products**  
**Inland deliveries of petroleum products in the EU, 1993**

(million tonnes)	All products	Change 1992/93 (%)	Motor fuel	Change 1992/93 (%)	Gas/diesel oil	Change 1992/93 (%)	Residual fuel oil	Change 1992/93 (%)
EU	485.2	-1.4	111.2	-1.3	185.4	0.2	68.4	-6.3
Belgique/België	18.3	-5.7	2.8	-3.4	9.1	-1.1	2.2	-12.0
Danmark	8.0	-1.2	1.8	0.0	4.1	-2.4	0.8	-11.1
BR Deutschland	129.1	1.3	31.8	0.3	63.0	3.8	7.7	-8.3
Hellas	12.1	-0.8	2.6	0.0	4.4	-8.3	3.0	15.4
España	39.8	-4.8	8.5	-4.5	13.1	-1.5	7.0	-2.8
France	81.9	-2.7	17.1	-2.8	38.0	0.0	5.6	-20.0
Ireland	4.7	0.0	0.9	0.0	1.9	0.0	1.2	0.0
Italia	83.7	-2.8	16.5	3.1	23.3	-4.9	26.2	-2.6
Nederland	20.7	-2.8	3.8	8.6	6.0	0.0	0.2	0.0
Portugal	11.6	-6.5	1.8	5.9	2.9	11.5	3.7	-21.3
United Kingdom	75.3	1.3	23.6	-1.3	19.6	3.7	10.8	-3.6

Source: Eurostat

currently standing at about 900 million tonnes, the USA is the largest single market for petroleum products in the world. The USA has also a demand configuration which favours lighter products than in Europe. The strong development of the gasoline market has led to this fuel representing about 45 % of demand, compared to about 25 % in the EU (where the middle cuts of the refined barrel (i.e. gasoil, kerosene) have been favoured by the development of diesel fuel for transport to a greater extent than the USA). Thus, typical US refineries have a much greater product upgrade capacity than those of Europe.

Although refining capacity in the USA like in the EU, is broadly in line with demand, seasonal and local imbalances, together with a very open trading environment, have encouraged an active trade in refined products across the Atlantic in both directions.

US refineries also face the challenge of meeting new regulations affecting fuel quality and the fuel demand pattern, which have potentially further-reaching implications for refiners than the measures enacted or proposed within the EU. The US Clean Air Act Amendments of 1990 sets deadlines for the use of clean fuels in cities or regions designated as ozone or carbon monoxide non-attainment areas (essentially gasoline containing 2.0 % oxygenate). The use of reformulated gasoline will be phased in from 1995 onwards, and is widely forecast to increase US refining and distribution costs by about \$0.1 per US gallon, and put strain on the storage and transport facilities. Another measure, the Energy Policy Act of 1992, contains provisions for the introduction of alternatively fuelled vehicles into the national vehicle park, in order to replace 10 % of motor fuel consumption by 2000 and 30 % by 2010. If implemented, this could have a severe impact on US refining activity, which is heavily geared to the production of transport fuels. It is forecast that a new series of refinery closures, primarily affecting the remaining smaller, less sophisticated refineries, could follow full implementation of these measures.

In Japan, the market for refined petroleum products is smaller than that of the EU, currently totalling about 230 million tonnes. The country is normally a net importer of petroleum products, as demand growth has outstripped local refining capacity. These are generally supplied from Singapore or the Middle East. The structure of the demand barrel is quite similar to that of the EU.

### Foreign trade

The EU is an open market for petroleum products, with Member States both importing and exporting products to match supply and demand. Refineries are also able to tailor production to more global trends in product demand, for example exporting products across the Atlantic to the USA when demand is high and prices are favourable.

In 1993, EU countries imported a total of 172 million tonnes of petroleum products, of which 80 million tonnes was supplied by non-EU countries. The principal non-EU suppliers were OPEC countries, representing 28 % of the total, and the former USSR, representing 18 % of the total. The USA accounted for 7 % of EU imports from outside the Union.

Extra-EU exports of refined products from EU countries totalled 77 million tonnes in 1993. The region as a whole was thus in the position of being a net importer, although this varied by product, with net imports of LPG, gasoil and naphtha offset by net exports of gasoline, jet fuel and residual fuel oil.

Intra-EU trade totalled 91 million tonnes in 1993. Germany, Ireland, Luxembourg and Portugal were net importers, with the other Member States in the position of net exporters.

## MARKET FORCES

### Demand

EU demand for refined petroleum products is subject to both volumetric and structural change. Total demand for petroleum products responds to general economic conditions, as well as the relative price of petroleum products versus competing fuels in applications where fuel substitution is feasible. Changes in the structure of demand, with evolving shares of light products, middle distillates, residues and special products, are driven by the differences in the potential for substitution between refined products. In general, gasolines and diesel fuel destined for the transport sector are resistant to substitution, while heating oil, and residual fuel oil, destined for the heating, steam-raising, industrial process or power generation market are susceptible to losing markets to competing fuels such as electricity, natural gas or coal, when expectations of differences in fuel prices, together with switching costs move consumer preference away from petroleum products.

These factors combined have contributed to a small decline in EU petroleum product demand, including marine bunker fuel, from 530 million tonnes in 1984 (including Greece, Portugal and Spain) to 522 million tonnes in 1993, an annual average decline of 0.2 %. Year-on-year variation in demand can deviate from this progression in line with economic activity, as seen, for example, in 1993 consumption figures, which registered a decline of 1.2 % compared to 1992. Over the same ten-year period, the share of residual fuel oil in total demand for petroleum products (including demand for marine bunker fuels) has declined from 25 % to 17 %, as industry and power generation have switched to competing fuels, including natural gas, coal and electricity in industry, and nuclear power and natural gas in the power generation sector.

### Supply and competition

#### Supply

Although the EU remains an open market for petroleum products, as described in the section on foreign trade above, EU-based refiners supply the vast majority of the region's petroleum product demand. This is due to the historical development of the EU refining industry over the last 30 years, during which most Member States developed domestic refining capacity to cover their own needs and to serve export markets. Such development was partly due to the economics of transporting and refining oil, since it is generally less costly to ship crude oil and refine it close to consuming markets than to refine it close to the source of production and ship the refined products. Prior to the availability of North Sea crude oil, which began to come on stream in the mid-1970s, Middle East crude oil formed the bulk of Europe's supplies, and was shipped to Europe to feed the local refining sector. Despite the rationalisation of refining capacity that took place in the 1980s after the slowdown in EU demand growth, EU refineries still cover practically all of the region's needs, with trade serving to balance supply and demand for specific products. Indeed, the reduction in capacity has meant an improvement in capacity utilisation rates from below 70 % in the early 1980s to over 90 % today, thus increasing the viability of those refineries which remain in operation.

The following paragraphs describe some of the more important changes in industry capacity over the recent past, with regard both to manufacturing (in refineries), and distribution (via retail outlets).

#### Refining

The decade of the 1980s saw the EU refining industry undergo profound restructuring. Capacity which had been constructed or planned in the 1970s, before the oil price shocks put a brake on regular demand expansion, was progressively taken

out of service in order to bring overall capacity back in line with demand. At the same time, refiners made large investments in upgrading facilities designed to produce more lighter products and less residual fuel oil, in line with the evolution of market demand. This process saw total primary distillation capacity in the EU decline to 569 million tonnes/year in 1990. At the beginning of 1994, EU primary distillation capacity stood at over 600 million tonnes/year (now including the refineries of the new Laender in Germany), and upgrade capacity for the whole of the EU stood at about 35 %.

The only major project entailing additional refining capacity in the EU is the planned construction of a new refinery at Leuna in Germany, where the existing 5 million tonne/year refinery is planned to be decommissioned and replaced by a new refinery of about 9 million tonne/year capacity. This refinery will be built and operated by a consortium led by Elf (F).

The period from the early 1990s up to the end of this century poses different challenges for the refining industry, of which the greatest is the need to adapt to the requirements of environmental legislation. Various new regulations covering emissions from refinery and distribution operations and potentially more stringent fuel specifications will add to refinery costs, and could also dampen demand for refined petroleum products if their competitiveness versus other fuels is reduced.

#### *Fuel retailing*

The drive to cut costs and increase productivity in petroleum product distribution over the last 15 years has had its most visible effect in the reduction in the number of service-station retail outlets across the EU. During the 1980s, the number of service-stations decreased by 26 %, as oil companies closed low-volume and rural outlets, to concentrate on higher volume service-stations. Rationalisation of the retail network did not occur uniformly across the EU, the most reductions in the number of outlets took place in the Netherlands (-36 %), France (-35 %) and Germany (-29 %), whereas the networks grew in Greece (+16 %) and Spain (+17 %). The rationalisation process, which is still continuing, has increased the competitiveness of those outlets that remain, in part because of increased throughputs. There is still considerable variation in average monthly throughputs from country to country: the highest are to be found in Spain where there is a small number of outlets per car. In contrast, average throughputs are approximately a fifth of Spanish levels in Italy, Ireland and Greece, where the rationalisation process has been slower. The number of outlets in Greece and Spain has been rising as a growing proportion of the population has had access to cars and as the average car size increased. In addition, regulatory restrictions limiting the development of new service-stations in Spain have gradually been lifted over the last five years, allowing new market participants to establish and expand their retail networks.

#### *Competition*

The petroleum product refining and distribution sector in the EU is generally recognised as being truly competitive. Several factors serve to safeguard this state of affairs. Firstly, each member state now has a number of major and independent oil companies operating within its market, competing for market share and profits. Secondly, there are no or few restrictions on trade, either between Member States, or between the EU and other suppliers, thus enabling product to be readily moved between markets in response to changes in the demand or price environment, and enabling new suppliers to take market share. Thirdly, there is a high degree of price transparency, with daily published quotations for all principal products in the Mediterranean and North West Europe, allowing refiners, distributors and consumers knowledge of movements in market prices.

Competition in the distribution chain is also reinforced by the presence of non-traditional fuel marketers such as hyper-

market and supermarket chains, which have gained significant market shares in France, Germany, the United Kingdom and the Benelux countries. Their low-cost operations and access to international supplies serve to maintain serious price competition right down to the final consumer.

#### **Production process**

The evolution in EU refining processes over the last ten years has focused around the increase in upgrading capacity, designed to produce more lighter products and less heavy products, and the installation of new production processes to manufacture unleaded gasoline in conformity with national and EU octane specifications. Although some Member States' refining industries moved earlier and faster on these developments, notably Germany, the United Kingdom, Denmark, the Netherlands and France, there is now a notable tendency to convergence, as southern European refining systems, in Spain, Portugal, Greece and Italy have invested, and are continuing to invest in these trends.

The major challenges for production processes in the EU refining industry over the next ten years are the increased proportion of middle distillates in the demand barrel, which will require different upgrading techniques than those used in the past to maximise light product yields, and the trend towards more stringent product specifications, notably the reduction in the sulphur content of gasoil, both for transport and heating use. These requirements will likely imply the need for further heavy investment by the refining industry in hydrotreatment and hydrodesulphurisation over the next few years. Although the costs of this investment will ultimately be reflected in prices paid by consumers, such price increases could dampen demand growth over the long term.

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## **INDUSTRY STRUCTURE**

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### **Companies**

#### *Refining*

Following the period of refinery capacity rationalisation in the 1980s, which not only saw the closure of capacity, but also sales of refineries to new operators, and the establishment of some joint-venture refining operations, the current environment for the role of companies in oil refining seems to be more stable. Broadly speaking the same companies that were involved in refining over the last two or three years have maintained their operations, and there are few plans for changes in the ownership structure of the network which remains.

The most recent addition to the EU refining network occurred in autumn 1991, when the 7.8 million tonne/year former Mobil refinery at Wilhelmshaven, in Germany, was brought back into operation. The refinery was acquired by Beta Refining & Marketing, a company jointly owned by the trading company Bulk Oil and the trading firm, Dreyfus.

During the second half of 1993, Elf and Thyssen announced plans to invest in a new refinery as a joint project in Leuna, in eastern Germany. This new refinery, that will replace the existing one in Leuna and another in Zeitz, will now have a planned capacity of 8.5-9 million tonnes/year. Following delays and renegotiations on the scope of this project, the initial planned capacity has been reduced, and the share of Elf reduced, as Russian crude supplier Rosneft will enter the consortium. Thyssen are also likely to divest their share of the venture to Buna, a chemical supplier which is one of the refinery's principal customers.

The role of refining companies owned by the state continues to recede with the wave of privatisation and liberalisation in the EU.

In Portugal, Petrogal, which owns and operates the country's three refineries was sold into the private sector in 1992 to a

**Table 4: Refining and distribution of oil products  
Capacities of primary distillation**

(million tonnes/year)	1980	1988	1989	1990	1991	1992	1993
EU	891	591	573	569	611	610	602
Belgique/België	54	32	32	32	35	34	34
Danmark	11	9	9	9	9	9	9
BR Deutschland	150	83	79	79	110	111	113
Hellas	20	18	18	18	18	18	18
España	70	62	62	62	60	60	59
France	168	99	88	88	90	91	91
Ireland	3	3	3	3	3	3	3
Italia	177	117	117	113	121	117	109
Nederland	90	66	60	60	61	63	61
Portugal	18	14	14	14	14	14	14
United Kingdom	130	88	91	91	90	90	91

Source: Eurostat, 1993 - Oil and Gas Journal, DRI Europe

consortium including several Portuguese financial institutions, and French oil company Total. Although initially, the consortium took only a 25 % stake, commitments were made to increase this to 51 %. However, progress on this objective has been delayed by disagreements over responsibility for Petrogal's pre-privatisation debt, and the investments needed to modernise its refining and distribution assets. Plans are proceeding, however, to upgrade the refineries. The oldest refinery at Cabo Ruivo, in the suburbs of Lisbon, no longer distils crude, but operates as a distribution centre and batch blending plant using feedstock from Petrogal's other two refineries. This facility is shortly to be completely closed down, as the site is needed for redevelopment to stage Lisbon's Expo 98. The other refineries, at Porto and Sines have been subject to extensive upgrading programmes.

In Greece, previous plans to privatise state-owned energy activities, including DEP, the holding company for Greece's two state-owned refineries, were put on ice following elections and a change in government at the end of 1993. However, since mid-1994, the new government has again been considering selling off a stake in DEP to the private sector, in order to raise revenue for the government.

In Ireland, the country's only refinery, Whitegate, operated by state-owned INPC, requires a major upgrading programme to be competitive, and the Irish government is actively seeking a private-sector partner or acquirer to ensure its future.

In Italy, where the domestic refining and distribution sector is dominated by state-owned Agip Petroli and Italiana Petroli, each part of the ENI group, privatisation has been on the political agenda for the past two or three years. Several proposals and timetables have been put forward for privatising the group. The latest plans call for privatisation in 1995, of an integrated upstream and downstream oil and gas company, including Agip (upstream oil), Agip Petroli and IP (downstream oil) and SNAM (natural gas transmission and distribution).

#### Fuel retailing

In petroleum product distribution and retailing, the major companies with refining assets continue to have a dominant position, even during years of recession, as they have invested large amounts to protect their market share. They now account for nearly 30 % of the EU retail outlets. Shell (NL/UK) has the dominant market share, closely followed by BP (UK). Some of the traditionally national oil companies have now spread their presence throughout Europe: Total is present in eight countries for a market share of 4.4 % (1992). A relative newcomer to the European refining and marketing business is Kuwait Oil, which introduced the Q8 brand in 1986 and now owns 4.5 % (1992) of the EU retail outlets. Kuwait Oil

is now the largest retailer in Denmark and has a major presence in Italy, the United Kingdom, Belgium and the Netherlands.

Overall, in the countries where regulations permit, hypermarket and supermarket chains have an important market share, but nowhere is it as large as in France where a third of automotive fuel is sold by supermarkets (their market share is over 40 % for gasoline alone). In the United Kingdom, their market share is nearing 15 % and is expected to increase to 20 % by 1995. The other two countries where hypermarkets have a substantial market share are Belgium and Germany, where it is 10 %, though this share is not expected to increase much more in the near future.

Liberalisation is also affecting the structure of the petroleum product retailing sector. In Spain, the refinery and product distribution sectors have been liberalised. The structure of its industry has changed in that Repsol (part state owned), Cepsa (part owned by Elf) and Petromed (owned by BP) inherited the former Campsa retail outlets and jointly own Compania Logistica de Hidrocarburos (CLH), which inherited the Campsa distribution network of storage depots and pipelines. The share of ex-Campsa retail outlets is roughly 60 % Repsol, 25 % Cepsa and 10 % Petromed. In 1993, Shell Espana also entered the shareholding structure of CLH upon acquiring 5 % of the capital equity formerly held by Repsol in the logistics company. In addition to this a number of other oil companies have entered the Spanish retail market, most notably Shell and Petrogal, with smaller networks being established by Agip, Conoco (USA), Esso (USA), Mobil (USA), Total (F), Texaco (USA) and Petrofina (B). This has been facilitated by the gradual removal of restrictions on expanding the overall service-station network, by reducing, and finally removing, minimum distance requirements between service-stations.

#### Strategies

While each company involved in the refining and marketing sector pursues its own strategy in terms of its geographical positioning, the markets it chooses to serve, its investments in research and development, production processes and technology, its control of operating costs, and the diversification of its business mix, the issues which face the sector in the mid 1990s are requiring an increasingly co-operative approach in order to preserve the industry's future.

Environmental compliance will require potentially heavy investments by refiners and distributors of petroleum products. The industry is already co-operating through its industry association, Europia, to review the impact of proposed environmental legislation. It is highly likely that this co-operation will extend to new agreements or joint-ventures between refineries to ensure that investment is optimised.



**Table 5: Refining and distribution of oil products  
Trends in the number of petrol retail outlets**

(units)	1981	1982	1983	1984	1985	1986	1987	1990	1991
EU (1)	166 760	161 170	153 945	150 543	144 115	142 763	138 275	126 618	122 068
Belgique/België	8 258	7 575	7 068	6 742	6 207	5 633	5 448	6 273	6 010
Danmark	4 208	3 985	3 631	3 733	3 622	3 515	3 364	3 031	2 930
BR Deutschland (1)	24 864	23 219	21 049	19 288	18 448	20 320	19 501	17 807	18 958
Hellas (2)	5 500	5 500	5 500	5 500	5 800	5 800	6 000	6 386	6 500
España	4 602	4 608	4 621	4 622	4 616	4 799	4 855	4 998	4 958
France	39 500	38 600	37 100	36 000	34 600	33 200	31 100	25 700	23 700
Irland (2)	3 874	3 828	3 702	3 544	3 428	3 375	3 300	3 100	3 000
Italia	38 255	37 672	36 716	38 500	35 800	35 300	34 700	31 000	28 490
Luxembourg	473	461	469	447	448	442	420	385	351
Nederland	10 366	9 554	8 982	8 492	8 106	7 858	7 560	6 602	6 024
Portugal (2)	2 100	2 060	2 010	1 970	1 900	1 880	1 830	1 871	1 900
United Kingdom	24 760	24 108	23 097	21 705	21 140	20 641	20 197	19 465	19 247

(1) Including former East Germany.

(2) 1991, CDP estimates.

Source: National Statistics, CDP

### Impact of the Single Market

The introduction of the European Single Market has had some impact on the downstream oil industry, without radically changing the level of activity or the competitive environment. The field of environmental legislation has provided one of the main areas where harmonisation and change in standards has been implemented on a EU-wide basis. Specifications for petroleum products, emissions standards for large industrial plants, labelling of dangerous substances, and measures to reduce harmful emissions during the storage and distribution of petroleum products have all been defined at EU level, allowing companies to operate under the same set of rules throughout the EU. Currently, the oil industry is working closely with the Commission and the automotive industry to define cost-effective measures to improve air quality by reducing emissions from vehicles.

Harmonisation of the excise taxes on petroleum products only had a limited impact on oil markets, since only minimum levels were set. Excise tax convergence has not followed from this measure, leading to final consumer prices for oil products which can vary considerably from one country to another.

Most remaining barriers to investment or establishment of oil refining and distribution operations in EU countries have been lifted in the period since the introduction of the Single Market. In Spain, foreign oil companies have been able to set up new distribution networks or take significant shareholdings in existing Spanish companies; and in France, the refining and product import licensing system has been abolished, making it easier for new operators to enter the market.

### REGIONAL DISTRIBUTION

Activities of refining and distribution of petroleum products are fairly well distributed around the EU Member States, with infrastructure having been developed to serve each national market. More broadly, the EU market is generally perceived as being divided into two major zones. These are north-west Europe and the Mediterranean. The north-west Europe zone covers the Benelux countries, the United Kingdom, Germany, Denmark and France's northern half and Atlantic seaboard, while the Mediterranean zone includes Italy, Spain, Greece, Portugal and southern France. Separate price quotations are generated for each of these zones, based around trade from the principal refineries in each zone. In north-west Europe, these are the refineries of Rotterdam, Antwerp and the Thames, while in the Mediterranean they are the refineries located in southern Italy, including Sicily.

The unification of Germany in 1990 also increased the importance of supply linkages and price formation involving Russia and the Baltic region, which do not always follow patterns established for the other regions.

### ENVIRONMENT

Environmental considerations remain high on the EU's policy agenda, and the energy sector has a particularly important role to play in meeting environmental targets.

As a response strategy to the threat of global climate change, the EU committed itself to stabilising CO<sub>2</sub> emissions at the 1990 level by the year 2000 and signed the Climatic Convention at the Rio de Janeiro conference. Although specific plans to achieve this target have been relatively slow to be developed at the national level, the implications of succeeding in meeting the target are both a substitution of low carbon content fuels for high carbon content fuels and a reduction in the growth rate of overall energy demand. Both of these will result in a relative decline in demand for petroleum products, and hence the activity of the EU refining industry.

The move to reduce emissions of other toxic substances, such as SO<sub>2</sub>, NO<sub>x</sub>, CH<sub>4</sub>, particulates and VOCs (Volatile Organic Compounds) also have a direct impact on the refining and distribution sector.

The sulphur content of gasoil is already scheduled to be reduced, the maximum sulphur content of diesel fuel will be 0.2 % wt. (by weight) from October 1994, and 0.05 % wt. from October 1996. The sulphur content of heating gasoil is also to be reduced to be 0.2 % wt. from October 1994. The regulation mandating closed systems with vapour recovery to minimise VOC emissions during storage and transport (Stage I) was approved by the Council in December 1994. The means for vapour recovery during refuelling of cars (Stage II or large carbon canister) are still under discussion in the Commission services.

In early 1994 a proposal was tabled by the European Commission for a new directive regarding sulphur levels in liquid fuels. This proposes phased reduction of sulphur content in residual fuel oil, for both inland and bunker use, heating gasoil, jet fuel and diesel. Maximum levels could vary by region according to the air quality of the region. The oil industry association, Europia, believes this directive to be unnecessary in light of the Second UN-ECE SO<sub>2</sub> Protocol which leaves it to Member States to apply cost-effective measures for achieving scientifically justified SO<sub>2</sub> reduction tar-

**Table 6: Refining and distribution of oil products  
Excise taxes on petroleum products, March 1994 (1)**

(ECU/thousand liters)	B	DK (2)	D	GR	E	F	IRL	I	L (3)	NL	P	UK
Premium gasoline	490	352	143	423	382	556	376	535	361	579	473	433
Unleaded gasoline	421	324	130	369	350	505	344	478	308	516	438	370
Automotive diesel oil	294	256	82	241	254	322	296	355	245	310	297	362
Heating gas oil	14	233	11	138	74	74	47	355	5	66	0	21
Heavy fuel oil HTS (ECU/tonne)	19	262	4	43	13	23	13	47	14	30	45	15
Heavy fuel oil BTS (ECU/tonne)	6	262	4	0	0	17	13	24	6	30	0	0

(1) Calculated using the monthly average exchange rates for March 1994.

(2) Premium gasoline is a mixture of 33% leaded and 67% unleaded gasoline in Denmark.

(3) Excise tax on automotive diesel oil, calculated as of 7th April 1994.

Source: European Commission, DG XVII

gets. Moreover, the proposal is unfairly targeted on petroleum products, when particularly coal is the dominant source of SO<sub>2</sub> emissions in the EU. Europia also points out that changes in the specifications for marine bunker fuels and jet fuel require widespread international consensus to be effective. The debate on further restrictions in petroleum product sulphur content is continuing.

Further regulations on fuel quality and VOCs are likely over the rest of the decade, but are pending a detailed review by a tripartite group representing the European Commission, the oil industry and the auto industry. This group will analyse whether additional reductions of transport emissions will be necessary beyond 2000 to achieve an acceptable air quality in the EU prior to the development of draft legislation. Measures under study to further curb emissions include vehicle inspection and maintenance, traffic management, vehicle technology and fuel composition. Fuel quality changes which could have an impact on emissions reduction, which are under study by the Tripartite initiative, include: for gasoline, reduction in volatility (RVP), elimination of residual lead, reduction in sulphur, reduction in benzene, reduction in aromatics, and an increase in oxygenates; for diesel, further reduction in sulphur content after October 1996, increase in cetane number, reduction in density and final boiling point in the distillation range, and a reduction in poly-aromatics; and, for other fuels, reduction in sulphur content, as referred to above.

Over the past decade, the most visible change to petroleum product specifications in response to environmental concerns has been the introduction of unleaded gasoline, following reduction in the lead content in the early 1980s. An EU directive adopted in 1985 required that unleaded gasoline be marketed in all Member States from 1 October 1989. This date coincided with the date when all large cars produced (above 2 litres) were to be equipped with catalytic converters. Unleaded gasoline is now widely available in all European countries. Moreover, all cars produced after 1 October 1990, whether they are equipped with catalytic converters or not, must be able to run on unleaded gasoline (Eurograde 95 research octane number [RON]). Although there have been some derogation for old-type engines, 90 % of cars produced can run on Eurograde.

The directive encouraged Member States to introduce tax incentives in favour of unleaded gasoline in order to accelerate its penetration, which all countries have done. In addition, in order to allow a larger proportion of the existing car population to run on unleaded gasoline, most oil companies introduced an unleaded fuel with a higher octane level, Super-premium unleaded (98 RON). Super-premium is marketed in most EU countries

From the beginning of 1993, all new gasoline-powered cars registered in the EU had to be fitted with three-way catalytic converters to meet exhaust emissions standards. This presages the universal use of unleaded gasoline. However, the speed

with which unleaded gasoline gains 100 % market share depends on the rate at which owners of pre-1993 cars opt for unleaded fuel and the rate at which old cars, able to use only leaded fuel, are scrapped. The effect will be relatively small in Germany, Denmark and the Netherlands, where the purchase of catalyst-equipped cars has been favoured for some time by tax incentives. However, in other countries, the new emission rules will give a significant push to sales of unleaded gasoline.

## REGULATIONS

### Petroleum product quality

EU legislation relating to fuel quality addresses the content of lead, benzene and oxygenates of gasoline and the sulphur content of diesel and other gasoil (national standards specify other fuel properties). The European Standard Organisation (CEN) adopted European specifications for unleaded gasoline (EN228), for automotive diesel (EN590) and LPG (EN 589).

The maximum authorised lead level in leaded gasoline is 0.4g/litre, but EU countries are encouraged to use a maximum limit of 0.15 g/litre. All EU countries, except Portugal, have now adopted this lower limit. The maximum benzene content of gasoline is set at 5 % for both leaded and unleaded grades.

CEN EN228 specifies the octane quality of Eurograde unleaded (95 RON/85 MON [motor octane number]), the benzene content (5 % vol. max.) and the lead content (0.013g/litre). The sulphur content is currently set at 0.1 % wt. maximum, but will be reduced to 0.05 % by 1995. Volatility and density specifications have also been agreed upon.

A directive requires that Member States permit fuel blends containing oxygenates and specifies the maximum content. If this maximum is exceeded, then the pumps must be clearly labelled. Most countries restrict limits below the maximum, with only four countries (Belgium, Denmark, Ireland and Luxembourg) permitting levels equal to, or exceeding, this level.

A 1987 directive specifies a maximum level of sulphur in gasoil of 0.3 % wt., except for gasoil used in shipping or further processing; the directive allows Member States to reduce the sulphur content to 0.2 % if necessary for environment or health reasons. Five EU countries have already reduced the sulphur content to 0.2 %. A directive, adopted in March 1993, calls for a reduction in the sulphur content of all gasoil to 0.2 % by 1 October 1994. A further reduction is to be implemented by 1 October 1996 for the sulphur content of automotive diesel (to 0.05 % by weight), as this is required to meet the exhaust emissions limits for diesel engines. The Council asked the Commission to propose a further reduction of the sulphur content of gasoil for industry, space heating and shipping, and sulphur limits for aircraft kerosene. This

**Table 7: Refining and distribution of oil products**  
**Net production of EU refineries**

(million tonnes)	1987	1988	1989	1990	1991	1992	1993
LPG	14.1	14.7	14.6	14.7	14.7	15.2	15.2
Naphtha	14.7	16.2	17.1	15.5	17.7	17.6	19.0
Motor spirit	103.4	109.1	110.8	113.9	117.0	121.8	120.2
Kerosene	30.0	32.9	34.5	36.2	33.7	34.6	35.1
Fuel oil & diesel oil	150.6	160.3	159.9	164.0	180.3	185.7	190.1
Residual fuel oil	95.1	92.0	91.2	95.0	99.6	101.5	99.0
Other products	29.1	32.3	31.8	32.5	35.1	37.6	39.7
Total	422.9	442.8	445.3	457.1	483.4	498.8	503.1

Source: Eurostat

directive also requires that the distributed automotive diesel of 0.05 % sulphur be gradually available by 1 October 1995.

### Emissions

As part of the EU policy to limit the emissions of harmful substances to the atmosphere, in 1988 the EU passed the Large Combustion Plant Directive (LCPD) and on 14 June 1994 the 2nd Sulphur Protocol was signed in Oslo. The LCPD applies to all industrial plants above 50 MW capacity, and applies to all existing refineries. Its objective is for plants to achieve a phased reduction of SO<sub>2</sub> emissions from 1990 levels totalling 60 % by 2003, by limiting the amount of SO<sub>2</sub> present in flue gas emissions. To meet these targets, refineries and other industrial plants and power generation facilities have been obliged to choose between burning lower sulphur fuels in their boilers, generally at higher cost than the high sulphur coal or residual fuel oil traditionally used, or to invest in flue-gas clean-up technology, such as FGD (flue-gas desulphurisation). Refineries have largely chosen to reduce the sulphur content of their own-use fuel. The LCPD will soon be due for review and revision. If tighter standards are introduced, conversion to natural gas firing for refinery boilers could be the only way to meet new standards.

### Reserve or strategic stocks

Reserve or strategic stocks consist of quantities of crude oil or refined products which can be called upon at any time by a country to bridge a temporary oil shortage situation. This withdrawal would have to be made according to the provisions of existing EU emergency legislation and IEA Rules. Directive 68/414 required the creation and maintenance of reserve stocks at the EU level initially representing 65 days' consumption;

this was then increased on 1 January 1975 to 90 days' consumption for three categories of product: petrol, middle distillates and heavy fuel oils. Since the directive merely imposed the obligation to achieve an end result, the EU Member States have established over the years systems quite different from one another and which can be divided into two categories depending on whether a centralised stockholding authority has been established.

#### EU countries with a central reserves administration

Five countries have a central reserves administration: Denmark, Germany, France, the Netherlands and Spain.

Denmark has had legislation governing reserve stocks for over 30 years; the reserves are administered by the Foreningen Danske Olieberedskabslager (FDO), a non-profit making foundation established in 1959 with voluntary membership. The FDO is financed by contributions from its members. The 1959 legislation related chiefly to fuels and was amended when Denmark joined the EU by the law of the 24 May 1972 which widened the stockpiling commitment to the three product categories specified in the EU directive. As of 1 January 1993, Denmark reduced its total reserve requirement from 125 days to a 90 day reserve of stocks.

In Germany, the lion's share of the stockpiling requirement of 80 days' consumption is administered by the Erdölbevorzugungsverband (EBV), a national body with public corporation status financed by means of a special tax. At least 90 % of the reserves stocked by the EBV are its own property. The refineries themselves ensure a mandatory 15 days supply. In addition, the federal government has amassed stocks of crude oil equivalent to a 30 day supply.

**Table 8: Refining and distribution of oil products**  
**Structure of production by product, 1993 (1)**

(%)	LPG & refined gas	Motor spirit	Naphtha	Kerosene	Fuel oil & gas diesel	Residual fuel oil	Others
EU	2.8	22.4	3.6	6.6	35.5	18.5	10.7
Belgique/België	1.7	19.6	2.9	5.3	36.8	21.5	12.2
Danmark	1.7	16.8	1.6	2.4	45.7	26.4	5.4
BR Deutschland	2.5	26.5	5.1	2.6	46.3	12.1	5.0
Hellas	3.6	24.3	1.0	9.1	23.0	29.7	9.3
España	3.3	13.9	4.4	6.8	24.5	23.1	24.0
France	3.0	20.2	2.7	6.1	38.1	13.9	16.0
Ireland	1.5	19.5	1.5	0.0	39.1	35.7	2.7
Italia	2.3	19.3	3.2	4.6	34.3	23.1	13.2
Nederland	4.4	18.6	3.4	8.4	31.9	21.1	12.3
Portugal	2.9	14.7	6.6	6.2	28.6	31.4	9.6
United Kingdom	1.9	29.8	2.6	11.6	28.7	13.2	12.2

(1) Output as a percentage of refinery input.

Source: Eurostat



**Table 9: Refining and distribution of oil products**  
**Share of unleaded petrol in total motor fuel sales (1)**

(%)	1988	1989	1990	1991	1992	1993
Belgique/België	0.5	15.3	24.5	37.4	46.1	57.4
Danmark	33.0	40.1	56.6	63.4	69.6	75.6
BR Deutschland (2)	44.5	57.5	67.8	76.9	84.0	88.7
Hellas	e	e	1.8	7.3	16.4	22.9
España	0.1	0.3	0.9	3.1	6.2	6.9
France	0.2	2.4	14.5	25.0	33.9	40.8
Ireland	e	6.4	18.8	23.9	30.2	38.5
Italia	0.7	2.1	5.1	6.7	13.1	23.7
Luxembourg	10.2	20.2	29.9	44.7	57.9	69.0
Nederland	26.0	32.3	42.2	52.7	69.5	75.1
Portugal	e	e	e	8.2	13.1	20.9
United Kingdom	1.1	19.4	34.0	40.8	46.8	52.0

(1) e = infinitesimal amount.

(2) Including former East Germany from 1991 onwards.

Source: Eurostat

France long ago established legislation requiring the stockpiling of oil reserves (the commitments to create and maintain safety reserves can be traced back to the law of the 10 January 1925). In 1988, France established a central reserve administration, the Société Anonyme de Gestion des Stocks de Sécurité (SAGESS), which was responsible for half the total legal stockpiling requirements. As of January 1993, SAGESS has been replaced by a new organisation, the Comité Professionnel des Stocks Stratégiques Pétroliers (CPSSP). Under the new law, registered operators establish stockholding obligations of up to 50 % of their commitments, but this progressively decreases to 20 % by 1 January 1996. The balance of the stockholding obligation is met by the payment of fees to CPSSP. CPSSP uses these fees to build and maintain strategic stocks equivalent to 90 days imports. Unregistered operators are obliged to pay fees for their total commitments. As of 1 January 1994, France held emergency oil reserves equal to 95 days of net imports.

In the Netherlands the collective administration of stocks is entrusted since 1986 to the Central Organ Voorraadvorming Aardolie-produkten (COVA), a public body which maintains 70 days of reserves of the light and medium distillation fractions. COVA is financed out of a levy on oil products additional to excise tax. The refineries are required to maintain a 50 day stockpile and sixteen and two-thirds days are maintained by the independents. The stockpiling of heavy fuel oils has been administered since 1 January 1987 by the Union of electricity generators (SEP).

Spain is attempting to adapt to EEC regulations with regard to stockpiling. Since 1988 numerous legislation has been enacted in order to facilitate the transition from a state monopoly to a free market. The latest Royal Decree on 22 December 1992 provides for the creation of a new entity to build-up, maintain and manage strategic stocks under the authority of the Ministry of Industry, Commerce and Tourism. Under the new law, oil distributing companies and consumers are required to maintain emergency stocks of up to 120 days of yearly sales or consumption. On January 1, 1994, Spain's emergency oil stocks were equal to 75 days of net imports, well below the 90 day IEA commitment level.

#### *EU countries with no central reserves administration*

In Belgium, compulsory stockpiling represents one quarter of domestic supplies made during the previous calendar year; the responsibility is assumed by refineries and importers who are both required to maintain 90 days of reserve stocks.

In Greece, the distributors are principally required to maintain 90 day reserve stocks, however this obligation may be assumed by the local refineries which supply the distributors. Distributors only commit themselves to the products which they actually import.

In Ireland, stockpiling is ensured by importers by means of coverage contracts signed with the state refinery company located at Whitegate.

In Italy, the compulsory 90 day reserves are administered by various bodies: the refiners, importers, ENEL, the national electricity generating company, as well as the government itself whose strategic stocks are handled by ENI.

For Portugal, Law Decree 77/91 of 16 February 1991 obliges all importers of crude oil products to maintain emergency reserves corresponding to one-quarter (for jet fuel) and one-third (for gasoline, diesel oil and fuel oil) of their previous 12 months net imports. In addition, stock utilisation depends on government authorisation, although a certain operational flexibility exists. The early use of stocks at the beginning of an oil crisis, or their utilisation in a sub-crisis situation, will be considered by the authorities when it appears necessary.

A maximum of 15 % can be deducted by the EU Member States from the stockholding obligations to take account of indigenous production used to satisfy inland demand. The maximum of 15 % is, for the time being, only attained by the UK and Denmark.

## **OUTLOOK**

Whereas the 1980s was the decade of capacity restructuring in the refining industry, the 1990s and the early years of the next century look to be the years of meeting the challenge of environmental compliance in a low growth market.

Overall growth in inland petroleum product consumption in the EU 12 is expected to average just under 1 % per year up to the year 2000, and only 0.3 % per year between 2000 and 2010. This growth is likely to be heavily concentrated in the middle distillate segment of the barrel (specifically diesel and jet fuel), with its share of total petroleum product demand in the EU reaching 45 % by 2000, and 48 % by 2010. This change in demand structure alone will place constraints on refiners who will need to invest heavily in hydro-treatment to increase production of these products. Parallel to this, oil's share of total primary energy demand will decline gradually over the next 15 years, reaching 40 % by 2010, as

natural gas makes further inroads into the power generation, industrial and domestic heating markets.

In addition, refiners will have to face the investment needs and higher operating costs associated with reducing emissions and producing fuels with new and tighter specifications.

Under such an environment, it is plausible that further rationalisation of EU refining capacity will be required over the next decade, as higher-cost refiners see their margins and profitability eroded by additional costs and stagnant demand. However, unlike what has happened in the USA, the EU refining industry is involved in the consultative process which will lead to changes requiring investment, and thus has the opportunity of being better prepared for whatever changes will be implemented.

The petroleum product refining and distribution industry in Europe is well accustomed to adapt to changing circumstances, as it has had to do continually over the last 20 years, and should be able to demonstrate its continuing viability and vitality over the coming years.

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# Electricity generation and distribution

## NACE 161

*Electricity consumption in EU countries has grown only very slowly since 1990. This has primarily been due to the slowdown in economic growth in 1992 and 1993.*

*However the slow growth in peak demand has not prevented considerable construction of new generating plants. The United Kingdom, France and Germany have all seen, and will continue to see over the next few years, a large amount of replacement plant. This is being driven by both economic and environmental forces, and has resulted in the substitution of new, cleaner fossil-fuelled plants (i.e. gas-fired plants or plants fitted with flue gas cleaning equipment) and nuclear plants for older solid fuel-fired plants.*

*However, despite continued construction of nuclear plants in France and the United Kingdom, the share of nuclear power is likely to start to decline after 1995. Electricity production from renewable sources remains limited by high investment costs and increasing concerns over siting. Limitations on these primary electricity sources will mean that an increasing share of electricity production is likely to be met by increases in fossil-fuel fired capacity, and in particular gas-fired capacity. This will have important environmental consequences, in particular the ability to meet CO<sub>2</sub> reduction targets.*

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### INDUSTRY PROFILE

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#### Description of the sector

This chapter covers the activities of electricity generation, transmission, and distribution of electricity. NACE 161.1 to 161.3 cover generation of electric power by public suppliers from conventional thermal plants, hydro plants and nuclear plants respectively. NACE 161.4 covers the operation of public electricity transmission and distribution systems. NACE 161.5 to 161.7 include the production by non-public suppliers of electricity for their own consumption.

The supply of electricity involves numerous commercial and industrial activities, including: fuel purchasing; power station construction and electricity generation; expansion, maintenance and operation of transmission and distribution networks; trading bulk electricity (both nationally and internationally); and operation of customer billing and accounting systems.

#### Recent trends

Average growth in electricity demand in Europe during the first few years of this decade was 3.1 %, slightly higher than that seen towards the end of the 1980s. However, much of the growth occurred in 1991 as a result of the re-unification of Germany and colder weather. Growth since 1991 has been slow, although, despite the recession and a return to more normal weather conditions, electricity demand has not fallen.

Growth in production in 1993 varied between EU countries, largely reflecting variations in economic cycles. Most countries, however, fell within the range -2 % to +3 %.

There has been little change in the concentration of electricity production over the past decade. The largest four countries in the European Union have consistently accounted for around 78 % of production. There has, however, been a continuing increase in the share of EU electricity generated in France. This has risen from around 18 % in 1980 to over 24 % in 1993. This reflects both an increase in exports as well as an above average growth in domestic demand.

Despite the slow growth in demand in recent years, together with the excess generating capacity available in many countries, the first half of the 1990s has seen considerable investment in new generation facilities by public suppliers. Much of this new capacity has been replacement capacity, particularly to allow early retirement of ageing coal- and oil-fired power plants on environmental grounds.

In the United Kingdom, the liberalising of electricity generation, along with economic investment decisions by UK electricity companies, has led to a rapid expansion in gas fired power plants. The concurrent removal of protection to the indigenous coal industry has resulted in a rapid fall in coal consumption, and hence a fall in sulphur dioxide emissions. In France, investment in nuclear power plants has continued, in line with an energy policy aimed at reducing dependence on imported oil and replacing closing coal- and oil-fired capacity to reduce sulphur dioxide emissions. In eastern Germany, several large lignite-fired plants are to be closed on environmental grounds and replaced with either new lignite plants fitted with flue gas cleaning equipment, or gas-fired plants.

In other countries in the EU, investment has been hampered by planning constraints, and changes to national energy plans. This is particularly true of Italy and Greece, where there is a need for new generating plants.

The electricity intensity of GDP increased between 1970 and 1985, but has since stabilised in more recent years, although across countries the trend has varied widely.

Several factors explain why electricity intensity in the EU stabilised after 1986:

- the continuation of low oil prices, and hence low fossil fuel prices in general, while electricity prices remained much more stable, which resulted in electricity becoming less competitive;
- the saturation effects in some applications and some countries. This is most evident in the northern EU Member States, while there is scope left for increased penetration of electrical appliances in the Mediterranean area;
- the development of more efficient appliances and processes in general.

Electricity has increased its penetration of total energy consumption, rising from less than 15 % in the early 1980s it reached 18 % in 1989, and has since remained roughly constant. The share of electricity in final energy consumption varies substantially across countries, reflecting the structure of industry, the level of automation in industry, the use of electricity for space heating and the level of appliance ownership in the domestic sector.

With the exception of the United Kingdom, there has been little change in employment levels in the electricity industry in the EU. This reflects the relatively mature nature of the industry, with small increases in output being met by increases in productivity. In the United Kingdom, the recent privatisation and deregulation of the electricity industry has given rise to a significant fall in employment. However, this has not had a large impact on the overall level of unemployment for a number of reasons. Firstly, most redundancies have been made voluntarily, particularly in conjunction with early retirement packages. Secondly, direct employment in the industry has fallen as a result of a greater degree of contracting-out for services as companies have sought to control costs and concentrate on core activities.

#### International comparison

The structure of electricity production in the EU is similar to that of North America. The key differences are a lower contribution of electricity generation coming from coal, and a correspondingly higher nuclear component. In comparison

**Table 1: Electricity generation and distribution**  
**Net electricity production by country**

(billion kWh) (1)	1980	1991	1992	1993	% change 1992/93
EU	1 327.0	1 841.3	1 851.7	1 857.9	.3
Belgique/België	51.0	68.1	68.4	67.1	-1.9
Danmark	26.0	34.1	28.3	32.0	13.1
BR Deutschland	347.0	500.5	497.8	491.4	-1.3
Hellas	21.0	32.7	34.4	35.3	2.6
España	104.0	148.4	150.8	148.9	-1.3
France	247.0	432.1	441.8	452.9	2.5
Ireland	10.0	14.3	15.0	15.4	2.7
Italia	177.0	210.5	214.2	211.3	-1.4
Luxembourg	1.0	1.3	1.1	1.0	-9.1
Nederland	62.0	71.5	74.2	72.8	-1.9
Portugal	15.0	27.9	27.7	28.2	1.8
United Kingdom	266.0	299.9	298.0	301.6	1.2

(1) kWh: Kilowatt Hour.  
Source: Eurostat

**Table 2: Electricity generation and distribution**  
**Main indicators (1)**

(billion kWh) (2)	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	1 626.0	1 677.0	1 727.0	1 774.0	1 814.0	1 966.6	1 976.1	1 984.1
Net production	1 524.0	1 568.0	1 611.0	1 656.0	1 698.0	1 841.4	1 851.8	1 857.9
Electricity consumption as % of final energy consumption	16.8	17.1	17.5	18.0	18.2	18.0	18.3	N/A

(1) Electricity delivered to market (excluding electricity consumed and losses within power stations). Including East Germany from 1991 onwards.

(2) kWh: Kilowatt Hour.

Source: Eurostat

**Table 3: Electricity generation and distribution**  
**Electricity intensity of GDP (1)**

(kWh/1000 ECU) (2)	1985	1986	1987	1988	1989	1990
EU	392	392	397	393	394	N/A
Belgique/België	459	462	474	473	472	471
Danmark	331	336	350	356	360	361
BR Deutschland	425	420	425	416	411	N/A
Hellas	546	545	568	586	594	N/A
España	471	466	459	456	467	459
France	366	373	382	375	380	381
Ireland	395	414	412	401	399	399
Italia	309	311	318	321	325	329
Luxembourg	830	800	790	766	738	722
Nederland	369	367	381	389	386	389
Portugal	643	659	655	674	679	697
United Kingdom	402	400	395	387	386	390

(1) At 1985 constant prices for GDP; consumption is defined as final consumption of electricity.

(2) kWh: Kilowatt Hour.

Source: Eurostat



**Table 4: Electricity generation and distribution**  
**Share of electricity in total final energy consumption, by sector and by country**

(%)	1989				1992			
	Total	Industry	Hh (1)	Transports	Total	Industry	Hh (1)	Transports
EU	18.0	25.7	25.3	1.4	18.2	27.3	25.0	1.5
Belgique/België	15.7	22.7	18.3	1.4	16.3	23.8	19.2	1.3
Danmark	18.8	30.3	25.9	0.4	18.9	31.5	26.5	0.4
BR Deutschland	18.4	25.6	23.9	1.9	17.7	26.9	21.2	2.1
Hellas	18.0	26.1	34.1	0.1	19.0	28.5	38.5	0.2
España	20.5	30.3	41.1	1.4	19.8	30.2	39.3	1.4
France	20.3	26.7	30.6	1.9	21.5	29.6	31.5	1.9
Ireland	14.3	20.1	19.6	0.1	15.9	21.1	23.0	0.0
Italia	16.8	26.2	21.0	1.4	17.8	29.2	23.0	1.6
Luxembourg	10.9	12.8	20.4	0.5	10.3	13.8	20.9	0.4
Nederland	14.2	22.9	16.9	0.9	15.0	23.1	17.6	1.1
Portugal	21.2	28.4	44.0	0.8	21.2	30.2	44.3	0.7
United Kingdom	17.1	24.3	25.5	0.6	17.3	25.2	24.9	1.0

(1) Hh: Households, etc.: consumption by households, agriculture, fisheries, administration, services and others.

Source: Eurostat

to Japan, the EU has higher coal, nuclear and hydro components and lower oil and gas. Clearly, the mix of fuels varies considerably within the EU, the most extreme cases being France with a share of nuclear generated electricity of over 80 %, and Italy which still has a large oil component.

In general, prices for both industrial and domestic consumers in the EU are higher than those in the USA, but lower than Japan.

#### Foreign trade

The flow of electricity between Member States has significantly increased over the past 15 years. However, differences in marginal generation costs, particularly in off-peak periods, together with the level of interconnection between EU countries, indicate the potential for still far greater levels of trade.

The main barriers to higher trade are technical constraints to ensure the safe and stable operation of the transmission systems; difficulty for commissioning new lines; and market restrictions due to monopolistic industry structures or restrictive contractual arrangements. Losses on the transmission system also provide a disincentive to trade.

International exchanges are coordinated, without executive powers, by two co-operative organisations of the electricity authorities. These are UCPT (Austria, Belgium, France, Germany, Italy, Luxembourg, Netherlands, Switzerland, Greece, Portugal, Spain and former Yugoslavia), and NORDEL (Denmark, Norway, Sweden, Finland and Iceland).

The electric utilities enter into a range of commercial arrangements for the exchange of electrical energy; these fall into three main categories: hour-by-hour exchanges on a cost

basis, including back-up in the event of grid difficulties; contracts (usually short-term) for net transfers; longer term contracts, including permanent arrangements for the transfer of energy from joint-owned production plants in a neighbouring country. It should be noted that all the elements of the international connection system are owned by companies which can be other than those involved in the electricity exchange, and transfer arrangements are made on a co-operative and not a mandatory basis.

Ireland and Greece are still not directly interconnected with any other Member State. In the case of Greece, it was disconnected from the UCPT grid because of the war in the former Yugoslavia. The EU has recently approved funding of the interconnection to Italy as a means of providing both countries with transfer power benefits. In Ireland, links between Northern Ireland and Eire have been cut as a result of past terrorist activity, although these will soon be re-established. Funding has been approved for a link between Northern Ireland and Scotland, but plans are being delayed by public enquiries. Proposals for a direct link between Ireland and the United Kingdom have been postponed due to the cost of the link.

In 1993, exports by EU countries were 112.8 TWh (terawatt hour), and imports 130.2 TWh. This represents a small increase compared with the previous year. However, throughout the past decade the amount of electricity traded has risen faster than consumption, such that in 1993 imports accounted for around 6 % of gross inland consumption, up from 1 % in the mid-1980s. Nearly 15 % of intra-EU trade is accounted for by the 2,000 MW DC link between France and the United

**Table 5: Electricity generation and distribution**  
**Breakdown of electricity consumption by sector**

(%)	1980	1987	1988	1989	1990	1991	1992
Industry	48.4	44.0	44.8	44.8	44.3	43.3	43.1
Transport	2.5	2.4	2.4	2.3	2.5	2.6	2.6
Households	28.6	30.3	28.9	28.4	28.7	29.3	29.5
Other	20.5	23.3	23.9	24.5	24.5	24.8	24.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Eurostat



**Table 6: Electricity generation and distribution**  
**Breakdown of final electricity consumption by country and by sector, 1992**

(%)	EU	B	DK	D	GR	E	F	IRL	NL	L	I	P	UK
Industry	43.1	51.5	30.4	47	38.3	49.6	36.7	36.9	43.2	60.8	49.9	49.9	35.6
Households, etc. (1)	54.2	46.4	68.9	49.7	61.3	47.2	60.5	62.9	55	37.5	47.1	48.8	62.5
Other	2.7	2.1	0.7	3.3	0.4	3.2	2.8	0.2	1.8	1.7	3	1.3	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(1) Households, etc. includes households, agriculture, fisheries, administration, services and others.  
 Source: Eurostat

Kingdom, and through which France exports around 16 TWh per year.

Trade with countries outside the EU is still very limited due to the lack of interconnections between countries. Currently only Austria, Switzerland and Norway exchange significant amounts with the EU. Switzerland has for many years traded electricity with other European countries on both a daily and seasonal basis. Norway, with its excess of hydro-capacity, has historically exported power to Denmark. However, this trade has fluctuated considerably in recent years both as a result of reduced precipitation and changes in the electricity market in Norway which have reduced the incentive for generators to export power.

Clearly, with the expected joining of the Scandinavian countries and Austria to the EU in 1995, the amount of trade outside of the EU will fall considerably. Further interconnections with other countries, particularly Eastern Europe, are unlikely to be capable of offsetting this fall until towards the end of the century.

France is the major net exporter of electricity within the EU. Its most important markets are Italy, Germany, Switzerland and the United Kingdom. The Netherlands is the third largest net importer in the EU, its main supplier is Germany. Net exports from France amounted to over 14 % of the country's production in 1993.

## MARKET FORCES

### Demand

The key drivers for electricity demand are the weather and the level of economic activity. Demand patterns therefore show important seasonal trends, and reflect growth in the economy. Response to price is typically quite low for domestic consumers, but can be significant with larger industrial and commercial users.

Over the longer term, societal trends towards higher living standards and technical developments in industrial processes have resulted in higher electricity consumption. Higher appliance ownership, higher heating standards and greater use of air-conditioning have been responsible for demand increases in the domestic and commercial sectors. At the same time a move towards electricity specific processes in the industrial sector, either due to technical necessity or overall process economics, has raised the electricity intensity of industrial production.

### Supply and competition

In most countries the regulated and monopolistic structure of the electricity industry prevents the operation of normal competitive pressures. Instead prices and service standards are set by either national or local governments, or are agreed between the utility and government following some form of consultative procedure. In some cases price controls can take the form of an explicit formula, and customer service standards may be subject to some form of objective measurement. Where utilities are state-owned, government finance targets play an important role in setting consumer prices.

Therefore, despite the lack of direct competitive pressures, most European electricity industries operate in a manner designed to achieve least cost supplies. This objective is pursued through government supervision and/or industry co-operation. For their part electric utilities seek to control costs by basing the utilisation of plant on short run marginal costs, and are usually required to demonstrate that new investment provides a least cost option for meeting future needs.

The main exception to this pattern is the United Kingdom, where, since privatisation in 1991, a competitive market now exists for all consumers taking over 100 kW (kilo Watt). This market covers over 50 000 customers, and about half the total electricity supplied in the UK. Price controls are only applied to residual monopoly businesses. The privatisation process in the United Kingdom was accompanied by a formalisation

**Table 7: Electricity generation and distribution**  
**EU electricity trade**

(TWh) (1)	EU	B	DK	D	GR	E	F	I	L	NL	P	UK
1992												
Total exports	110.0	6.8	4.9	33.7	0.4	3.7	58.5	0.6	0.5	0.2	1.2	0.0
Total imports	121.6	5.8	8.6	28.4	1.0	4.4	4.7	35.9	4.5	8.9	2.5	16.7
Net exports	-11.6	1.0	-3.7	5.3	-0.6	-0.7	53.8	-35.3	-4.0	-8.7	-1.3	-16.7
1993												
Total exports	112.8	5.4	2.9	32.7	0.3	3.3	65.1	0.7	0.4	0.3	1.9	0.0
Total imports	130.2	7.6	6.3	33.1	1.1	4.6	3.4	40.3	4.4	10.6	2.1	16.7
Net exports	-17.4	-2.2	-3.4	-0.4	-0.8	-1.3	61.7	-39.6	-4.0	-10.3	-0.2	-16.7

(1) TWh: Terawatt Hour.  
 Source: Eurostat



**Table 8: Electricity generation and distribution**  
**Maximum nuclear output capacity and the share in electricity generation**

(GWe) (1)	1992		1993		1996	
	Capacity	% share	Capacity	% share	Capacity	% share
EU	107.0	34.6	107.8	36.2	110.5	35.0
Belgique/België	5.5	59.9	5.5	59.0	5.5	53.5
BR Deutschland	22.6	30.1	22.6	29.7	22.6	29.5
España	7.1	36.5	7.1	36.0	7.1	34.0
France	57.7	72.9	59.1	77.7	61.5	79.0
Nederland	0.5	4.9	0.5	5.1	0.5	4.5
United Kingdom	13.5	23.2	13.0	26.3	13.3	19.6

(1) GWe: Gigawatts of electricity.  
 Source: Eurostat

of price controls and other performance objectives for electricity supply to domestic consumers. Prices to this market segment are set according to an explicit formula, and each of the regional electricity suppliers is monitored against a set of customer service standards.

It is now becoming more widely accepted that whilst transmission and distribution may remain natural monopolies, electricity generation, and particularly the construction of new plants, need not be. Several countries are now in the process of opening their electricity generation industries to competition. Furthermore, it has also been demonstrated that transmission and distribution systems can be opened to competitive suppliers, by the use of Third Party Access (TPA) regulations. The new structure of the industry in the United Kingdom provides one example of TPA in practice.

However, irrespective of whether or not electricity supply is operated competitively, larger customers in most countries have the option, or are required, to buy their electricity on a contractual basis. Prices (usually discounted against published tariffs), indexation clauses and payment terms are negotiated on an individual basis. For some customers with the capability to shed load at short notice, special terms may be agreed whereby the consumer can avoid paying capacity related costs in return for reducing demand, or operating their own generating plant, during peak periods. Industrial customers can also exert considerable buying power when choosing the location of new plants.

### Production process

The key steps along the electricity supply chain are fuel procurement and storage, electricity generation and delivery to the high voltage transmission network, transmission to substations near demand centres, distribution to final consumers on lower voltage lines and cables.

A variety of technologies are available for electricity production. The most common type of power plant is the traditional fossil fuel fired power plant using a conventional steam power cycle. Other common options include nuclear powered plants, open cycle gas turbines, and hydro electric plants. More recently gas turbines used in a combined steam and gas power cycle, and renewable generating capacity, such as wind, have become more important. Diesel plants, or small gas turbines, are frequently used to provide power to isolated systems.

The mix of generation in each country varies considerably, and reflects access to the various primary energy sources. However, it is possible to determine some key trends that will shape the future supply picture for the EU as a whole.

Hydro-electric power, having maintained a relatively stable share of the total energy input over the 1970s and first half of the 1980s, has seen its share edge lower as growth has returned in electricity consumption. Should electricity pro-

duction increase further over the next decade, it is expected that hydro-electric's share of the total will fall further. The scope for additional hydro-electric development is limited for a variety of political, economic, and environmental reasons, with the result that the remaining exploitable hydro resources will see limited development throughout most of the EU. Significant developments are only expected to occur in the Mediterranean area.

Electricity production from renewable sources remains small, although there are considerable efforts at the EU and national government level to promote and subsidise their development. Excluding hydro-electricity, only geothermal and wind power have made real inroads into the public supply sector, although across the EU there are wide variations in the use of renewable sources. Of these two energy forms, Denmark has the highest share of wind power, 1 % of total generation, while Italy has the highest EU level of geothermal power, 1.5 % of total generation. The principal limitations to the development of renewable sources are high investment costs, and concern over siting in a number of countries. However, more recently, considerable interest has been shown in the use of biomass and waste as a source of fuel for electric power plants. It is anticipated that these sources will become more important and widespread in the future.

The development of nuclear power during the past decade has been mixed. With the exception of France, no new orders for construction of nuclear power plants (which have not subsequently been cancelled or indefinitely postponed) have been placed in Europe since the early 1980s. Indeed in two countries, Italy and Denmark, nuclear power is banned, and in two others, Spain and the Netherlands, there is a moratorium on new construction. New construction of nuclear facilities in Germany is effectively prevented by the difficulty in obtaining the necessary consents and licences to build and operate nuclear plants. The question of continuing the use of nuclear power in the United Kingdom is currently subject to a government review.

In 1993, conventional thermal generation accounted for 53 % of supply, down slightly from the previous year. Indeed, the share has declined substantially over the past two decades, down from 83 % in 1973, largely due to the increase in nuclear power generation. The share of nuclear power share has risen from 5.4 % in 1973 to 36.2 % for the EU as a whole in 1993. However, fossil fuel use in conventional thermal power plants continues to dominate the energy input mix within the power generating sector.

In general, the use of a power station is determined by its marginal cost, and plant will be scheduled in order to minimise costs. However, the nature of electricity requires that any increase in demand must be met with an instantaneous increase in production from within the confines of the transmission system. This imposes technical requirements for the opera-

**Table 9: Electricity generation and distribution  
Structure of electricity production (1)**

(%)	1988	1989	1990	1991	1992	1993
Hydro	12.5	8.7	9.2	9.4	9.5	10.7
Nuclear	33.9	35.7	34.8	33.3	34.4	36.2
Thermal, of which:	53.4	55.6	55.9	57.2	55.9	53.1
Oil	9.4	10.7	10.4	10.2	10.7	N/A
Natural gas	6.5	7.3	7.2	6.8	6.9	N/A
Solid fuel	35.6	35.7	36.2	38.3	36.5	N/A
Other	2.0	1.9	2.1	1.9	1.9	N/A
Total (billion kWh) (2)	1 611.0	1 659.0	1 703.0	1 847.0	1 862.6	1 856.5

(1) Including former East Germany from 1991 onwards.

(2) kWh: Kilowatt Hour.

Source: Eurostat

tional management of the system and the scheduling of power stations. Other factors, such as power losses, will also provide a second order input into the economic scheduling of power plant. Thus more expensive plant capable of fast response is sometimes used in order to maintain grid stability.

## INDUSTRY STRUCTURE

### Companies

The structure of the electricity supply industries in the EU countries varies considerably, reflecting a number of factors, including the historical development of the industry, and government policy in such areas as security of supply and competition. Some countries of the EU have industries dominated by a single, often state-owned, vertically integrated utility. Others have far more decentralised industries with a separation between generation and distribution, and others have a mixture of small municipal distribution companies and much larger vertically integrated companies. France and Italy have highly vertically and horizontally integrated utilities, while, at the other extreme, the United Kingdom and the Netherlands have decentralised structures.

In Belgium, the three private generators (Ebes, Intercom, Unerg) were grouped together in July 1990 to create a new entity, Electrabel. The municipalities are responsible for the distribution of electricity destined for public lighting and domestic use, as well as to industrial users who consume less than 1 000 kW in the Flemish region and less than 10 000 kW in the Walloon region.

In Denmark, electricity generation is in the hands of twelve companies, most of which are directly or indirectly owned by municipalities. The public electricity generation companies are grouped into two associations, Elsam and Elkraft, which are responsible for co-ordination and planning of generation and transmission capacities, as well as the daily operational co-ordination of fuel purchases for power stations. Electricity distribution is provided by 105 companies, 53 are municipal companies and 52 are co-operatives or foundations.

In France, the monopoly for electricity generation, transport and distribution was given to *Electricité de France* (EdF) in 1946. EdF operates 88 % of installed capacity and 96 % of electricity distribution. The remainder is accounted for by auto-producers and a few municipal distributors.

In Germany, the electricity supply industry is highly decentralised, with some 960 individual public electricity companies. The electricity companies operate on a commercial basis, subject to state supervision in accordance with energy and cartel legislation. Nine large public companies own and operate the majority of generation capacity, including all the nuclear power stations and almost the entire national high-voltage grid. In

the former East Germany, the main generator and transmission system operator, VEAG, has now been privatised, and the grid is scheduled to be connected to UCPTÉ.

In Greece, the Public Power Corporation holds the monopoly for generation, transmission and distribution. Electricity generation by autoproducers, or small independent producers exploiting renewable energy sources or co-generation potential, is also permitted.

The Irish electricity industry has been substantially reorganised in order to give it greater flexibility and cost transparency, and to accommodate potential developments in regulation at the European level. The Electricity Supply Board (ESB) now has a horizontal structure, with the main activities of generation, transmission and supply, separated into different divisions. The new structure specifically allows for the development of independent power generation. The company is still state-owned.

In Italy, the electricity industry largely consists of a single state-owned company, ENEL, responsible for electricity generation, imports, exports, transmission and distribution throughout the country. The only exceptions to this are: municipal companies in existence before 1962; generating organisations which consume more than 70 % of their own production; production by combined heat and power plants of less than 15 MW; generation from renewable resources. In July 1992, ENEL was incorporated as a joint company following a decision by the Italian government to privatise its industrial and commercial activities. The timing of the privatisation of ENEL S.p.A. will depend on government decisions on the structure of the industry, the creation of a new regulatory authority, and the signature of the concession act. It is presently anticipated that it will take place in 1995.

In the Netherlands, electricity generation, transmission and distribution is in the hands of municipal and provincial companies. Since the coming into force of the Electricity Act of 1989, there are four generating companies which co-operate within a pooling system operated by SEP, the electricity producers' co-operative. Forty five municipal companies distribute electricity and are grouped within VEEN.

In Portugal, *Electricidade de Portugal* (EdP) previously held the quasi-monopoly for generation and transmission, except in areas not covered by its system. However, EdP has now been substantially reorganised, and the grid company REN has been recently created. The most important aspects of this are that distribution is now in the hands of four regional distributors and the generation of electricity is open to competition, and that the private sector has an increased role.

In Spain, the electricity industry has seen a number of mergers and asset swaps in recent years. This has resulted from the need to consolidate the financial position of some companies

**Table 10: Electricity generation and distribution  
Power generating output capacity by country, 1992**

(MW) (1)	Nuclear	Thermal	Hydro	Other	Total
EU	104 643	266 547	87 680	1 476	460 346
Belgique/België	5 485	7 148	1 401	4	14 038
Danmark	0	9 563	10	458	10 031
BR Deutschland	22 605	84 144	8 626	55	115 430
Hellas	0	6 436	2 523	9	8 968
España	7 020	20 380	21 306	30	48 736
France	57 675	22 477	24 857	240	105 249
Ireland	0	3 411	516	6	3 933
Italia	0	41 803	19 351	471	61 625
Luxembourg	0	106	1 132	0	1 238
Nederland	505	16 829	37	147	17 518
Portugal	0	4 509	3 709	6	8 224
United Kingdom	11 353	49 741	4 212	50	65 356

(1) MW: Megawatt.  
Source: Eurostat

following the nuclear moratorium and insufficient return on equity during the 1980s. The industry currently consists of a number of companies, some privately owned and some public, but is dominated by just four, which own or have effective control over virtually all generating plant. These are Iberdrola (controls 40 % of capacity), Endesa (75 % state-owned, 40 % of capacity), Union Fenosa (15 % of capacity), and Hidroeléctrica del Cantabro. The capacity controlled by Endesa includes the plant of two other important companies, Sevillana de Electricidad and Fuerzas Eléctricas de Cataluña, in which it has large minority interests. The national transmission system is owned and operated by Red Eléctrica de España, in which the state has a 51 % interest. New legislation approved by the council of ministers in June 1994 (it is expected to come into force as a law in January 1995), which allows for independent electricity traders and requires the separation of generation and distribution business accounts. It also provides for the introduction of a bulk electricity market, and a new national regulatory authority.

The United Kingdom undertook a privatisation and re-structuring programme in 1990 and 1991. This created 15 public electricity suppliers, which have a monopoly until 1998 on distribution, sales to smaller customers and an obligation to supply. In England and Wales transmission is carried out by the National Grid Company (currently jointly owned by the 12 public suppliers in the region, but likely to be sold during 1995), whilst in Northern Ireland and Scotland transmission and distribution are both controlled directly by the public suppliers. Electricity generation is largely open to competition, although some measures have been introduced to ensure that nuclear power and renewable energy power have a guaranteed market share.

### Strategies

During the 1970s and early 1980s, most countries saw a decline in the amount of electricity produced by non-public suppliers. This reduction was largely due to the widespread use of oil-fired capacity which had become uneconomic. At the same time utilities typically had policies of purchasing excess generation from such plants at prices reflecting their own short-run marginal cost, thus making investment in non-utility generation unattractive.

However, since the mid-1980s there has been a gradual reversal of this trend. Firstly, governments are increasingly requiring utilities to base purchase prices on full avoided costs. Secondly, the widespread availability of gas and technical developments in power plant have increased the attractiveness of self-gen-

eration, and in particular co-generation of heat and power. Finally, partly in response to national legislation (and anticipation of future EU requirements), and partly due to their own financial constraints, many utilities are themselves turning to independent generators to meet capacity needs.

### Impact of the Single Market

Although some specific elements of the Single Market measures have had a direct impact on the electricity sector, the future shape of the industry will depend on the outcome of ongoing discussions to define the measures which will be implemented to form the Internal Energy Market. The type of Third Party Access (TPA) mechanisms introduced will have a critical influence on the structure of competition in the electricity sector in Europe, as will the generalisation of the right to establish power generation facilities in other EU Member States. The initial measures contributing towards the Internal Energy Market, the electricity transit directive, and the price transparency directive, have not had a significant impact on business activities of the existing electricity utilities.

Measures which have had a direct impact on the electricity companies include the liberalisation of service industries, which has facilitated direct investment by electricity utilities into the telecommunications industry; the Large Combustion Plant Directive, which has caused many utilities to invest in emission abatement equipment, or to modify their fuel mix; and the Utilities Directive which, together with the Government Purchasing Agreement, is perceived to have increased the administrative burden of tendering for equipment supply.

The main priority for the industry is to resolve the outstanding issues surrounding the Internal Energy Market, thus allowing a clear framework for long-term planning of the development of the electricity sector in Europe.

### ENVIRONMENT

The electricity industry is responsible for a number of important environmental impacts, including emissions of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and CO<sub>2</sub>. Furthermore, whilst nuclear power generally results in very low environmental impacts, the associated fuel cycle does have important environmental consequences. There are also considerable emissions of particulates and visual intrusion.

All countries have their own national regulations and strategies for controlling environmental impacts. The main piece of EU legislation in this area is the Large Combustion Plant Directive



(no. 88/609). This controls emissions of SO<sub>2</sub> and NO<sub>x</sub> from boilers with thermal capacity above 50 MW, as well as imposing national emission targets. Under the directive, all new large combustion plants are subject to a licensing procedure to ensure that the plant meets specified emission standards for SO<sub>2</sub>, NO<sub>x</sub> and particulates. The second part applies to existing stationary combustion sources (those for which authorisation was given prior to 1st July 1987), and specifies target values for reduction of emissions based on the 1980 level. Reductions in emissions are targeted at different levels by country; compared to 1980, overall EU SO<sub>2</sub> emissions must be reduced by 60 % by the year 2003, and NO<sub>x</sub> emissions by 30 % by 1998, the former in three stages, the latter in two phases. Plants authorised prior to 1987 and built before 1990 must either conform to the new plant standards or be taken into account in the global ceiling value.

However, a new international agreement has now been reached under the auspices of the UNECE (United Nations Economic Commission for Europe), which involves tighter emission targets. The targets have yet to be incorporated into legislation at the EU level, but it is likely that most countries will be able to comply as a result of current strategies and national policies.

The strategies used to meet these emission targets vary from country to country, once again reflecting the resource base. In Germany, compliance has been achieved by the widespread use of flue gas treatment plant (both for SO<sub>2</sub> and NO<sub>x</sub>). In other countries, fuel switching is the main abatement option. In France the expansion of nuclear power has ensured that emission targets for the power generation sector have been met. In Italy switching from high sulphur fuel oil to low sulphur fuel oil has been the main route, whilst in the United Kingdom there is currently a switch to gas from coal.

In order to reduce CO<sub>2</sub> emissions some countries are introducing higher energy taxation and in some cases specific CO<sub>2</sub> taxes. In addition, many have active energy conservation programmes as well as support for renewable energy schemes.

At the EU level there has been proposed a carbon/energy tax as a way to give an incentive to the industry to achieve CO<sub>2</sub> reduction targets and limit other environmental degradation caused by energy consumption. The proposals have yet to gain support from all Members of the Union due to concerns that it may affect industrial competitiveness. The carbon/energy tax was proposed as part of a package of measures which included initiatives on energy conservation (SAVE) and the development of renewable energy (Altener).

## REGULATIONS

The supply of electricity is subject to a number of technical and safety regulations. These are mostly established at a national level, although interconnections and international co-operation has insured that there is a level of uniformity across countries. At the EU level the key regulatory developments have been in the implementation of the Single Market and the Internal Energy Market. To this end, the Council has adopted a number of directives which constitute the first stage of a planned three stage approach towards the completion of the internal market in electricity. The EU is also pursuing a number of test cases on the application of existing EU trade legislation on the energy sector.

The transit directive (no. 90/313/30), approved by the Council on 30th October 1990, provides that "each high voltage transmission utility shall facilitate power exchanges between other utilities through its grid, provided that transmission reliability is not affected." Meanwhile, the price transparency directive (no. 90/185/16), approved by the Council in June 1990, provides that "electricity and gas utilities shall supply to the Statistical Office the rates they charge to all categories of

customers on the understanding that published aggregate figures will respect confidentiality."

The Commission has also presented plans for the further development of an internal energy market within the EU, involving two further stages in addition to the two directives cited above. The second stage is three-fold. Firstly it is based on the creation of a transparent and non-discriminatory system of licensing or tendering for the production of electricity and the building of electricity lines. The aim of this proposal is to "open up investment in production and transport to independent operators, and in particular to large industrial users". Secondly it is based on the creation of transparency of operations by the separation of accounting of production, transmission and distribution operations in vertically integrated undertakings (commonly called "unbundling"). Thirdly it is based on the introduction, on a limited basis, of third party access (TPA). The transmission and distribution companies will be negotiated to "offer access to their network to certain eligible entities at reasonable rates, within the limits of available transmission and distribution capacity". Those eligible will include large industrial users and distribution companies.

The Commission also wishes to see subsidiarity play a substantial role during the second phase. This involves Member States retaining their regulatory powers for all end-users not eligible for TPA, as well as determining the extent and nature of distribution companies' rights and their public service obligations. Member States will also be free to establish the criteria used for granting licences to build power stations and transmission and distribution lines. The Commission initially wanted to see the second stage enter into force on 1 January 1993. However this did not happen; discussions are still continuing and no firm timetable has yet been announced. The third stage will be defined in detail in the light of the experience acquired during the second stage.

## OUTLOOK

The outlook for growth in the demand for electricity is slow, on average 1.7 % per year between 1993 and 2010. The main development within the industry will therefore be changes in fuel mix, rather than growth in capacity. Developments in the structure and regulation of the industries will have an increasingly important bearing on this issue.

Increases in the standard of living will continue to put upwards pressure on the demand for power but this will be limited by saturation effects and will be offset by efficiency gains. In addition, over this time frame, the electricity intensity of industry will be limited by the relative low price of fossil fuels. Furthermore, the use of explicit demand side management is likely to become more widespread as governments seek to take advantage of economic energy conservation as a means to meet emission targets.

On the supply side, development of hydro power, renewable sources, and nuclear power is expected to be limited over the next decade. The reasons for this are that most economically exploitable hydro resources have been developed. The development of nuclear power will be limited by planning constraints, or moratorium on construction. The completion of capacity currently under construction, and firmly committed capacity, will lead to a peak in nuclear generation production in Western Europe in the late 1990s. Unless further nuclear plant is ordered within the 1990s the share of nuclear power will begin to decline in the early 21st century, due to increasing electricity demand and plant retirement. New construction in France, and possibly the United Kingdom, after the year 2000 will not be sufficient to offset the steady decline in nuclear generation capacity (though life-extension programmes are expected to draw out operating spans to as much as 40 years for most reactors).

The slowly declining shares of nuclear and hydro/geothermal power over the next decade will be offset by expansion of the share of conventional thermal power. Consequently, the major capacity development questions facing the Western European electricity supply industry surround the refurbishing, replacement, and expansion of conventional thermal power generation capacity.

Within this context, there is considerable scope for natural gas use for power generation in Europe. It is, however, only in a few EU countries where the use of gas in power generation will increase substantially. Italy, Belgium, Denmark and the United Kingdom are all in the process of changing the fuel mix in favour of gas. Such a move is also planned in Spain and Portugal, but in these countries the future of gas depends upon the development of supply infrastructure. In Greece, electricity production from gas will be introduced by the Public Utility for the first time in the fuel mix before 1998. Natural gas fired power generation could almost double its share of the power generation fuel mix in the EU by the year 2010, from its 1990 level, almost tripling the volume of gas consumed in this use.

It is expected that the development of environmental legislation and competition regulations will have a large impact on the future of this sector. Environmental legislation, aimed at internalising the significant external environmental costs associated with electricity generation, could have an impact on the economics of plant choice. The introduction of competition in generation is likely to encourage the development of smaller lower capital cost plants. The move towards privatisation and de-regulation of electricity industries is expected to gather pace. The next major privatisation is likely to be in Italy, with the sale of ENEL. It can also be expected that current moves within the EU to liberalise the sector will result in greater trade, even if full TPA is not implemented. The number of countries with TPA regulations in the EU will increase with the membership of Finland and Sweden.

These factors, together with the removal of protection for domestic coal industries, are likely to favour gas fired plants and auto-production (particularly co-generation). The reasons for this are that gas offers both environmental and financial benefits. It is less polluting than other fossil fuels, thus avoiding the need for expensive flue-gas treatment plant; combined steam and gas cycle plants, and particularly co-generation, offer higher efficiency and therefore reduce specific fuel consumption; plant costs are lower and present therefore lower risk than more capital intensive options.

However, despite the cost of emission abatement equipment, coal will remain an important source of fuel, reflecting the importance the power generating utilities place on flexibility, and the expectation that coal will retain a relatively low and stable price profile. In the longer term, the prospects for coal will be improved with the development of high efficiency Integrated Gasification Combined Cycle (IGCC) generation.

In the longer term, after the year 2000, it is unlikely that emissions of CO<sub>2</sub> can be stabilised without recourse to greater use of non-fossil generating capacity. This may lead to new orders for nuclear power stations early in the next century.

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# Transmission and distribution of natural gas

## NACE 162

*Natural gas is growing in importance in the EU energy demand mix, with its market share in 1993 exceeding 20 % for the first time. Its growth is being encouraged by environmental concerns, but also by the abundant supplies of natural gas and its continuing cost-competitiveness versus other fuels. New gas markets are being developed, or will be developed over the next few years, in Spain, Portugal and Greece. There are also growth opportunities for gas in the more mature markets where natural gas is already firmly established such as the United Kingdom, Germany and France.*

*Gas demand growth is likely to be accompanied by changes to the competitive and regulatory structure, as the EU promotes measures to open up markets to more competition. Some progress has been made on these issues, but there is likely to be a continuing debate over the most appropriate solutions to promote competition while preserving security of supply.*

### INDUSTRY PROFILE

#### Description of the sector

NACE 162 is defined as the production of manufactured gas in gasworks and the distribution of gaseous fuels via mains (pipeline systems). In the EU, this sector is now dominated by the distribution of natural gas, which has come to play a significant role in the energy mix over the past 20 years.

Natural gas is a hydrocarbon fuel composed mainly of methane, which is produced from natural deposits, sometimes containing just gas, and sometimes containing both oil and gas. This chapter concerns solely the transmission and distribution of natural gas to final consumers. Exploration and production of natural gas is dealt elsewhere in the book. It should be noted, however, that, in many instances, companies involved in exploration and production activities are also involved in transmission and distribution.

There is also an important distinction to be made between transmission and distribution of natural gas.

Transmission activities typically involve:

- the bulk purchase of natural gas supplies, normally under long-term contracts with gas producers;
- the transport of gas via high-pressure, high-capacity pipeline systems from the point of purchase to the principal zones of demand;
- the storage of natural gas for strategic or load-balancing purposes; and,

- the bulk sales of natural gas to distribution companies, other transmission companies or large-volume industrial or power generation customers.

Distribution activities involve the movement of gas through local low-pressure, low-capacity pipelines to final consumers in the residential, commercial and small industrial sectors, together with associated meter-reading, invoicing and account administration services.

Natural gas is used in a variety of ways to meet a number of energy needs in various demand sectors. It is burned as a fuel for space heating and hot water production, especially in the residential and commercial sectors; it is used in power stations to generate electricity; it provides a feedstock for the petrochemical industry to produce ethylene and propylene; and it is used in industry for steam raising, firing furnaces, and in drying processes.

#### Recent trends

Table 1 shows that 1993 natural gas consumption increased significantly over 1992, by 6.5 %, as natural gas increased its share of total primary energy demand, as it is rapidly gaining favour as the fuel of choice in the power generation sector.

Although over a third of EU natural gas consumption is supplied by imports (primarily from Algeria, Norway and the former USSR), higher gas output from the United Kingdom sector of the North Sea was sufficient to meet most of the 1993 increase in demand.

Since 1985, natural gas consumption in the EU has increased at an average rate of 3.5 % per year, roughly double the rate of increase of inland energy consumption as a whole. Natural gas has increased its share of EU primary energy consumption from under 18 % in 1985 to 20.5 % in 1993. Natural gas has thus become a major competitor for oil in all sectors except transport, for electricity in all sectors except lighting, appliances and electricity-specific applications, and for coal in all uses.

#### International comparison

The West European natural gas market is the third largest in the world, currently accounting for nearly 14 % of total world natural gas demand. Natural gas represents 20.5 % of primary energy demand in the EU, a proportion which has been growing and is expected to continue to grow over the remainder of the decade. This level of penetration is slightly less than that observed in the USA, where a mature natural gas supply and transmission system has resulted in a share of natural gas in primary energy demand currently standing at about 25 %. This has been favoured by deregulation of the natural gas transmission and distribution industry in the USA, which has promoted competition, price transparency, and end-user natural gas prices which are very competitive with other fuels. In Japan, which has no indigenous resources of natural gas, natural gas only represents about 10 % of primary energy demand, mainly into the power generation sector and into local distribution grids in some of Japan's major cities. Japan currently imports all of its natural gas requirements in the form of

**Table 1: Transmission and distribution of natural gas**

#### Main indicators

1000 TJ (GCV) (1)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Gross EU consumption	8 592.3	8 689.3	9 221.9	8 890.2	9 369.5	9 654.9	10 775.5	10 655.6	11 351.1
Primary EU production	5 913.5	5 798.3	6 001.6	5 509.1	5 825.8	6 035.9	6 722.2	6 769.8	7 275.8
Extra-EU Imports	2 858.8	3 094.0	3 427.2	3 487.9	3 731.2	3 819.7	4 149.1	4 178.3	4 198.4

(1) TJ: terajoule, GCV: gross calorific value.

Source: Eurostat



**Table 2: Transmission and distribution of natural gas  
Trends in consumption and usage of natural gas**

thousand TJ (GCV) (1)	1985	1986	1987	1988	1989	1990	1991	1992
Gross EU consumption	8 592.3	8 689.3	9 221.9	8 956.8	9 369.5	9 654.9	10 775.4	10 655.6
% of total energy consumption	17.9	17.9	18.7	17.9	18.3	18.8	19.1	19.1
Final non-energy consumption	626.6	529.7	527.2	531.2	534.9	528.4	532.8	438.4
Transformed in power stations	1 055.0	1 020.0	1 108.0	1 098.7	1 244.3	1 288.7	1 303.4	1 338.4
Final energy consumption, of which:	6 536.7	6 698.6	7 193.5	7 016.7	7 248.0	7 478.7	8 182.0	8 474.7
industrial	2 376.7	2 341.7	2 632.5	2 681.8	2 850.8	2 939.9	2 890.0	3 244.9
domestic and commercial	4 148.8	4 355.5	4 549.7	4 324.5	4 387.4	4 529.1	5 282.1	5 219.8

(1) TJ: terajoule, GCV: gross calorific value.  
Source: Eurostat

**Table 3: Transmission and distribution of natural gas  
EU trade by origin**

thousand TJ (GCV) (1)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Primary production	5 913.5	5 798.3	6 001.7	5 590.6	5 825.4	6 035.9	6 722.2	6 769.8	7 275.8
Intra-EU trade	1 297.4	1 115.7	1 123.5	964.2	1 131.0	1 199.3	1 361.5	1 483.3	1 518.4
Extra-EU imports	2 858.8	3 094.0	3 427.2	3 487.9	3 738.6	3 819.7	4 149.1	4 178.3	4 198.4
Norway	1 030.4	1 039.2	1 133.2	1 126.6	1 057.9	1 030.7	996.1	1 004.8	996.2
ex-USSR	979.6	1 215.0	1 294.7	1 351.7	1 475.2	1 683.9	1 882.6	1 799.8	1 889.7
Algeria	797.9	797.9	961.5	970.2	1 040.5	1 077.5	1 165.3	1 287.3	1 258.2
Other	50.1	41.9	37.8	39.4	164.9	57.8	105.1	86.4	54.3
Extra EU imports as a % of gross EU consumption	33.3	35.6	37.2	39.2	39.9	39.6	38.5	39.2	37.0

(1) TJ: terajoule, GCV: gross calorific value.  
Source: Eurostat

**Table 4: Transmission and distribution of natural gas  
Share of natural gas in gross EU energy consumption**

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	17.9	17.9	18.6	17.9	18.3	18.8	19.1	19.1	20.5
Belgique/België	16.8	14.6	16.1	15.6	17.1	17.3	17.5	17.6	19.4
Danmark	3.0	5.5	6.9	7.8	8.9	9.8	10.9	11.7	12.0
BR Deutschland	15.5	15.5	17.1	16.5	17.6	17.7	16.9	17.0	17.9
Hellas	0.4	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.5
España	3.3	3.6	3.6	4.2	5.3	6.2	6.2	6.5	6.6
France	12.5	12.3	12.5	11.8	11.7	11.9	12.7	12.7	13.2
Ireland	22.2	15.1	14.4	17.2	19.6	19.8	18.6	18.5	21.4
Italia	20.6	21.5	22.8	23.5	24.7	25.8	27.0	26.8	28.8
Luxembourg	9.7	9.8	11.4	11.3	12.0	12.1	11.9	12.4	12.8
Nederland	52.8	51.2	51.5	47.3	47.9	46.7	49.6	48.1	48.8
United Kingdom	23.1	23.2	23.3	22.1	21.6	22.4	23.5	23.1	27.1

(1) Excluding Portugal.  
Source: Eurostat



Liquefied natural gas (LNG). The region of the world where natural gas has the largest place in the primary energy mix is the former USSR, where natural gas accounts for over 40 % of primary energy demand. Abundant low-cost resources and the use of natural gas as a base-load fuel in industry, power generation and municipal heating have resulted in natural gas being the dominant fuel in this region.

### Foreign trade

Since production of natural gas in the EU is primarily focused in the United Kingdom and the Netherlands (with smaller contributions from Denmark, France, Germany and Italy), and EU production satisfies only 63 % of demand, foreign trade is an important component of the natural gas supply mix in the EU. The importance of the investments required to develop gas transport and transmission infrastructure, either by long-distance pipeline or by LNG (Liquefied Natural Gas), have favoured the existence of long-term relationships between suppliers and transmission and distribution companies in EU Member States. Imports continue, therefore, to be primarily sourced from three major suppliers: Algeria, Norway and the former USSR. Imports from outside the EU rose by 0.5 % in 1993 versus 1992 to 4198 TJ (Terajoules), representing 37 % of gross EU consumption. Since 1985, total extra-EU imports of natural gas have risen by 4.9 % per year, on average, as rising demand has outpaced increases in EU indigenous production.

Natural gas transmission links between the EU and its suppliers are continuing to be developed in anticipation of future growth in EU natural gas demand. For example, from Norway, two new pipelines, Zeepipe (commissioned in 1993) and Europepipe (to be ready in 1995), are in the process of adding 25 bcm/year (billion cubic metres) of export capacity to the continent. These are part of the Troll contracts which were signed in 1986 and saw first deliveries at the end of 1993. By the year 2000, Troll contract deliveries should reach a plateau of 55 bcm/year while exports based on older, depletion contracts will have decreased to around 10 bcm/year. Most of this gas will be heading into the current EU countries.

Algerian gas is either transported by pipeline via Tunisia and into the Italian grid, or is imported as LNG from liquefaction plants at Arzew and Skikda to reception and regasification terminals in Belgium, France and Spain. Within a few years Greece will also receive Algerian natural gas in this manner. An extension of the Trans-Med pipeline from Algeria to Italy is currently under way and will see its capacity double to 25 bcm/year by 1996. The liquefaction plants, including the oldest in the world, are, in parallel, being refurbished and should reach a capacity of 30 bcm/year in 1996. Finally, work on the EuroMaghreb pipeline started in 1994. This 9 bcm/year pipeline will run through Morocco and supply Spain after crossing the Straits of Gibraltar as of next year. In 1997, an off shoot will provide 2.5 bcm/year to Portugal.

Russian gas is currently supplied through major gas pipelines from the Western Siberia gas-producing fields, crossing Ukraine and former Czechoslovakia to the German border. A number of projects are being developed for new pipeline routes including a line through Belarus and Poland, and a pipeline from the major gas fields in the Yamal Peninsula. In addition, Russia is scheduled to supply Greece with natural gas by pipeline over the next few years. These developments are expected to reinforce the position of the former USSR as a major supplier to the EU over the next 10 to 15 years.

## MARKET FORCES

### Demand

EU natural gas demand has increased at over 3.5 % per year, on average, since 1985 and is expected to continue to expand over the rest of the decade and in the early years of the next century.

In the EU, almost 50 % of natural gas is used in the residential and commercial sector, predominantly for space heating, while small amounts are used for water heating or cooking. The big users are the Netherlands, the UK, Germany, Italy and France. Only in the latter country is gas encountering serious competition (from electricity) in new dwellings. Rates of penetration, with an EU average of 37 %, should keep progressing except in the Netherlands, where this segment of the market is virtually saturated at a share of over 70 %.

Industry, the next biggest sector for natural gas demand, corresponds to a third of total gas consumption. Use for boilers accounts for over 80 % of natural gas demand, where it competes quite successfully with heavy fuel oil and coal, because of its price and environmental advantages.

In 1993, power generation represented 17 % of total natural gas use. This relatively small market is the most promising for natural gas which has seen its share grow from 6.7 % in 1992 to 8.4 % in 1993. Several recent developments have increased the attractiveness of gas as a power station fuel. Firstly, increasing environmental concerns have in particular led to tighter emission norms: emissions of SO<sub>2</sub> and CO<sub>2</sub> are lower for natural gas than for other fossil fuels. In addition, the European Community repealed in 1991 a 1975 Directive that limited the use of natural gas in power plants. Thirdly, technological developments have increased the efficiency of gas plants to over 50 % for a combined cycle system, compared to an efficiency of only 35 %-40 % for oil or coal plants. And lastly, structural and institutional changes in the electricity industry have contributed to the growth of natural gas demand, with privatisation in some countries and the widespread development of independent power generation: this evolution favours the use of gas, because of the lower capital cost and shorter construction lead time for gas plants.

### Supply and competition

As befits a sector in a phase of expansion, the natural gas transmission and distribution industry in the EU is subject to diversity in the existing arrangements, and pressure for change, as competition, privatisation and deregulation make their impact on market structures. The effects of these developments on specific companies is highlighted in the following section on Industry Structure, but more broadly speaking, there is a dichotomy between countries which wish to keep faith in traditional market organisations, dominated by central or local/regional government-owned entities with a monopoly over their service area, and countries which are introducing competition on a large scale. The United Kingdom is the country which has gone the furthest in the latter route with the break-up of British Gas and the appearance of a number of new competitors with firm access to gas supplies. Germany has also become open to competition, with the appearance on the market of WinGas, a joint-venture between Wintershall and Russian gas supplier Gazprom, which is aggressively seeking new business in areas served by the traditional gas transmission and distribution companies.

The European Commission has been promoting the introduction of a Third Party Access (TPA) regime in the EU, in order to accelerate the introduction of competition by allowing major consumers or distribution companies a greater choice of suppliers. These proposals are still subject to debate, and are being resisted by many of the existing gas companies. If implemented, a TPA regime could have a major impact on the competitive structure of the industry, leading to greater competition, and downward pressure on margins right along the gas supply chain.

The natural gas supply profile will also favour the development of a more competitive structure for natural gas transmission and distribution in the EU. The EU's traditional suppliers have an abundance of gas reserves which can be brought to the market at relatively low cost, thus contributing to mod-



**Table 5: Transmission and distribution of natural gas  
Trends in natural gas consumption by country**

thousand TJ (GCV) (1)	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	8 592.1	9 211.4	8 956.6	9 369.5	8 689.4	9 697.9	9 590.0	10 216.0
Belgique/België	355.0	356.1	335.6	373.0	342.0	365.7	378.9	393.8
Danmark	26.3	60.8	64.8	69.3	74.7	85.2	89.1	93.0
BR Deutschland	1 918.2	2 115.7	2 069.6	2 175.6	2 021.0	2 416.8	2 378.1	2 482.5
Hellas	3.3	5.2	6.2	6.3	5.8	5.7	5.3	4.0
España	109.4	121.9	155.7	206.5	208.1	234.4	245.1	240.1
France	1 129.1	1 168.3	1 104.5	1 137.6	1 041.7	1 181.8	1 175.1	1 212.8
Irèland	90.5	62.8	75.7	85.4	78.4	80.2	79.5	90.2
Italia	1 265.2	1 491.5	1 561.5	1 716.6	1 633.5	1 736.0	1 721.3	1 860.2
Luxembourg	N/A	N/A	16.5	18.9	18.0	18.7	19.5	20.3
Nederland	1 503.7	1 563.6	1 416.7	1 451.9	1 290.0	1 442.5	1 397.6	1 411.4
United Kingdom	2 191.4	2 265.5	2 149.8	2 128.6	1 976.2	2 130.9	2 100.6	2 407.8

(1) TJ: terajoule, GCV: gross calorific value.

(2) Excluding Portugal.

Source: Eurostat

eration in price increase trends compared to other fuels. However, according to Eurogas, future supplies of gas will be dependent on huge investments from more distant sources which will be technically and economically more difficult to exploit.

The price of gas to final consumers is normally linked to that of competing oil products, heating oil for residential and commercial sector applications and residual fuel oil for industrial and power generation applications. This principle has seen some exceptions in recent years, particularly in the power generation sector, where natural gas price escalation linked to coal prices or inflation has been introduced into some sales contracts. If this trend spreads, it will also act as a moderating factor on natural gas price increases and contribute to increasing competitiveness of natural gas versus other fuels.

## INDUSTRY STRUCTURE

### Companies

The structure of gas markets in Western Europe is still dominated by central or local/regional government-owned entities, which purchase or import gas, store and transport it and deliver it to the end user. The major exceptions to this state of affairs are Germany and the United Kingdom. In both countries private capital now controls most of the major gas companies (although final distribution to small and medium sized customers is usually controlled by municipalities in Germany), and competition is becoming more a feature of the market place.

In the United Kingdom, evolution of the market structure has been overseen by the government regulatory office put in place after the privatisation of British Gas (BG) in 1986, which has seen BG required to unbundle its gas supply and transmission business from its gas marketing business, and allow competitors to take increasing shares of gas end-user markets, securing their own gas supplies and having access to the BG pipeline network at a regulated tariff.

In Germany the major gas companies until recently enjoyed virtual regional monopolies. However, the advent of the new market entrant WinGas, a subsidiary of Wintershall in joint-venture with Russian gas supplier, Gazprom, has introduced a new element of competition into the market. WinGas is competing directly with the gas companies already in existence to supply industrial users and municipalities as their current contracts come up for renegotiation. WinGas also has ambitions to significantly expand its activities, not only in Germany,

but also as a supplier of Russian gas to other West European countries.

Although the markets retain the dominance of monopolistic and/or state-owned structures, the trend to liberalisation has clearly begun. The wave of privatisation and liberalisation that started with the sell-off and subsequent restructuring of the United Kingdom's British Gas in the years following 1986 is liable to continue. Countries where further developments in privatisation are expected during the life of the forecast are Belgium, Portugal, Greece, Spain, and Italy.

In Belgium, the state's 50 % participation in the gas import and transmission company Distrigaz is in the process of being sold off to the existing minority shareholder Tractebel, the private holding company controlling most of the Belgian electric power generating sector.

In Portugal, the consortium of state-owned banks, insurance and energy companies which comprise the ownership of Transgas, the company charged with importing and transporting gas purchased from Algeria, will be opened up progressively to private capital over the next five years. A number of European gas companies are interested in taking a strategic stake in order to participate in one of Europe's last remaining new markets for natural gas.

In Greece, arrangements for the import of Russian gas supplies by pipeline, including new pipeline developments, have been changed several times. State gas company DEPA was initial signatory to the contract, prior to losing and then regaining monopoly transport and marketing rights to the gas. The situation is likely to evolve further over the next few years as the Greek government seeks to privatise energy sector assets.

In Spain, the gas sector recently underwent significant consolidation when, in 1993, state-owned Enagas, which previously held the import and transmission monopoly, was merged into Gas Natural, a subsidiary of partially privatised hydrocarbons giant Repsol and La Caixa Bank. Gas Natural was originally formed in 1990/91 by a merger between Catalana de Gas, Gas de Madrid, and some of Repsol's gas distribution holdings. The new company is thus in a position to dominate all parts of the gas chain in Spain. Privatisation of further tranches of Repsol capital will reinforce the independence of the new company vis-à-vis the state.

In Italy, privatisation of state energy holding company ENI, which includes gas importer and transporter SNAM, has been the objective of successive Italian governments for the past three years. Political changes, together with the need to achieve consensus on the structure and role of the privatised companies,

**Table 6: Transmission and distribution of natural gas  
Structure of West European Gas Markets**

<b>Gas import/purchase and transmission</b>			
Country	Major operators	Ownership	Competition
Belgique/België	DistriGaz	Government (50%) Tractebel, Shell	No
Danmark	DanGas	State	No
BR Deutschland	RuhrGas BEB ThyssenGas WinGas VNG	Private Consortium Shell, Esso Shell, Esso, Viag Wintershall, Gazprom Private gas company consortium	Limited
Hellas	DEPA	State	No
España	Gas Natural	Repsol, La Caixa Bank	No
France	Gaz de France CeFeM SNGSO	State GdF, Elf, Total GdF, Elf	No
Ireland	BGE	State	No
Italia	SNAM	State	No
Nederland	Gasunie	State (50%) Esso, Shell	No
Portugal	Transgas	State-owned consortium	No
United Kingdom	British Gas New competitors	Private investors Various private	Yes
<b>Gas distribution</b>			
Country	Major operators	Ownership	Competition
Belgique/Belgie	Local distributors	Municipalities	No
Danmark	Municipalities	Municipalities	No
BR Deutschland	Municipalities	Municipalities	No
Hellas	DEPA	State	No
España	Gas Natural	Repsol, La Caixa Bank	No
France	Municipalities Gaz de France CeFeM SNGSO	Municipalities State GdF, Elf, Total GdF, Elf	No
Ireland	Municipalities	Municipalities	No
Italia	BGE	State	No
	Italgas	State (via SNAM)	No
Nederland	Municipalities Gasunie	Municipalities State (50%) Esso, Shell	No
United Kingdom	Municipalities British Gas New competitors	Municipalities Private investors Various private	Yes

Source: DRI Europe

have delayed the process, but it is expected that ENI will enter the private sector before the year 2000.

### Impact of the Single Market

The natural gas supply and distribution sector draws a generally favourable overall picture of the Single Market measures implemented so far. The benefits are, however, seen to be indirect, in that liberalisation of financial and other services have improved the overall business environment in Europe. The direct activities of natural gas supply, transmission and distribution have not changed as a result of the Single Market. Natural gas production takes place in only a minority of EU Member States, and the EU as a whole is a net importer of natural gas. There has thus always been an incentive for EU states to develop open trade in natural gas, and there have been no significant barriers to trade, either within the EU or between the EU and other countries. The gas transit directive, and price transparency, have not altered the structure of activity or prices to consumers in any meaningful way.

Where changes in the structure of the gas industry have taken place, such as the introduction of regulated competition in the UK, the appearance of new competitors in Germany, and the forthcoming creation of a new gas industry in Portugal, these have been primarily due to particular national circumstances rather than EU-sponsored measures.

Further development of the Internal Energy Market could have more profound consequences for the industry, but the impact is difficult to foresee prior to agreement on the type of liberalisation or Third Party Access (TPA) regimes which would be implemented. In most cases, the current gas transmission and distribution companies have been opposed to the full-scale TPA arrangements proposed by the Commission, arguing that they would impede their ability to invest in supply infrastructure and to enter into long-term gas supply contracts. The gas industry sees the main priority for the EU and national governments to ensure a stable political and regulatory framework within which a diversity of long-term gas supply contracts can be negotiated on a commercial basis.

**Table 7: Transmission and distribution of natural gas  
White Paper priority list for trans European gas networks**

Introduction of gas into new regions	Connection of isolated gas networks
Northern Ireland	Ireland - Northern Ireland
Germany - New Länder	Great Britain - Continent
Corsica and Sardinia	Germany - Belgium
Spain - New regions	Spain - France
Portugal	Portugal - Spain
Greece - (including Crete)	
Improved storage and reception capacities	New gas supply pipelines
Ireland - Construction of LNG station	Norway - Belgium or Netherlands
Germany - Construction of LNG station	Norway - Germany (Europipe)
France - Extension of LNG station	Norway - Denmark-Sweden (Scanpipe)
Italy - Extension of LNG station	Algeria - Morocco-Spain-France
Spain - Extension of LNG station	Algeria - Tunisia-Italy
Spain - Creation of underground storage	Russia- Ukraine-EU (upgrade)
Germany - Creation of underground storage	Russia - Belarus-Poland-EU
France - Creation of underground storage	Russia - Scandinavia-EU
	Bulgaria - Greece
	Libya - Italy
	Iran - Turkey - EU

Source: COM (93) 700 & The Financial Times EC Energy Monthly

## REGIONAL DISTRIBUTION

The development of natural gas markets in the different European countries has been extremely uneven, because of differences in indigenous resources and in pipeline access. The most developed, and mature, market is the Netherlands, where the share of gas in primary energy consumption is nearly 50 %. The other countries where the discovery of the Dutch Gröningen field favoured the penetration of gas are Belgium, France, Italy and Germany. However, the development of nuclear power in France and Belgium has limited the role of gas, whereas abundant indigenous coal resources in Germany were a constraint on the penetration of gas. In Italy, which has substantial gas reserves but little other energy resources, the gas market expanded rapidly and gas accounts for 28 % of primary energy demand. The other gas market that developed rapidly thanks to indigenous reserves is the United Kingdom, where the share of gas is 27 %. The three most mature markets (the Netherlands, United Kingdom and Italy) account together for 52 % of Western European gas demand. Germany is the largest market with consumption of 65 bcm, but the share of gas in German energy demand is only 18 %, and there is considerable scope for higher penetration, because of the currently low level of use in the power generating sector.

Some countries are just introducing natural gas, or will introduce it soon, such as Greece and Portugal, and offer considerable scope for gas consumption, if the required infrastructure can be developed. Finally there is a middle tier of underdeveloped markets, with the share of gas ranging from 6 % in Spain to 13 %-20 % in some of the more mature markets listed earlier (France, Germany and Belgium). The share of gas in Spain is low because gas was only recently introduced but the market should now expand rapidly, with the development of the appropriate infrastructure.

The scope for further developments of these markets vary considerably depending on their energy resource endowment (other than gas), their energy policy and the development of the required infrastructure (for transmission and distribution within the country but also pipelines and LNG facilities to import gas). In particular, infrastructure developments will be essential to the development of middle tier, and especially new or "yet-to-be-created", markets. However greater integration of the European Union energy infrastructure (especially regarding electricity

and gas markets) has been given high level of priority in the completion of the Internal Energy Market. In 1992, a Communication on electricity and natural gas transmission infrastructure noted that infrastructure integration was essential to completion of the Internal Energy Market, while ensuring flexibility and security of energy supplies.

More recently, the Delors White Paper on growth, competitiveness and employment (COM(93) 700 final) stressed the role of trans-European networks in strengthening the competitiveness of European industry. The White Paper identified eight priority projects to which the Union funds can contribute 13 billion ECU. The list of projects for gas is given in Table 7, and concerns both interconnection of existing networks or development of national networks and the development of new supply pipelines. In addition to this, the projects to connect peripheral parts of the Union can also be financed by structural funds under the REGEN initiative.

## ENVIRONMENT

The environmental advantages of natural gas compared to other fuels has been one of the major factors in its success in increasing its market share in the EU. Natural gas contains very little sulphur and it emits less NO<sub>x</sub> per unit of energy than other fossil fuels. It also contributes to less emissions of CO<sub>2</sub> and other greenhouse gases than oil or coal, and is thus perceived as a lesser contributor to the threat of global climate change.

Initiatives taken within the EU, such as the Large Combustion Plant Directive (LCPD), and internationally, such as the Framework Convention on Climate Change, under which the EU has set targets to limit its CO<sub>2</sub> emissions to 1990 levels by the year 2000, have contributed to a favourable climate for increased penetration of natural gas. The economics of burning natural gas versus the cost of installing emissions clean-up equipment and burning other fuels, has favoured gas in many industrial and power generation sector applications.

## REGULATIONS

The regulatory environment in the EU embracing the natural gas transmission and distribution industry is gradually moving towards one designed to support a more competitive envi-

ronment. Although the evolution towards TPA is currently moving quite slowly, and the final shape of TPA is difficult to forecast at the time of writing this article, other measures are moving ahead. One such supporting measure already enacted was the gas transit directive, adopted by the EU in 1991. This directive is aimed at facilitating the transit of gas between high pressure transmission grids. Companies owning or controlling high pressure gas pipelines in one EU Member State are obliged to allow a counterpart company in another State to carry gas across its transmission system if capacity is available and subject to price and quantity negotiations. Article 3 of the Directive requires all transit requests and the outcome of negotiations to be notified to the Commission. With gas able to be moved across a third country, this process is seen as forming the first step towards liberalisation of West European gas markets.

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## OUTLOOK

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Natural gas is expected to continue its growth over the next 10 to 15 years, rising to over 25 % of primary energy demand by 2010 and over 26 % by 2015, primarily at the expense of oil and nuclear electricity. This trend is due to its abundant supply, its continuing price competitiveness versus other fuels, and its environmental advantages. In addition, over this period new natural gas markets will develop, in Greece and Portugal, and there should be a significant expansion in gas demand in Spain, which is currently a relatively immature market.

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# Renewable energy

*In 1992, primary electricity generation from renewable energy sources grew by 3 % compared to the previous year while total primary energy demand fell by 1 %. Thus the share of primary electricity from renewable energy sources grew slightly as a percentage of EU primary energy demand from its 1991 share of 9.7 %. In 1991, total energy production from renewable energy sources contributed around 4 % to total primary energy demand in the EU. Of this percentage, the majority of the share came from large scale hydro-electricity production (31 %) and from the combustion of biomass (60 %). The remaining 9 % was accounted for by other renewable technologies in varying stages of development. Hydro-electricity production dominated electricity production from renewable energy sources with a 92 % share and biomass accounted for 98 % of EU heat production. Expansion of the role of renewable energy is an important part of EU energy and environmental policy, and a number of programmes are in place to promote its development.*

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## INDUSTRY PROFILE

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### Description of the sector

The renewable energy industry is very broad in definition and is not classified as a single industry under NACE.

Fuels from renewable sources, that is those that are not depleted due to their exploitation, may be in the form of electricity or as gases, liquids or solids. Some renewable energy sources are limited to one form of energy transformation, e.g. hydro-electric power generation to produce electricity. Others are more flexible: biomass may be converted to liquid fuels, burnt as a low calorific solid fuel or gasified. The major renewable energy technologies are listed together by the form of energy they most commonly produce.

#### Electricity

Tidal power extracts energy from the tides using the same principles as hydropower facilities but captures the tidal ebbs and flows rather than the flow of a river to generate electricity.

Small hydro-electricity generation uses the same principles as large scale hydro-electricity, but plants use different types and sizes of turbines.

Wind power generation uses the wind turbine to generate electricity by the same principles as the old fashioned windmill but using a higher level of technology.

Photovoltaic systems use semiconductor materials to convert solar radiation into DC (direct current) electricity without moving parts.

#### Heat and/or electricity

Geothermal energy use takes heat from the earth directly for heating purposes, or uses it for electricity generation. The temperature determines the application.

Biomass is considered all matter that can be derived directly or indirectly from plant photosynthesis. "Indirectly" refers to the products available via animal husbandry and the food industry. Feedstocks for the technologies include wood resources, agricultural wastes, industrial and municipal solid waste (MSW) residues and surpluses and energy crops.

#### Heat

Active solar generation produces heat by capturing solar radiation. It usually consists of one or more collectors, an energy transport system to move the heat to the point of use, an electronic control system and an energy storage system.

In addition, a number of industries are associated to the renewable energy sector. They fall into two types:

- Industries that provide feedstock, e.g. the agricultural products industries (NACE 011, 014, 020) who provide feedstocks such as straw, slurry and wood residues for biomass derived renewable energies; the pulp and paper and wood processing industries (NACE 471/2, 461/2) who produce waste products and residues which can be used as feedstocks; and the waste and recycling industries (NACE 62, part of 921) who provide low cost feedstock.
- Manufacturing industries that provide components for use by renewable energy technologies: e.g., the mechanical engineering industry (NACE 32) that is involved in the manufacture of renewable energy equipment, the most important being turbines (water turbines for hydroelectric plants, aeroturbines for wind farms and steam turbines for geothermal power stations); agricultural equipment used for biomass collection and processing; and the electrical engineering industry (NACE 34) which, in addition to manufacturing electrical components for control equipment, provides semiconductor material for photovoltaic cells.

### Recent trends

Mature renewable energy technologies such as biomass combustion and hydroelectric power have been a significant part of EU energy supply for some time. Since around the 1970's, the energy supplied by these sources has seen significant growth. The energy supplied from other renewable sources has grown very quickly, though it is still a very small fraction of total energy supply.

Around 10 % of electricity demand is met by renewable energy sources. Hydro-electric power generation accounts for 86 % of the renewable electricity supply. Biomass and hydro, together, make up nearly 98 %. Biomass sources provide almost all of the renewable heat supply and 3 % of total EU heat demand.

Greece has the largest installed capacity of solar collectors. But the penetration in France and Portugal is also significant. The Danish have by far the largest amount of wind power installed, generating roughly 77 % of electricity from wind power in the EU. Italy, France and Spain generate the majority of electricity from small hydro sources in the EU. Italy has the largest geothermal energy industry, a large proportion of which (520 MW (megawatts)) is used for electricity generation. France, Germany and Italy have the largest biomass consumption due to much direct wood combustion. Denmark, however, uses a high proportion of agricultural waste, mainly crop residues, in biomass consumption. Spain generates the most electricity from biomass in the EU.

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## MARKET FORCES

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### Supply and competition

#### Tidal power

The development of large scale tidal power stations in the EU has been inhibited by the huge investment cost, the very long construction time and concern over the environmental impact of tidal barrages. The largest tidal power station in the world was built in 1968 at La Rance, in France with an installed capacity of 240 MW. However, no further sites have been developed in the EU, despite their considerable potential.

In the EU, the best sites are to be found along the west coast of Portugal, France, Ireland and the United Kingdom. In the United Kingdom, where the tidal potential is approximately 54 TWh/year (terawatt/hours per year) - over half of the total European tidal resource - the government has heavily invested on tidal energy research and feasibility studies since 1979. A barrage across the Severn Estuary could generate around 17 TWh, equivalent to about 2.5 large power stations (1 000

**Table 1: Renewable energy**  
**Electricity production from renewable energy sources, 1991 (1)**

(TWh) (1)	Solar (PV)	Wind	Biomass	Hydro	Tidal	Geo-thermal	Total	Contribution to overall electricity generation (%)	Total demand (%)
EU	0.02	1.08	9.81	162.03	0.57	3.21	176.7	9.1	10.3
Belgique/België	0.00	0.01	0.56	0.24	0.00	0.00	0.8	1.1	1.3
Danmark	0.00	0.74	0.29	0.03	0.00	0.00	1.1	2.9	3.5
BR Deutschland	0.00	0.22	4.96	17.12	0.00	0.00	22.3	4.1	4.7
Hellas	0.00	0.01	0.00	3.10	0.00	0.00	3.1	8.7	10.2
España	0.01	0.01	0.22	27.28	0.00	0.00	27.5	17.8	2.1
France	0.00	0.00	0.87	57.34	0.57	0.02	58.8	13.1	17.0
Ireland	0.00	0.00	0.00	0.75	0.00	0.00	0.7	5.0	5.9
Italia	0.01	0.00	0.17	42.24	0.00	3.18	45.6	20.8	20.4
Luxembourg	0.00	0.00	0.05	0.08	0.00	0.00	0.1	18.6	3.1
Nederland	0.00	0.07	1.14	0.10	0.00	0.00	1.3	1.8	1.7
Portugal	0.00	0.00	0.81	9.18	0.00	0.01	10.0	33.4	39.6
United Kingdom	0.00	0.01	0.75	4.58	0.00	0.00	5.3	1.7	1.8

(1) TWh: Terawatt hour.  
Source: Eurostat

MW). Another project is on the Mersey which could generate 0.5 TWh.

#### Small hydro-electricity generation

In the EU, the total installed hydroelectric capacity is about 80 GW (gigawatt). Small hydroelectric plants (less than 1 MW) contributed 1.3 GW to this or just over 1.7 % in 1991. There is a marked trend towards small scale applications of hydropower which have a smaller impact on the environment than their larger counterparts. The shift has mainly been due to the limited availability of new large scale sites. The percentage of sites economically exploitable and already in use is 95 % for large hydro but only 20 % for small hydro-electricity. The total additional EU exploitable potential for small hydro-electricity is between 4-5 GW. France, Italy and Spain have by far the largest small hydro potential. In Spain, the electric utility, Union Fenosa, has 28 small hydro plants with a total generating capacity of 55 MW in operation, and plans to bring a further 52 plants on-line before 1998.

#### Wind power

Denmark is the largest generator of electricity from wind energy in the EU. The industry has expanded considerably so that in 1991, the total installed capacity in the EU was 509 MW of which Denmark accounted for 70 %, the Netherlands and Germany both for 11 %. The USA has an installed capacity of 1 500 MW, consisting of around 15 000 turbines. Denmark has one of the smallest wind power potentials, and yet has by far the largest installed capacity. Sizeable subsidies were given by the Danish government during the late 1970s and early 1980s which boosted the industry and enabled it to enter the large Californian, USA export market ahead of competitors. The United Kingdom, in contrast, has the largest potential but relatively few turbines installed. However, under the national programme to promote non-fossil fuels, the wind power industry is currently enjoying rapid growth.

Germany is witnessing a huge boom in wind farm construction: in the first six months of 1994, 100 MW of wind power generating capacity came on line. In Spain, a 30 MW plant has been commissioned, built largely by Endesa, the state electricity company, and Ecotecnica, a Spanish turbine manu-

**Table 2: Renewable energy**  
**Heat production from renewable energy sources, 1991**

(thousand toe)	Biomass	Solar	Geothermal	Total
EU	25 235.0	158	335	25 728.2
Belgique/België	310.0	1	1	312.2
Danmark	1 035.0	2	1	1 038.2
BR Deutschland	2 877.0	9	7	2 893.2
Hellas	1 398.0	82	3	1 482.6
España	3 729.0	22	2	3 753.5
France	10 188.0	15	120	10 322.8
Ireland	108.0	0	0	108.1
Italia	2 775.0	7	200	2 982.2
Luxembourg	7.0	0	0	7.0
Nederland	453.0	2	0	454.9
Portugal	1 997.0	13	0	2 009.7
United Kingdom	358.0	5	1	363.8

(1) toe: Tonnes oil equivalent.  
Source: Eurostat



**Table 3: Renewable energy  
Tidal energy resources in the EU, 1990 (1)**

	Electricity production (TWh)	Technical potential (TWh/year)
EU	0.5	105.3
BR Deutschland	0.0	0.8
España	0.0	0.1
France	0.5	44.4
Ireland	0.0	8.0
Nederland	0.0	1.8
United Kingdom	0.0	50.2

(1) TWh: Terawatt hour.  
Source: World Energy Council

facturer. In Greece, 13 new wind farms have begun operation in the last two years, with a total generating capacity of 22 MW. Two new farms of 5 MW each are planned for Crete in 1995. In Ireland, an EU Thermie grant is being used in the construction of a 5 MW wind farm in county Kerry.

Technical difficulties have meant that off shore farms are less commercially developed. In Denmark, however, the electric utility Elkraft brought on-line the world's first off-shore wind farm consisting of eleven 450 kW (kilowatt) turbines. A second 5 MW farm is planned by the other electric utility, Elsam consisting of ten 500 kW turbines. In the UK sector of the North Sea, a total of four wind turbines of a capacity of 5 kW are to be installed on two unmanned oil installations.

#### Photovoltaic systems

The decrease in cost accompanied by the increase in efficiency of photovoltaic (PV) cells has enabled a rapid growth in the market for photovoltaic systems. Since 1978, when a mere 1 MW was installed worldwide, it has increased to reach around 56 MW in 1991, primarily for remote sites. However, it is now becoming feasible to use PV for power generation in a centralised manner. In 1992, in Switzerland, a 500 kW PV power station came on-line. In Greece, a 600 kW plant has been completed. In Spain, Union Electric Fenosa are to build a huge 1 MW PV power station for water pumping. The Spanish government also plans two other large projects of 100 kW capacity. In Italy, a PV power station over three

**Table 4: Renewable energy  
Electricity generation and installed capacity of small hydro  
plants, 1991 (1)**

(GWh)	Generation	Capacity (MW)
EU	6 490.7	1 330.8
Belgique/België	5.8	2.6
Danmark	13.9	5.5
BR Deutschland	2 665.0	360.0
Hellas	11.0	3.9
España	718.7	169.3
France	1 556.0	410.0
Ireland	24.4	10.6
Italia	1 366.0	322.0
Luxembourg	20.5	9.0
Nederland	1.0	0.2
Portugal	40.0	23.4
United Kingdom	68.4	14.3

(1) Capacity per plant 1 MW; GWh: Gigawatt hour; MW: Megawatt.  
Source: Eurostat

times this size is under construction. Currently, the demand in Europe exceeds the production capacity. In 1991, the two largest PV manufacturers in Europe were BP Solar (UK) and TST with a market share of around 15 % each. Other large PV manufacturers are Helios (GR), Italsolar (I) and Photowatt. Together this group of companies accounts for about two-thirds of the PV market. Europe has increased its share in the world market since 1985 at the expense of the Japanese and US industries.

#### Geothermal energy

In the EU, the greatest amount of geothermal electricity generating capacity by far lies in Italy where over 50 geothermal units are in operation. Other countries include France, Portugal and Greece. Further developments are centred in Italy where the largest geothermal power plant in the world, a 60 MW plant, opened in Tuscany in 1991. Plans for three more plants of this size are being considered in line with governments policy to increase the share of geothermal-derived electricity to 3 % of total national energy production. Other plans include a 5-10 MW plant which is planned for 2000 in one of three sites in France, Germany and UK, funded by the EU JOULE programme.

From a world perspective, the production of electricity from geothermal sources has accelerated over the past decade. Between 1980 and 1990, production increased by 50 % from 3 900 MWh (megawatt/hour) to 5 850 MWh.

In addition to energy for electricity production, hot ground water may be used for space heating on a smaller scale. In the EU, it is estimated that in terms of primary energy, geothermal heat provided 370 000 toe of energy in 1990. The regional distribution is the same as that for geothermal electricity production, and is used predominantly in urban areas. In 1990, the equivalent energy saving from using this source of energy was 170 000 toe in France and 200 000 toe in Italy. Other countries with geothermal potential for heating include Spain, Portugal, Greece and Germany. In former East Germany, much use was made of geothermal energy for district heating. A 12 MW plant will come on-line in 1994 in Mecklenburg-Vorpommern. In the west, a 20 MW project in Bavaria will be Germany's largest geothermal plant, and is due for completion in 1994. Worldwide, the consumption of geothermal energy for heating was around 2 million toe (tonnes of oil equivalent), the majority being used in Japan, China, Iceland and Hungary.

#### Biomass

The theoretical potential for biomass in the EU is very large, at around 100-120 million toe. Within the EU, wood, straw and municipal solid waste are the most commonly used biomass fuels. The primary energy derived from these sources amounted to almost 22 million toe in 1989.

The great proportion of this total is given by wood. The EU currently consumes around 20 million toe of wood energy. France is by far the largest consumer of wood taking 45 % of the EU total due to the large proportion of wood burning stoves used in rural areas.

The biggest consumer of straw for energy in the EU is Denmark, where there are over 12 000 straw-burning stoves on farms and over 30 district heating schemes using straw. The combustion of straw currently provides 1.5 % of Denmark's primary energy needs. As a means to reduce coal imports, achieve environmental objectives and indirectly subsidise farmers, the Danish government has obliged electricity utilities to purchase 1.2 mt/year (million tonnes per year) of straw. Biomass as a whole provides 5.8 % of Denmark's total primary energy requirements and the government intends to increase this to 9 % by the year 2000.

The most widely used method of recovering energy from MSW is by incineration; another rapidly expanding major source



**Table 5: Renewable energy  
Economic Indicators for the Danish wind power industry**

(%)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Annual growth	149	121	270	167	158	-28	-56	-42	158	23
Turnover (million ECU)	14	19	51	121	302	195	84	47	102	121

Source: European Wind Energy Association (EWEA)

is landfill gas. In the EU, around 550 schemes were operating in 1988, including 174 with heat recovery of which more than 80 % are in France, Germany and Denmark. Disposal of MSW in landfill is widely practised in many Member States. In the United Kingdom, 90 % of MSW is disposed of in landfills. Typical schemes generate between 1 to 5 MW and may be used to generate electricity or used directly as fuel in industry.

Biogas is a fuel consisting mostly of methane, produced from the anaerobic digestion of organic material. Agricultural waste, sewage and a variety of liquid industrial effluents can be treated anaerobically. The technology is widespread at sewage works and it is expected to be used increasingly in treating food industry waste and slurry from intensive livestock farming. Member States currently using biogas to any extent are Italy, United Kingdom, Denmark and the Netherlands, due to their livestock farming industries.

The development of energy crops is closely tied to the Common Agricultural Policy (CAP). Set-aside land, which farmers must put to a use other than food production, will total around 15 % of EU agricultural land. Energy crops are therefore an attractive option to farmers. Wood could be sustainably harvested or coppiced (where only the outer branches of a tree are stripped away). If 15 million hectares of farmland is in surplus by the end of the century, and if it was all turned over to fuel wood crops then it is estimated that 120-150 million tonnes of wood with an energy content of 55 to 65 million toe might be produced per year.

Biofuels may also be produced from energy crops. For example, the Netherlands is investigating using feedstocks such as elephant grass, poplar wood or straw for gasification to a fuel for use in electricity generation plants. An Italian biofuel refinery, run by Distilleria F. Palma is operating with a capacity of 70 000 tonnes/year. The largest biofuel producer is Novamont which operates refineries in Italy and France with a capacity of 240 000 tonnes/year, including the world's largest plant at Livorno (80 000 tonnes/year).

#### Active solar collectors

By far the largest user of active solar collectors is Greece. In 1989, the total installed solar collector surface area was around 1.3 million square metres that contributed around 67 thousand toe to primary energy production. In Greece, hot

water from active solar collectors contributes 4.5 % to the total hot water needs. In the other Member States, this fraction is considerably less, due to less favourable climatic conditions and a smaller area of collectors installed.

Today, solar collector sales in Greece represent over half the total sales in the EU. Solar collector production in Greece, however, is solely for the home market, which is very large. At EU level, imports from outside Europe are decreasing: they amount to about 2 500 solar water heaters and about 1 000 additional collectors each year.

#### Production process

##### Tidal power

The simplest systems generate power by capturing water at high tide and running the head of water through turbines (ebb generation). More complicated systems impede the flow of water in both directions. The turbine best suited for the low head characteristics is the bulb-type turbine, and units are manufactured with runner diameters of 7.5 metres and capacities of 60 MW.

##### Small hydro-electricity generation

Countries and institutions define "small" differently. An upper limit for small hydro is 10 MW, while capacities may be as low as a few hundred kilowatts. The technology differs compared to large scale hydro-electricity generation in that turbines are specifically designed for low head conditions and control equipment differs in its complexity.

##### Wind power

Wind power in Europe, in its present form, can be said to have begun in the mid 1970s in the wake of the oil crisis. The industry went through a slump in the mid 1980's with lower energy prices, which prompted intensified efforts to reduce costs and improve operating efficiency. Costs have come down dramatically and the percentage of capacity used on average has increased steadily.

Modern wind turbines operate on either a horizontal or a vertical axis, though horizontal axis machines are the most common units manufactured. Turbine designs have improved considerably such that the efficiency, measured in energy generated per swept area per year, doubled between the beginning and the end of the 1980s. The average size of wind turbines installed in the EU has increased steadily since the 1970's though there is no consensus as to the optimum size. R,D&D work is currently centring on 300 kW machines with rotor diameters of 25 metres. Along with improved technology comes increased reliability and lower costs. A study of the top performing wind farms in California showed an increase in the availability of electricity generated from 60 % to around 95 % over the 1980's. Based on Danish experience, turbines in the range 100-300 kW have an average total cost per swept area of 280 ECU/square metre. The costs vary from country to country and from site to site, depending on the terrain and other factors.

In addition to onshore wind sites, a great potential exists for turbines situated off-shore. There are particular problems associated with this, however, such as difficulties of operation

**Table 6: Renewable energy  
Installed and planned geothermal power capacity (1)**

(MW)	1989	1995
Hellas (Milos)	2	12
France (Guadeloupe)	4	4
Italia	545	885
Portugal (Acores)	3	13
USA	2 777	3 170
Japan	215	457

(1) MW: Megawatt.

Source: World Energy Council



**Table 7: Renewable energy  
Solar collectors total installed surface, 1991**

(thousand square metres)	Surface area	Share (%)
EU	3 557	100.0
Belgique/België	36	1.0
Danmark	69	1.9
BR Deutschland	390	11.0
Hellas	1 600	45.0
España	286	8.0
France	342	9.6
Ireland	3	0.1
Italia	290	8.2
Luxembourg		0.0
Nederland	95	2.7
Portugal	170	4.8
United Kingdom	276	7.8

Source: Eurostat

in a saline environment, achieving designs rigorous enough to stand up to storms and the difficulties of access for maintenance. Off-shore sited turbines tend to be larger than their land based counterparts and environmental constraints hindering turbines on land are more relaxed for off-shore sites.

#### Photovoltaic systems

The basic element is the PV or solar cell. This is comprised of semiconductor materials which have both negative and positive charge carriers. When photons fall on the cell, electrons in the semiconductor are freed, and an electric current is generated. Cells are built into modules of around 1 square metre in size and may generate in the region of 100 W<sub>p</sub> (peak watts). Efficiency has increased by about 50 % over the past decade.

Three methods of production exist. First, single crystal silicon is a well established technology, with cells that tend to be stable and relatively efficient. The cost of manufacturing, though decreasing, is still relatively high. Second, polycrystalline silicon ingots with grain sizes of several millimetres can be produced by a casting process less expensive than single crystalline process. Larger areas are needed for the same power and module efficiency is slightly lower. Polycrystalline silicon ribbons may be manufactured using edge defined film-fed growth and dendritic web processes. The manufacturing process is complex though it has high potential for high speed production. Third, thin film technology is an area of intense research effort. Films are deposited directly onto substrates by technologies such as glow discharge, chemical vapour and electro-chemical deposition. Semiconductor materials being investigated include amorphous silicon, copper indium diselenide, gallium arsenide and cadmium telluride.

#### Geothermal energy

At temperatures below 150° C the most common application of geothermal energy is for direct heat. This has advantages in terms of its simplicity, efficiency and adaptability and is relatively cheap. The hot water cannot economically be transported at distances greater than about 1 km, so the site location is limited by the end use location. Electricity generation at high geothermal steam temperatures is the most attractive application due to the low distribution costs.

The basic technology involves drilling geological formations to obtain hot water or steam, which is then used in the direct application or to power turbines to produce electricity. Other methods such as magma, geopressed and hot dry rock technologies have been investigated though none are near to commercial viability.

#### Biomass

On a global scale, the majority of the population relies on biomass as its primary source of fuel. In the industrialised world, where energy production is more centralised, biomass energy conversion is perhaps the most technically, economically and socially complex renewable energy option. Old, well developed technologies co-exist with completely new, advanced techniques for converting biomass to useful energy.

Over recent years, considerable investment has been made in developing techniques to produce transport fuels, or components thereof, from biomass as an alternative to fuels refined from petroleum. These fuels may be produced by various methods, three of which are mentioned here.

The first is the production of biodiesel, consisting of complex natural esters from the esterification of oils extracted from plants such as rapeseed, linseed and the sunflower. A second method involves the hydrolysis and subsequent fermentation of plants with a high energy value to produce methanol or ethanol. Thirdly, a diesel or gasoline fuel may be produced by liquefaction, a variant of the pyrolysis technique. An indirect method gasifies the biomass and is followed by the catalytic conversion of the product to a liquid fuel. Direct liquefaction skips the gasification step using lower temperatures to produce partially dcoxygenated, complex oils which are then upgraded.

Electricity generation and heating requirements can be met by direct combustion or gasification of wood, straw or other dry biomass. Household waste may be incinerated, or the landfill gas used to provide heat and/or electricity. Agricultural waste such as slurries from animal husbandry may be used in the anaerobic digestion process to produce biogas. In addition, any organic material may be gasified (or liquefied) by pyrolysis (thermal decomposition in the absence of oxygen).

#### Active solar collectors

Active solar technology can supply heat at moderate temperatures for industrial processes, and heat at ranges that satisfy building energy needs. The essential component is the collector and designs include flat plate collectors (glazed or unglazed), evacuated tube collectors and air collectors.

Unglazed solar water heaters are used in outdoor applications, predominantly for heating swimming pools. Glazed solar water heaters form the bulk of the market, representing approximately 90 % of total installed collector surface area in the EU. Evacuated tube collectors form a small but growing part of the market, particularly in northern Europe. In value terms, they account for approximately 10 % of total EU sales. Air collectors are generally built into the building structure to produce warm air directly or in connection with a heat pump for space heating. The most important and widely used application is for drying hay, particularly used in Sweden, where an estimated 200 000 square metres have been installed.

## INDUSTRY STRUCTURE

The renewable energy industry is a heterogeneous mixture of companies in terms of size, specialisation and geographical scope of operations. Small companies, which tend to rely on business generated through EU and national programmes, generally concentrate in niche markets where their core expertise lies. Large multinational companies have historically tended to view renewable energy investments as part of a long term strategy of diversification, and these activities generally form a very small part of their overall business portfolio.

Research into renewable energy technologies is conducted predominantly in universities and government research institutes. However the research budget for renewable energy in large companies has been on the increase. Government incentives have made renewable energy technologies more at-



**Table 8: Renewable energy**  
**Forecast of energy production from renewable energy sources (1)**

	Electricity (TWh)					Heat (ktoe)				
	1991 (2)	1995	2000	2005	2010	1991	1995	2000	2005	2010
Tidal	0.6	0.5	0.5	0.5	0.50	0.0	0.0	0.0	0.0	0.0
Hydro	162.0	172.2	181.5	186.0	186.72	0.0	0.0	0.0	0.0	0.0
Wind	1.1	7.5	19.2	28.4	34.84	0.0	0.0	0.0	0.0	0.0
PV	0.0	0.0	0.1	0.3	0.77	0.0	0.0	0.0	0.0	0.0
Geothermal	3.2	6.2	9.1	10.6	11.82	335.3	817.9	1635.7	2093.9	2349.1
Biomass	9.8	40.7	83.0	107.9	126.70	25235.0	24874.3	31404.3	35658.7	37502.1
Active Solar	0.0	0.0	0.0	0.0	0.00	N/A	712.9	1675.7	2006.4	2118.5
Passive solar	0.0	0.0	0.0	0.0	0.00	157.9	175.9	689.3	1357.8	2063.0
Total	176.7	236.3	300.6	346.7	378.16	25728.0	26703.6	37087.6	45314.6	51969.1
Energy demand	1708.2	2102.0	2329.0	2648.0	2778	N/A	670727.0	712141.0	741620	776815
Contribution (%)	10.3	11.2	12.9	13.8	13.6	N/A	4.0	6.2	6.1	6.7
Renewable primary energy						45624.0	66556.0	96093.0	117696	134165
Total primary energy						650251.0	1182917.0	1279658.0	1382476	1453928
Renewable energy contribution (%)						7.0	5.6	7.5	8.6	9.2

(1) TWh: Terawatt hours; ktoe: Thousand tonnes oil equivalent.\*

(2) Including large hydroelectric power stations.

Source: Eurostat, DG XVII

tractive and companies involved in the market have stepped up investment in order to retain a competitive edge in the field.

### Impact of the Single Market

There is no umbrella association representing the renewable energy industry in Europe, which is composed of several quite different activities and technologies. While the European Commission has sought to increase the role of renewable energy in the EU energy mix, the latter's contribution remains small, and varies from country to country, depending upon the overall financing and incentive packages available for R & D, pilot projects, information campaigns etc., through EU funding programmes such as ALTENER, JOULE and THERMIE, and from national sources.

### REGIONAL DISTRIBUTION

The factors currently governing the regional distribution of renewable energy technologies are the relative size of national financial incentives promoting renewable energy, the technical and commercial maturity of the technology and the size of the resource base.

For more mature technologies, such as biomass combustion and hydro-electricity generation, the size of the resource is the most important. For other technologies, financial incentives are more significant drivers. For example, although the wind resource in the region around Denmark is relatively small, a government commitment to wind energy has produced the largest wind energy industry in Europe. In the United Kingdom, which has the biggest wind energy resource in Europe, the wind energy industry is less well established.

In the long term, as renewable energy technologies mature, the size of the resource base should become the main factor controlling the size of the industry. PV, active solar energy and biomass all rely on sunlight, hence the southern regions have the most potential. The mountainous regions of the Union have the largest potential for small hydro power. The largest tidal potential exists along the western coasts of the United Kingdom and France. Wind energy has the largest potential in the north west region of Europe. Geothermal power will remain essentially confined to Italy.

### ENVIRONMENT

In the mid 1970s, interest in renewable energy was born as a result of high crude oil prices. Recent interest has been largely due the relatively benign effects on the environment of fuels from renewable energy sources (particularly with respect to their contribution to reducing carbon dioxide emissions).

With the exception of biomass, renewable energies are almost free of pollution. This clearly differentiates them from conventional methods of energy production, where increasing concerns over pollution from the energy sector is forcing very large investments in emission control equipment. This is not to say that renewable energy has a negligible environmental impact. Ironically, the growth of the renewable energy industry is driven by two antagonist factors: on the one hand by world scale environmental factors such as the threat of global warming, while on the other hand, being constrained by environmental factors on a local or regional level such as the visual impact of wind turbines and the environmental impacts of tidal and hydro-electric schemes.

There are two main environmental factors promoting the industry. The first is that renewable energy technologies produce zero or negative net CO<sub>2</sub> emissions. Biomass releases carbon dioxide when burnt to produce energy. However, during biomass growth, carbon dioxide is sequestered from the atmosphere. If biomass use is accompanied by afforestation then the net carbon dioxide emissions for biomass could theoretically be zero or even negative in the long run. The second factor is that, with the exception of biomass, energy produced from renewable sources does not produce sulphur dioxide, sulphur trioxide or nitrous oxide, the principal components of acid rain.

The environmental impacts of renewable energy technologies are generally lower than that of conventional energy sources but are significant since, along side costs, they determine the feasibility of implementation. For example, tidal power systems have a very large impact on the environment due to changes in water levels, flow patterns and velocities, sediment movement, and the physical presence of the barrage. In addition water quality will be affected and the impact on wildlife, mainly birds and fish, is particularly acute. The most serious effects are felt in navigation and for port facilities.

The environmental impact of wind power is essentially on the human rather than the natural environment. There is significant visual intrusion, especially since the best sites are often on a skyline. Other environmental impacts are noise and interference with telecommunications.

Active solar collectors and photovoltaics have a visual impact since their use is predominantly in a widely dispersed fashion and because they must, for maximum efficiency, be placed in prominent positions.

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## REGULATIONS

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Over the last decade, many Member States have successfully encouraged the development of domestic renewable energy industries through policies discussed below.

In Denmark, subsidies for installing wind turbines were phased out in 1989 and replaced by tax credits: shareholders obtain income from the electricity sold tax-free below a set limit. State aid also encourages the use of straw as fuel, biogas plants and certain solar projects. The Energy 2000 action plan calls for 1 500 MW of installed wind power capacity by 2005, and is setting up demonstration projects for new renewable energy technologies.

In France, the government sees the greatest potential for an increase in renewable energy production coming from the combustion of wood. Also, special grants have been used to cover the exploration risks of geothermal development. In the area of biofuels the French government gives grants derived from a tax on petroleum products and a newly created biofuels agency co-ordinates R,D&D. Biofuels are exempt from excise taxes. Special grants are given to develop pilot programmes.

In Germany, a law (Einspeiseverguetungsgesetz, 1991) has helped renewable energy technologies producing electricity by forcing the utilities to pay for electricity generated by these methods at a premium rate. Subsidies encouraging the installation of wind power are also available. A proposed change in the law to facilitate planning permission for wind turbines is currently under discussion.

In Greece, the government has made particular commitments to the promotion of wind and geothermal installations. Financial incentives take the form of subsidies in the region of 40-55 % of the total investment. Tax breaks and low interest loans are also available. Wind power has enjoyed a boom over recent years, mainly on isolated islands.

In Spain, the national energy plan gives a clear objective for the contribution of renewable energy in the year 2000 and provides for government support. A number of large scale solar and wind power demonstration projects have come on line, though the majority of renewable energy use comes from biomass.

In Portugal, the EU Valoren project and a national programme to promote renewable energy (STURE) have benefited many projects in small hydro-electric generation, active solar collectors, photovoltaics, geothermal energy, wind power, the use of wood residues and the production of biogas. The relaxation of the authorisation procedure for the production of electricity from small installations has benefited renewable energy production. Also, fiscal incentives to promote the penetration of renewable energy technologies exist in the form of reduced VAT on renewable energy equipment.

In Italy, funding is available covering a portion of the capital costs for renewable energy projects. Efforts to remove barriers to the incorporation of electricity from small generators has resulted in very favourable tariffs for wind, photovoltaics, geothermal and biomass energy in particular. Biofuels are exempt from excise taxes and production has increased rapidly over recent years.

In the Netherlands, wind power installation is subsidised on the basis of the swept area and in the area of R,D&D, funding for 50 % of the costs are made available. A second phase of an integrated programme on wind energy provides government funding for research, development and market introduction of wind power technology. Other government programmes exist to promote biofuels and photovoltaics. General subsidies go to solar, biomass and geothermal projects.

In the United Kingdom's privatised electricity sector, regional electricity companies (REC's) are obliged to purchase a portion of their electricity from non-fossil sources under the Non-fossil Fuel Obligation (NFFO). This obligation also forces the REC's to purchase the electricity at premium prices organised in bands. Different renewable technologies are associated to different price bands according to their commercial status. Most projects receiving support are for the production of energy from waste, but a number of wind and small hydro-electric generation projects have also been undertaken.

The European Commission has several programmes running which support renewable energy.

The Altener programme was launched by the Commission to promote greater penetration of renewable energy. It will run until 1997 on a current budget of 40 million ECU. The plan contains the political EU objectives which are to increase the penetration of renewable energy's contribution to total primary demand from the current 4 % to 8 % by 2005, to triple the production of electricity from renewable energy sources (excluding larger hydro-electricity power stations) and to secure for biofuels a market share of 5 % of total fuel consumption by motor vehicles.

In 1994, the Fourth Framework for R, D & D was agreed by the European Parliament, incorporating funding for existing programmes set up under the Joule programme for research and technological development, and the Thermie programme for energy demonstration projects. Both these programmes originally included support for renewable energy research and pilot projects, covering such areas as wind energy, photovoltaics, biomass and geothermal energy. Continued funding will be provided under the umbrella of the non-nuclear energy component of the Fourth Framework, which has a funding of around 1 billion ECU.

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## OUTLOOK

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Strong growth in the renewable energy industry is predicted into the next century. Some technologies will see faster growth than others and this will depend more on the type and effectiveness of policies promoting market penetration than technological development, though this will also take place.

Strongest growth could occur in the area of biomass and other renewable energy technologies, notably wind and geothermal energy. The share of large hydro-electric generation, though remaining large, will see relatively slow growth due to the lack of suitable sites remaining.

For electricity generation, biomass, predominantly wood, agricultural residues like straw, and waste will be increasingly used. Direct combustion will be the main method, though gasification should see larger growth. Electricity generation from wind energy is expected to grow rapidly though it is dependent on political factors to enable its widespread development. In the generation of electricity from geothermal sources, only Italy and Greece have high temperature geothermal resources. Italy is likely to see the largest growth in this area in the short term. Small hydro-electricity generation will experience higher growth than its larger counterpart. Photovoltaics, though a small component, will see growth in applications for remote locations. In the long term, PV will see higher growth through grid connection from either centralised or decentralised generation sites.

Geothermal energy for heating will experience growth in all Member States where resources are available, principally in Italy. However, biomass should remain the major fuel for heat production from renewable energy sources, with gasification technology showing the largest growth.

The outlook for biofuels, formed from energy crops such as rapeseed or sunflowers, depends very much on future agricultural policy in the EU. Energy crops could supply farmers with a valuable source of revenue from set-a-side land. Tax breaks, as seen in Italy and France and continued Member States support will ensure that the use of biofuels increases.

The prospects for the active solar collectors market depends to a large extent on the effectiveness of national and EU energy plans. Denmark and the Netherlands will see large growth due to government commitments to reducing carbon dioxide emissions; similar conditions should favour the industry in Germany. Italy has recently included the development of active solar energy into its national energy plan, ambitious targets have been made and these should promote strong growth. Spain has considerable potential; a government commitment combined with public education campaigns could result in active solar being widely implemented. In Greece, the market, though large, is not near to saturation and is likely to continue increasing steadily.

Written by: DRI Europe

# Water supply and distribution

## NACE 170

*The sector of drinking water supply is organised very differently in the various Member States.*

*Water is essential to life and health. Water suppliers, therefore, have to comply with technical and health standards and regulations that are becoming ever stricter and which, in consequence, have an increasing impact on the price of water.*

### INDUSTRY PROFILE

#### Description of the sector

The service of supplying drinking water covers abstraction, treatment, quality control, storage, transport and distribution, including maintenance of the infrastructure, metering (in Member States where metering is generally applied), invoicing and customer information and advice services, both for domestic and industrial users.

Research and development efforts, for the most part carried out by the water suppliers themselves, whether they are public or private, are constantly increasing to ensure compliance with the quality requirements imposed by European legislation (cf. section on Regulations) because of the increasing pollution of raw water sources.

The water supply may be provided by private companies, by public companies or by municipalities.

The water suppliers are represented by national associations, which are themselves members of a European association, EUREAU.

A few representative figures on the economic and social importance of the sector and its evolution are illustrated by the tables. The text does not provide a qualitative analysis of any particular management structure.

#### Recent trends

Water supply services are facing developments in connection with their rationalisation, the requirement to comply with European legislation, and the economic aspects of their function.

The main options for change currently being considered by some Member States are whether to:

- take into account the complete water cycle by integrating water supply and sewerage into one entity;
- reinforce co-operation between small isolated operations under the care of a limited number of large regional companies;
- separate the accounting of services or reorganise the services into individual entities;
- encourage the formation of water supply companies for the smallest communities.

In general water supply services are under pressure to comply with both national and European legislation, that is becoming more and more stringent in terms of quality, and is leading to increased investment costs, on one hand, and to improve the infrastructure (i.e. the distribution networks), on the other hand.

Some Member States therefore currently decide to delegate the management of the total or part of their water supply and wastewater treatment services to private or public organisations under their responsibility on a contractual basis and using methods agreed by both parties, for all or part of the infrastructure and the service(s) (see Table 1).

In some Member States water prices tend to evolve so as to incorporate not only the costs of the service, including the

**Table 1: Water supply and distribution Management types by Member State, 1992 (1)**

	B	DK	D	E	F	IRL	I	L	NL	P	UK (2)
Direct public management:											
-Direct management	X	X	X	X	X	X	X	X	X	X	X
-Autonomous board	X		X	X	X		X			X	
Direct supramunicipal management:											
-Direct management	X	X	X	X	X		X	X			
-Autonomous board	X			X			X			X	X
Delegated public management:											
-Co-operative companies		X									
-Public trading companies	X		X	X			X		X	X	
Delegated private or mixed companies:											
-Private companies	X		X	X	X		X			X	
-Mixed capital companies	X		X	X	X					X	
Direct private management:											
-Private companies											X

(1) Data for Greece was not available.

(2) England and Wales: direct private management, Scotland: regional direct management, Northern Ireland: direct public management.

Source: EUREAU



**Table 2: Water supply and distribution**  
**Percentage of population served by management type and Member State, 1992**

(%)	Direct public management	Direct supramunicipal management	Delegated public management	Delegated private or mixed management	Direct private or mixed management
EU (1)	37	11	16	21	16
Belgique/België	5	0	90	5	0
Danmark	67	0	33	0	0
BR Deutschland	35	20	30	15	0
España	48	11	12	29	0
France	23	0	2	75	0
Ireland	100	0	0	0	0
Italia	72	23	1	4	0
Luxembourg	100	0	0	0	0
Nederland	15	0	85	0	0
Portugal	92	0	8	0	0
United Kingdom (2)	3	9	0	0	88

(1) Average weighted by population. Excluding Greece.

(2) England and Wales: direct private management, Scotland: regional direct management, Northern Ireland: direct public management.

Source: EUREAU

protection of resources, but also various taxes (such as taxes on water abstraction) and charges for waste water treatment.

In certain Member States, however, the water prices do not cover all of the costs of the service provided. The investment requirements imposed on water services regularly lead to price increases.

There is a clear tendency in some of the Member States to give preference to abstraction from surface water sources because groundwater sources are insufficient and their protection is becoming more and more difficult with less certain results. In others, groundwater abstraction is increasing to ensure sufficient supply.

In general, significant efforts will be necessary in the future to prevent both surface and groundwater pollution when these waters are intended for human consumption.

### International comparison and foreign trade

Generally speaking, water is not an exportable "product" and its distribution therefore essentially has a national, regional or even local character. Certain water suppliers nevertheless export their know-how in the framework of international co-operation agreements (technical assistance, training, etc.). They also delegate some of their activities to foreign partners and sometimes purchase foreign materials or products to carry out their services.

Major private European players, namely French, British and Spanish companies, share their knowledge in consortia with large cities in other parts of the world, such as Buenos Aires, Mexico, Caracas, Sydney....

Some public or private entities have engaged in the development of operations, service provisions, co-operation and

**Table 3: Water supply and distribution**  
**Abstraction for water supply by source and by country**

(million cubic metres)	True ground water		Spring water		Surface water		Total water abstraction		Average annual growth rate 1980-91 (%)
	1980	1991	1980	1991	1980	1991	1980	1991	
Belgique/België	435	465	0	0	217	250	652	715	0.8
Danmark (1)	362	346	0	0	3	2	365	348	-0.4
BR Deutschland (2)	4 199	4 142	546	460	1 893	1 934	6 638	6 536	-0.1
España	684	1 234	0	0	2 426	2 895	3 110	4 129	2.6
France	N/A	3 800	N/A	N/A	N/A	2 280	N/A	6 080	N/A
Italia	3 290	4 025	2 535	3 167	892	1 273	6 717	8 465	2.1
Luxembourg	2	2	27	30	16	14	45	46	0.2
Nederland	667	846	0	0	337	381	1 004	1 227	1.8
United Kingdom	1 910	2 132	0	0	5 060	5 488	6 970	7 620	0.8
Austria (3)	198	221	221	225	5	4	424	450	0.5
Finland	196	226	0	0	252	220	448	446	0.0
Sweden	239	222	0	0	716	744	955	966	0.1

(1) DVF statistics (75% of population covered).

(2) Estimates (including former East Germany).

(3) OVGW statistics (60% of population covered).

Source: IWSA



training programmes with other countries (for example, the Netherlands in Indonesia and Germany in Eastern Europe).

Recently, American involvement in the European water supply sector has grown.

## MARKET FORCES

### Demand

Factors influencing drinking water demand are demographic evolution, consumer habits (varying in the Member States), climate, price structures, the number/types of sanitary installations and industrial development.

In all Member States, raw water abstraction for the production of drinking water is a key priority and it must be carried out in accordance with conditions which ensure the adequate protection of the environment and economic use of water resources. In all Member States, measures are taken to encourage water conservation (including leakage control).

General emphasis is put on quality improvement (European Directives) and on the rational use of drinking water.

The availability of sufficient drinking water quantities to satisfy customers' needs (drinking, hygiene, leisure....) nevertheless remains an important issue for water suppliers.

### Distribution and competition

The function of water supply is carried out either by public, private or mixed entities operating within the framework of geographical monopolies.

The direct management system excludes, except in certain cases, competition within the water distribution sector, while the delegated management system allows a renewal of the service provider's contract at the sovereign discretion of the local community.

Work and supply contracts relevant to the water service and its execution are open to full competition in compliance with the specifications of the European Directives on procurement procedures for public utilities.

Although there are differences between Member States, the general trend is to increase the price of water services, par-

ticularly in the wastewater treatment segment, due to constant increases related to:

- general investments for modernisation of installations and for improvement of processes (involving significant research and development-work) to meet the ever increasing quality requirements,
- investments for aquifer protection, water treatment, maintenance of networks and modernisation of distribution (automation, remote metering where applied; leakage detection),
- payments to farmers in some of the Member States to compensate for their efforts to ensure better protection of water resources,
- water abstraction and treatment taxes in some of the Member States (incorporated in the price of drinking water).

As is the case for environment related industries in general, the water supply sector will make use of more and more refined and diversified skills.

Wages and service operating costs differ from one Member State to the other because of varying requirements due to differences in local conditions: therefore, no reliable estimate is available.

In general, water supply conditions must reflect the regional and local conditions of the raw water resources and the nature of the local customer base.

## INDUSTRY STRUCTURE

As indicated in the EUREAU 1992 report on EU Management Systems, the structures of drinking water production and distribution services are extremely diverse even within each member state.

This diversity is due to historical circumstances which governed the creation of these services and to specific institutional and legal practices.

The main characteristics may nevertheless be described as follows:

- in general, the provision of drinking water is ultimately the responsibility of a public body (except in England and

**Table 4: Water supply and distribution  
Water deliveries by sector and by country**

(million cubic metres)	Households and small businesses		Industry and others		Total deliveries		Average annual growth rate 1980-91 (%)
	1980	1991	1980	1991	1980	1991	
Belgique/België	366	416	208	179	574	595	0.3
Danmark (1)	193	202	112	95	305	297	-0.2
BR Deutschland (2)	3 869	4 106	2 002	1 581	5 871	5 687	-0.3
España	2 146	1 854	794	871	2 940	2 725	-0.7
France	2 085	3 300	1 120	1 300	3 205	4 600	3.3
Italia	3 945	4 552	1 295	1 384	5 240	6 036	1.3
Luxembourg	24	26	10	13	34	39	1.3
Nederland	733	949	192	217	925	1 166	2.1
United Kingdom	3 160	3 405	2 070	2 051	5 230	5 456	0.4
Austria (3)	252	359	155	77	407	436	0.6
Finland	218	230	171	197	389	427	0.9
Sweden	516	531	298	261	814	792	-0.2

(1) DVF statistics (75% of population covered).

(2) Estimates (including former East Germany).

(3) OVGW statistics (60% of population covered).

Source: IWSA



Wales) whether it is a municipality, another territorial community, a province, a region or the central State;

- management of the service is guaranteed either by the responsible entity and by its own resources, or by a body distinct from the appointed entity (e.g. delegated management contracts);
- the organisation of the service varies according to whether or not a distinct legal status is or is not granted to the management entity, the nature of the law that is applicable to its function (administrative law or company law), the structure of the share capital and especially the option to use private capital, exclusively or in association with public capital (mixed companies), the nature, composition and method of appointment of the management bodies, the degree of budgetary independence granted to a management entity compared to the general budget of the responsible entity (German Regiebetriebe);
- when management is delegated, there can be significant differences in the relationship between the responsible entity and the management body (participation of the responsible entity in the management entity: operating, regulatory, statutory or contractual rules);
- delegated contractual management is the formula that gives the management entity the most freedom in negotiation and operation;
- investments are financed either through the overall budget of the responsible entity (which, in this case, generally finances other public services apart from drinking water supply with this budget), or by the management entity;
- it is frequently the case that the responsible entity and the management entity - when they are distinct - each finance part of the investments for infrastructure or operation;
- when responsibility and management are grouped under a single entity, this entity is the owner of the installations and equipment;
- when they are distinct, one or the other can own the installations and equipment, dependent on the particular case;
- clearly, it is not necessarily the case that one entity provides the financing and owns the system;

- as to price-setting, a distinction is made between management systems. Some are based on prices set "at the risk of the management body" (found mainly in contractual forms of management), others have prices set with the aim of balancing income and costs (Cost Recovery), while others have a system in which unreasonable costs will not be refunded. In the first case, once the tariff is set (it is usually accompanied by an adjustment formula or a revision procedure) the management body bears all the consequences of any gap between the costs of service provision and income (except if there is a change in circumstances). In the second case, the price is set so as to equalise income and reasonable costs;
- the activities of the bodies responsible for monitoring the proper execution of public services (generally sanitary authorities and the local community) mainly include control of the tariffs, of the nature and areas or investment, of the management of service and of compliance with health standards.

### Impact of the Single Market

When taking into account the impact of the Single Market program in the drinking water and supply sector, one must consider the different effects that this may cause to the companies operating in the sector. On the whole, the industry feels that the impact has been negative for government controlled companies as crumbling national barriers will force them to restructure and adapt to enhanced market conditions; instead, private companies will be hit positively by internal market completion because the monopolistic aspect of markets will be gradually eliminated. Further, the industry is aware that the implementation of the Single Market will force companies to spur certain un-procrastinable changes, especially in the field of rationalisation, compliance to European legislation and general economic aspects of their activity. Finally, completion of EU legislation in the domain of liberalisation of concessions deems of the utmost necessity.

### PUBLIC HEALTH AND ENVIRONMENT

European drinking water suppliers all share one daily objective: to ensure that the quality of the drinking water supplied by their networks meets the public health standards and the

**Table 5: Water supply and distribution**  
**Water consumption per capita by sector and by country**

(litres per capita per day)	Households and small businesses		Industry and others		Total consumption		Average annual growth rate 1980-91 (%)
	1980	1991	1980	1991	1980	1991	
Belgique/België	104	116	59	50	163	166	0.2
Danmark (1)	175	175	102	82	277	257	-0.7
BR Deutschland (2)	141	144	73	55	214	199	-0.7
España	157	131	58	61	215	192	-1.0
France	109	161	58	64	167	225	2.7
Italia	211	214	69	63	280	277	-0.1
Luxembourg	183	183	76	91	259	274	0.5
Nederland	142	173	37	40	179	213	1.6
United Kingdom	154	161	100	98	254	259	0.2
Austria (3)	155	215	100	46	255	261	0.2
Finland	148	150	117	129	265	279	0.5
Sweden	195	195	120	96	315	291	-0.7

(1) DVF statistics (75% of population covered).  
(2) Estimates (including former East Germany).  
(3) OVGW statistics (60% of population covered).  
Source: IWSA



**Table 6: Water supply and distribution investments in water treatment capacity by Member State, 1990**

(million ECU)	Clean water	Waste water
EU	7 484	6 706
Belgique/België	140	102
Danmark	11	168
BR Deutschland	2 046	1 933
Hellas	97	43
España	494	150
France	1 324	1 106
Ireland	64	37
Italia	918	696
Luxembourg	11	28
Nederland	476	469
Portugal	146	151
United Kingdom	1 757	1 822

Source: World Water and Environmental Engineer

requirements laid down in European legislation (see section on Regulations).

The public service of water distribution requires ever increasing efforts in the field of R&D, investment and quality assurance, especially in the light of the political and economic climate which tends to limit public financing and availability of private financing.

However, the socio-economic and political impact of the price paid by the consumers which increasingly covers, as previously mentioned, both drinking water supply and wastewater treatment and disposal, cannot be neglected and must remain within socially acceptable limits.

In this context, the European water suppliers are combining their efforts with those of other professional sectors in this field and with the national public authorities and European institutions in order to define a legal framework and a series of development actions which both match the needs of public health and environmental protection and also anticipate future developments.

The task is made even harder by the diversity of the interests involved (agriculture, industry, public health) which are often in conflict. This calls for a clear and consistent legal framework with a realistic timetable and availability of sustainable and sufficient public and private funds.

## REGULATIONS

European legislation governing the field of drinking water quality, protection of surface and groundwater resources and the activity of the sectors having a direct or indirect impact on the quality of these resources is at present being revised with a view to easing its implementation and improving its coherency to produce an integrated approach for the entire water cycle.

More specifically, Directive 80/778/EC of 15 July 1980 on the quality of water intended for human consumption was based on scientific knowledge available in the 1970s and needs to be updated, though there is no doubt that this Directive made a useful contribution to the recognition of the importance of drinking water quality and led to constant improvements in this field.

Since it was adopted, substantial improvements in technical and scientific knowledge of the factors influencing water quality and in the methods of measuring this quality were made. Moreover, the knowledge of the harm to drinking water quality caused by various sources of pollution is constantly increasing.

The Commission proposal for the revision of the Directive 80/778/EEC was adopted on 4 January 1995: there is likely to be extensive discussion in Council and Parliament before its final adoption. The revision of Directive 80/778/EEC aims not only at adapting its content to scientific and technical progress, but also at resolving the implementation problems which occurred with this Directive, and at taking into account commitments on subsidiarity made at the Edinburgh European Council.

The current initiative to revise and update the Directive is one of a number of measures which will have a significant impact on the quality of drinking water and on the harmonisation of technical standards for products having a significant impact on the quality of drinking water and on the cost of its distribution.

This European process of legislation/standardisation takes account of the evolution of international legislation and builds on the work of ISO and the recommendations of the World Health Organisation (WHO).

## OUTLOOK

The legitimate expectations of consumers and of health authorities can only be fulfilled if the following conditions are met:

- the raw water resources are protected and the relevant European legislation is revised on the basis of an integrated approach;
- research & development efforts and costs for improvement of infrastructure (especially networks) are sustainable and the necessary funds are easier to reach.

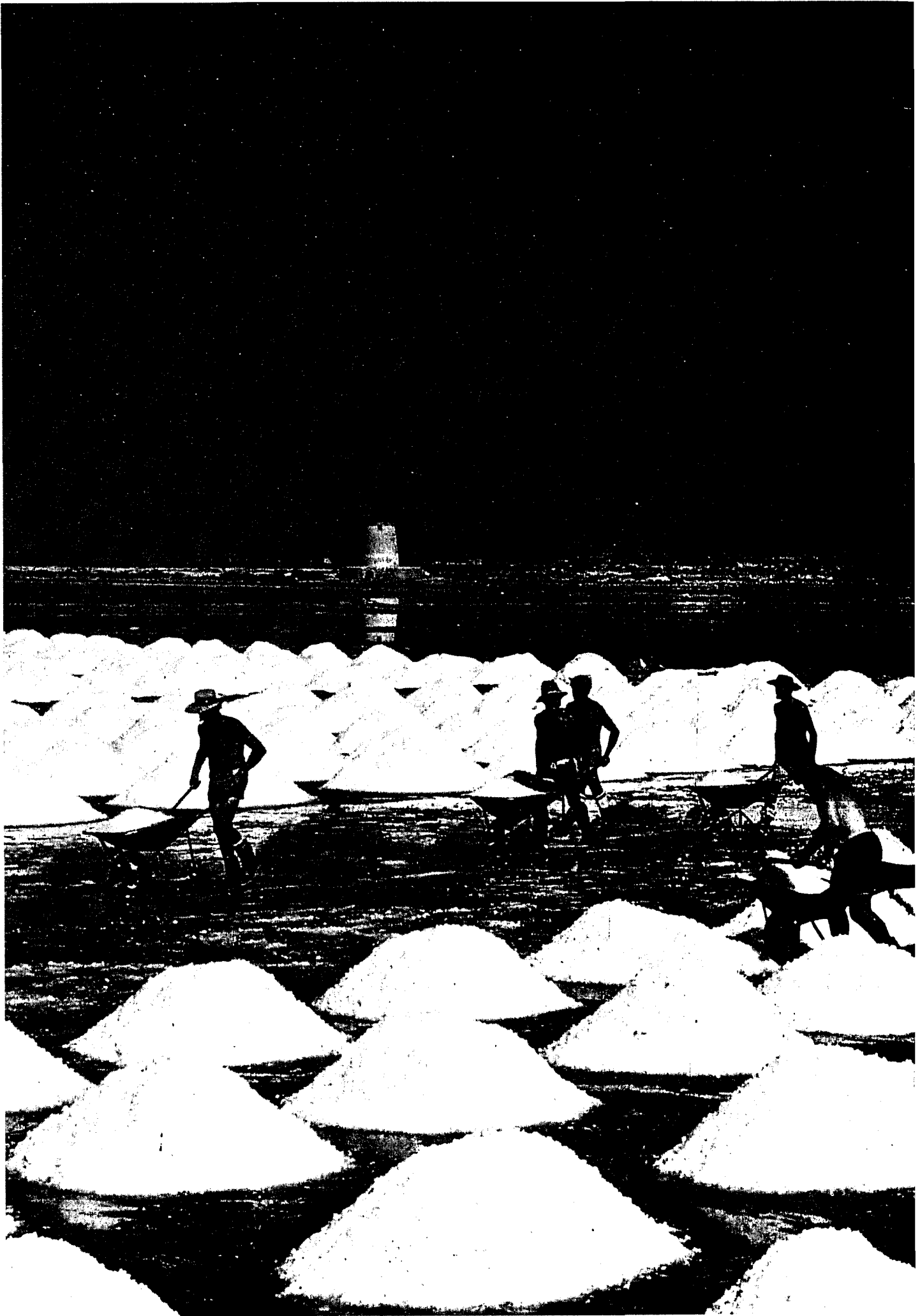
The water supply organisations will continue their efforts to reach these goals together with the relevant public authorities.

They will also continue their efforts to share their acquired technological skills with developing countries and will continue to improve such skills in the European context.

Written by: EUREAU

The industry is represented at the EU level by: European Union of National Associations of Water Suppliers (EUREAU). Address: Chaussée de Waterloo 255, Bte 6, B-1060 Brussels; tel: (32 2) 537 4302; fax: (32 2) 539 2142.





## Overview

### NACE 21, 23

Mining and quarrying activities in the EU cover a wide range of minerals and include a number of world-class operations. The EU is a significant producer of copper, lead, zinc and chemical industrial minerals and a major centre for both construction raw materials and physical industrial minerals production. Mined products, although relatively low in value terms, provide the raw materials for a number of major added value industries. The sector continued to face adverse conditions in 1993 which were manifest in weak demand and low prices, but the leading operations demonstrated resilience which is expected to be translated into generally improved performance in the short term.

### INDUSTRY PROFILE

#### Description of the sector

The non-energy mining and quarrying sector comprises the extraction and physical processing of all solid minerals with the exception of coal and uranium. The minerals are extracted by open-pit or underground methods and are normally subjected to mineral dressing techniques to provide ores and concentrates for further upgrading or use in their own right.

The sector is subdivided into metallic and industrial minerals. Metallic minerals are discussed under the chapters on ferrous and non-ferrous ores and industrial minerals are reviewed under the chapters of stone, construction raw materials, chemical industrial minerals, crystallised salt and physical industrial minerals. In the case of metals, the ores and concentrates produced form the raw materials for metals production which is covered in chapters 3 and 4. Industrial minerals may also be classed as intermediates, which proceed for further processing, but are normally considered as finished products.

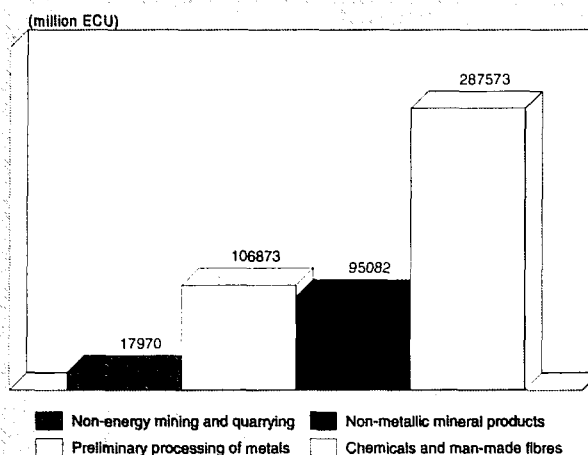
The scale of mining operations within the EU varies, although there are over two thousand operations and over three hundred companies involved which extract around fifty commodities, most of them are small scale, producing for local consumption. The major metallic ores mined in the EU are copper, lead and zinc. The major industrial minerals include: bentonite, dolomite, kaolin, limestone, sand and gravel, silica and stone. The total value of the non-energy mining and quarrying sector is around 18 billion ECU. Although small in comparison with other industrial sectors, mining provides key raw materials for value added industries such as metals production, chemicals and construction. The metals production industry also provides value added materials for industries such as engineering, transportation and power generation and transmission.

All EU member countries enjoy some mining activities, although Germany, France and the UK together account for around two-thirds of output. Spain, Italy, Greece, Belgium and Ireland are also significant producers of certain minerals.

#### Recent trends

Overall volume production in the sector remained relatively unchanged to that of 1992, although the individual mineral groups fared differently. The tonnage of iron ore produced declined, in value terms, by 47 % in 1993 with low prices continuing. Output levels for non-ferrous metal ores recorded a marginal increase of 7 %, but experienced an average price reduction of 15 % compared with 1992.

Figure 1: Non-energy mining and quarrying Production in comparison with related industries, 1993



Source: B.M.Coope & Partners, DEBA

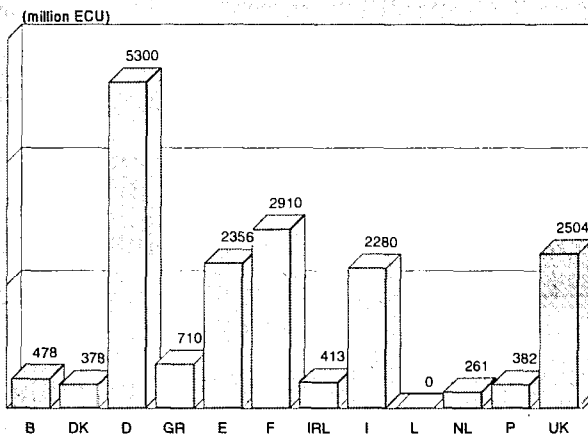
The construction raw materials sector grew by over 30 % over 1992s production level, although there were variations between individual countries. In the chemical industrial minerals sector the decline experienced since 1985 continued with an 11.4 % decrease in production from 1992, primarily due to falling prices. Finally, the physical industrial minerals sector showed some growth (1.5 %) during 1993.

The prospects for all areas appear brighter for 1994, although fears exist for the long-term sustainability of the iron ore mining industry in the EU.

#### International comparison

Iron ore mining in the EU is insignificant in world terms, producing less than 1 % of the world's production while consuming around 13 %. EU operations are small and low grade

Figure 2: Non-energy mining and quarrying Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Non-energy mining and quarrying**  
**Main indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	23 976	24 502	27 210	25 006	24 469	23 800	22 758	25 786	26 920	27 970	29 150
Production	16 182	17 756	19 326	18 202	17 996	17 993	17 970	18 815	19 120	19 420	19 720
Extra-EU exports	987	1 174	1 552	1 422	1 521	1 553	1 519	1 700	1 680	1 580	1 580
Trade balance	-7 794	-6 746	-7 884	-6 804	-6 473	-5 807	-4 788	-6 971	-7 800	-8 550	-9 430
Employment (thousands)	212.5	201.0	201.5	208.3	209.8	199.2	186.5	180.2	180.0	180.0	180.0

(1) Eurostat estimates.

(2) Rounded DRI forecasts.

Source: B.M.Coope & Partners, DEBA, Eurostat

**Table 2: Non-energy mining and quarrying**  
**Breakdown by sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Iron ore	2 151	56	2
Non-ferrous metal ores	2 576	596	273
Construction raw materials	14 178	13 851	371
Chemical and fertilizer minerals	1 554	1 425	476
Physical industrial minerals	2 297	2 042	397

Source: B.M.Coope & Partners, DEBA, Eurostat

**Table 3: Non-energy mining and quarrying**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-0.37	-6.16	-2.99	-11.53
Production	0.32	-4.09	-1.66	1.00
Extra-EU exports	6.18	-1.01	2.92	-13.17
Extra-EU imports	-1.18	-11.10	-5.72	-38.52

Source: B.M.Coope & Partners, DEBA, Eurostat

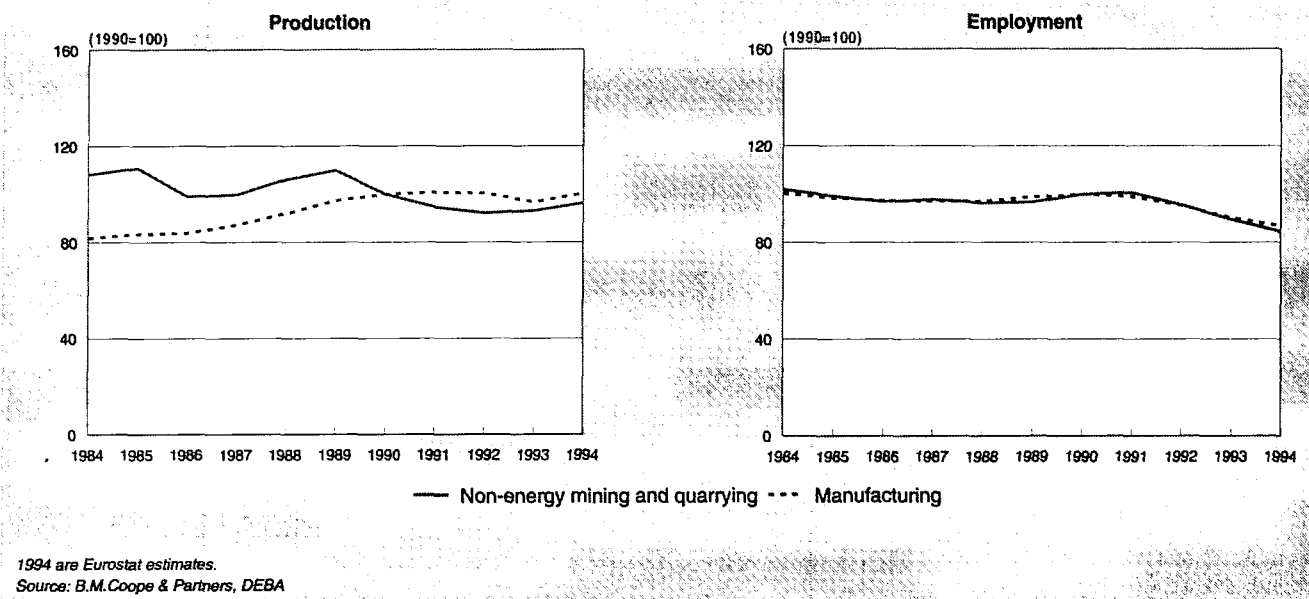
**Table 4: Non-energy mining and quarrying**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	987	942	743	754	1 174	1 552	1 422	1 521	1 553	1 519	N/A
Extra-EU imports	8 781	9 373	7 222	6 392	7 920	9 436	8 226	7 994	7 361	6 307	N/A
Trade balance	-7 794	-8 431	-6 479	-5 638	-6 746	-7 884	-6 804	-6 473	-5 807	-4 788	N/A
Ratio exports / imports	0.11	0.10	0.10	0.12	0.15	0.16	0.17	0.19	0.21	0.24	N/A
Terms of trade (1)	92.8	94.6	100.7	106.2	92.0	94.8	100.0	101.4	111.8	90.4	N/A

(1) NACE 23 only.

Source: DEBA, Eurostat

**Figure 3: Non-energy mining and quarrying  
Production and employment compared to EU total manufacturing industry**



in world terms and may not survive in the medium term, despite more optimistic price and demand predictions. The situation in the EU compares with that of Japan, while the USA remains self-sufficient.

In non-ferrous metals the EU's position is a little better with over double the level of self-sufficiency of Japan. Here again, production and consumption in the USA are largely in balance. However, the EU does have a small number of world-class mines which compete effectively with international operations in this sector.

For the construction raw materials sector the EU is the largest world producer with an output twice that of the USA and three times that of Japan. The USA, however, is dominant in the production of chemical industrial minerals due to the fact that they are a leading producer of four minerals (salt, sulphur, phosphate rock and boron) and an important source of two others (potash and barite). These minerals combined exceed EU output three-fold. Japan has only two minerals of significance (sulphur and iodine). In physical industrial min-

erals the EU leads the USA by around 40 % in output, while Japan is only a minor producer.

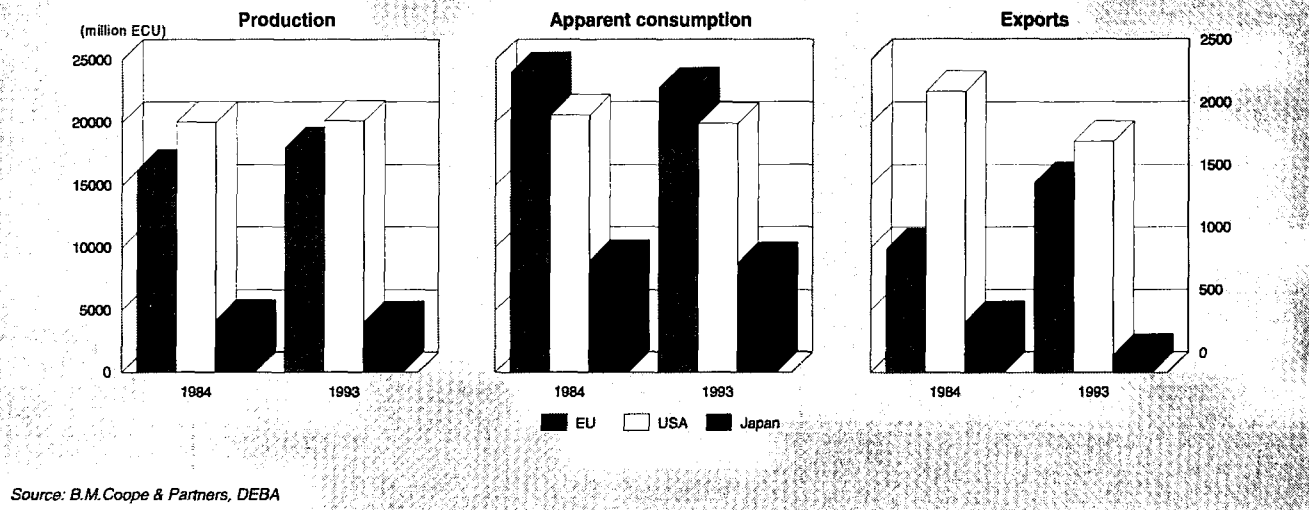
Overall the EU is a major player in the international non-energy minerals mining sector; where, with the exception of iron ore mining, it shares a leading position with the USA.

**Foreign trade**

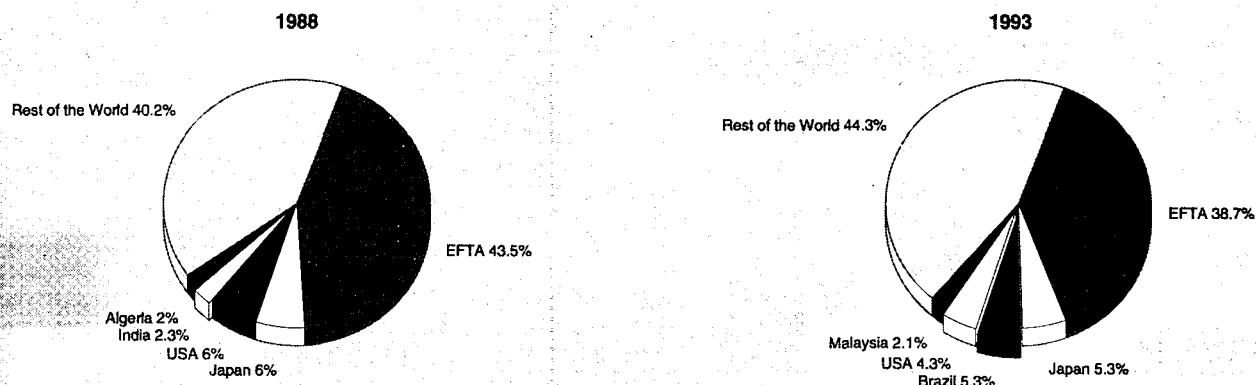
The trade features of each of the groups within the sector are somewhat different. In the case of iron ore the value of EU ores is relatively low precluding exports, while it is almost totally dependent on imports. Despite a dependency rate of 77 % on imports for non-ferrous metals ores, approximately 45 % of EU output was exported in 1993, demonstrating the international nature of the markets.

Foreign trade accounts for very little with respect to construction raw materials, but the EU has a substantial import and export trade of chemical industrial minerals, importing in particular phosphate rock, potash, borates and sulphur and exporting potash, salt and sulphur. The position of physical industrial minerals lies somewhere in between the previously

**Figure 4: Non-energy mining and quarrying  
International comparison of main indicators in current prices**



**Figure 5: Non-energy mining and quarrying  
Destination of EU exports**



Source: Eurostat

mentioned industrial mineral groups, with imports exceeding exports but at a decreasing rate.

Trade partners for all commodities in this sector are widely distributed with nearby EFTA countries receiving 38.7 % of EU exports and the rest of the world receiving 44.3 %. Data on imports reveals that Brazil (15.5 %), EFTA countries (14.7 %) and Canada (10.6 %) supply the EU with 40 % of its imports.

## MARKET FORCES

### Demand

The minerals in this sector have a very wide range of applications which provides a dampening effect with regard to demand. However, consumption levels and prices generally follow international economic trends. For the period 1992-1993 overall EU demand was different from country to country but total consumption declined by 11.53 %. Prices levels were also depressed due to high stock positions built up during the recession.

This position was broadly held by each of the groups in the sector in 1993, with demand reflecting the generally modest

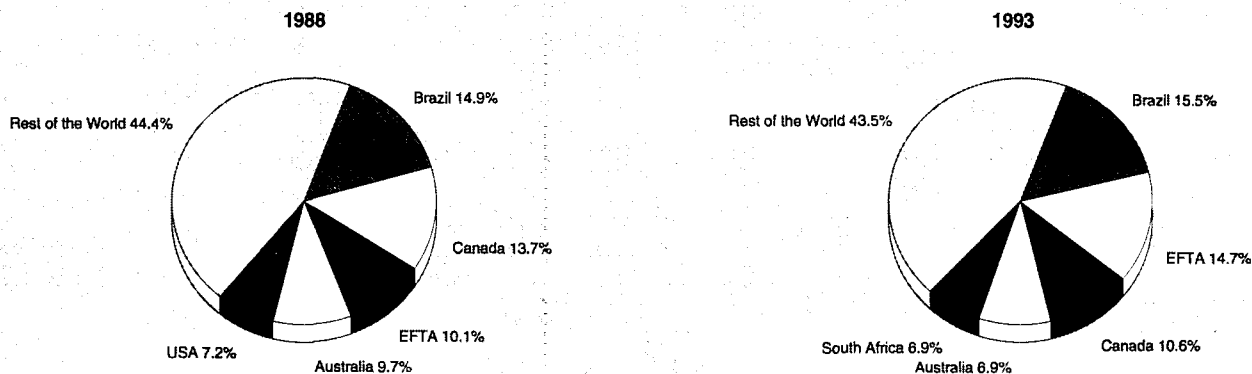
industrial demand in the major internal and EFTA markets, compensated to a small degree by better conditions in the USA and, particularly, South East Asia.

### Supply and competition

In iron ore mining, the EU has a very limited supply capability and cannot compete with the large, high grade deposits exploited overseas, despite having a large and continuing demand for steel making raw materials. In contrast, EU non-ferrous metals mining operations provide between 2-7 % of the world's minerals for metals manufacture and the leading operations are competitive in cost and quality. However, the number of potentially economically-exploitable ore deposits in the EU limits the expansion of supply.

In the industrial minerals field, with its relatively lower unit prices, transportation costs are a major factor restricting foreign competition, except where absolutely necessary. Fortunately, the EU is virtually self-sufficient in construction raw materials and for the bulk of its needs for physical industry minerals. Thus, for the EU the only practical competition is in selected chemical industrial minerals and where specific grades of materials cannot be matched by internal supply.

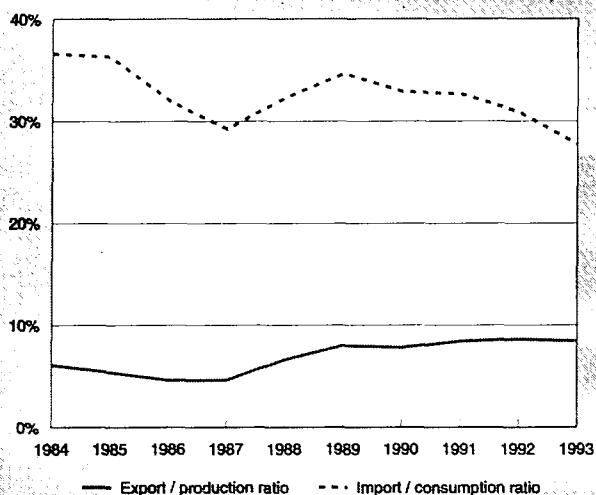
**Figure 6: Non-energy mining and quarrying  
Origin of EU Imports**



Source: Eurostat



**Figure 7: Non-energy mining and quarrying Trade Intensities**



Source: B.M.Coope & Partners, DEBA

### Production process

The fundamental processes of mining and mineral processing have changed very little over the years, however they have adapted to the response to international competition and the need to reduce operating costs. The main features of these changes have been, and continue to be, energy reduction, scale-up and increased utilisation of process control and automation. The combination of these effects has resulted in a steady increase in productivity in the sector with a corresponding lowering of employment.

## INDUSTRY STRUCTURE

### Companies

In the EU only two significant producers of iron ore remain in operation, CAM in Spain and ARBED in France, less than 1 % of the number of companies active in the 1960s. The number of operations in the non-ferrous area has also declined, but no-where near as dramatically, although small operations were forced to shut-down or suspend activities in 1993. The major producing companies are Somincor (Portugal, copper), Tara (Ireland, zinc) and Asturiana de zinc (Spain, zinc) and two new zinc mines are planned to open in Ireland in the coming years. A number of major international mining companies have their headquarters in the EU, but their mining operations are almost exclusively overseas.

The largest companies in the construction raw materials sector are the major cement and aggregates groups including Lafarge of France, RMC, Redland, Tarmac, Tilcon, Blue Circle, Hanson

and Bardon of the UK, Heidelberger Zement, Dyckerhoff and Basalt AG of Germany, Italcementi of Italy, CBR of Belgium and CRH of Ireland. Chemical industrial minerals production is dominated by a group of large companies including AKZO (Netherlands, salt), Solvay (Belgium, salt), BASF and SKW (Germany, salt), Kali und Salz (Germany, potash), MDPA (France, potash), INI (Spain, potash), Cleveland Potash (UK, potash), Elf-Aquitaine (France, sulphur), BEB (Germany, sulphur), Pechiney (France, fluorspar), Laporte (UK, fluorspar), Nuova Mineraria Silius (Italy, fluorspar), Minersa (Spain, fluorspar), Sachtleben (Germany, fluorspar and barite), M-I (UK and Ireland, barite) and Barytine de Chaillac (France, barite). Most of the leading companies in the physical industrial minerals area are industrial minerals specialists, although some companies from construction, petroleum and metals are involved. The major companies in kaolin and ceramic clays are ECC and Watts Blake and Bearne (UK), Amberger Kaolinwerke (Germany), AGS and Imetal (France). The main enterprises in the bentonite and special clays area are Sud Chemie (Germany), Laporte and Redland (UK), Tolsa (Spain), Eliopoulos (Greece), and Laviosa (Italy). The major companies in other areas are CECA (France, diatomite), Grecian Magnesite (Greece for magnesia and natural magnesite), Sardamag (Italy), NedMag Industries (Netherlands, magnesia) and Talc de Luzenac (France, talc).

### Strategies

The strategies of the various groups within this sector are varied. In the case of iron ore, survival is the major factor, and for non-ferrous metal ores the development of world-class orebodies is the main criteria. In the construction raw materials area strategies are interlinked with the downstream activities of the major companies and continue to feature a number of acquisitions aimed at strengthening raw material supply.

For the chemical industrial minerals sector rationalisation, mergers and acquisitions are ongoing strategies. The largest restructuring has occurred in the German potash industry with the combination of Kali und Salz Beteiligung AG. A similar trend is being followed in physical industrial minerals with the strategies being world-wide and not just confined to the EU.

## REGIONAL DISTRIBUTION

Iron ore mining is concentrated in the Lorraine and the Pyrenees, while virtually all the non-ferrous metal ores mining activity is in Iberia, Ireland and Greece. New gold operations are projected with the re-opening of the Salsigne mine in France and the deposit at Omagh in the UK.

Industrial minerals mining activities are undertaken in every EU member state, with sand, gravel and clays particularly well distributed. Commodities with particular areas include dimension stone (Italy, Spain), gypsum (Germany, France, Spain, UK), potash and salt (Northern Europe), salt evaporites (Mediterranean coast), kaolin (south-west of England), bentonite (Bavaria, Milos and Sardinia) and sepiolite (Madrid).

**Table 5: Non-energy mining and quarrying Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	14 080	88.2	38.0	34.0
20-99 employees	1 688	10.6	31.8	34.2
100 or more employees	194	1.2	30.2	31.8

(1) Estimates; NACE 23 only.

Source: Eurostat "Enterprises in Europe"

**Table 6: Non-energy mining and quarrying  
The largest companies in the EU, 1992**

(million ECU)	Country	Sales	Employment (thousands)
<b>Construction minerals groups</b>			
Lafarge Coppee	F	4 635	29.7
RMC	UK	4 018	26.3
Tarmac group	UK	3 755	28.6
Redland	UK	2 419	22.1
Ciments Français	F	2 268	18.0
Blue Circle	UK	1 753	22.2
Heidelberger Zement	D	1 533	9.7
BPB Industries	UK	1 439	12.6
CRHcx	IRL	1 389	10.6
CBR Cimenteries	B	1 168	9.0
Knauf Gips	D	868	2.5
Marley	UK	728	9.8
<b>Chemical industrial minerals</b>			
Elf Aquitaine	F	30 533	88.0
Elf Atochem	F	6 953	34.2
Solvay	B	6 325	44.8
EMC	F	2 392	13.5
Kali und Salz	D	650	7.0
BEB	D	526	1.9
Rio Tinto Minera	E	324	1.2
BHS	D	180	2.0
Sudwestsalze	D	91	0.6
<b>Physical industrial minerals</b>			
Redland	UK	2 419	22.1
English China Clays	UK	1 236	10.8
Hepworth	UK	803	9.5
Sud Chemie	D	445	4.4
Ibstock Johnsen	UK	355	4.2
London Brick	UK	103	2.4
Amberger Kaolin (&Kick)	D	98	1.1
Watts Blake Beame	UK	90	1.1
<b>Mining houses</b>			
RTZ Group	UK	6 182	60.0
RTZ Industrial Minerals	UK	1 283	8.9
Imetal	F	886	N/A
<b>Non-ferrous metal ores</b>			
Somincor	P	N/A	1.1
Tara	IRL	N/A	0.8
Parnasse	GR	N/A	0.7
Esturiana de Zinc	E	N/A	0.6
Exminesa	GR	N/A	0.5
<b>Iron ore</b>			
ARBED (Montrouge mine)	F	N/A	0.5
Compania Andaluza de Minas (CAM)	E	N/A	0.5
Agrupacion Minera (Agruminsa)	E	N/A	0.2
PRESUR	E	N/A	0.1
Metaliqimica del Nervion	E	N/A	0.1

Source: B.M.Coope & Partners

### Impact of the Single Market

The creation of the Single Market is perceived to have had an important and primarily positive impact on the non-energy mining and quarrying sector -- not least because the mining industry is accustomed to thinking long-term and in an international context.

The whole industry sees free movement of goods, services, and capital as highly beneficial but the importance of other issues varies according to the sub-sector.

For instance, technical harmonisation and intellectual property issues are more important to the physical industrial minerals sector (where product differentiation is important) than to the

metallic ores and chemical industrial minerals sectors (where international product standardisation is the order of the day).

Meanwhile, public procurement is highly relevant to the construction minerals sub-sector but is regarded as almost irrelevant by the metallic ores sector.

Remaining obstacles or areas where future progress is deemed necessary include monetary union, energy transit and price transparency, and competitiveness issues (e.g. "hidden" subsidies in southern Europe and dumping by non-EU suppliers).

**Table 7: Non-energy mining and quarrying  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.70	0.74
Danmark	0.96	1.33
BR Deutschland	0.97	0.92
Hellas	4.54	5.22
España	1.68	1.85
France	1.02	0.87
Ireland	2.19	2.08
Italia	0.88	0.89
Luxembourg	0.00	0.00
Nederland	0.27	0.31
Portugal	1.68	1.63
United Kingdom	0.84	0.95

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: B.M.Coope & Partners, DEBA

## ENVIRONMENT

Environmental features for the mining industry include dust and noise suppression, minimisation of disturbance to the natural habitats, as well as, mine after-life restoration. Non-ferrous metals mining has to contend with acid mine and rock drainage caused by water leaching of sulphide ores. Great care must be taken to avoid discharging acidic waters into local water courses.

Industrial minerals mining faces objections to proposed superquarries but, in general, it has a good record of pollution abatement and also produces a number of materials used in environmental processes, such as lime for flue gas desulphurisation. Environmental restrictions continue to be especially strict with respect to chemical industrial minerals, most notably, avoidance of potash waste discharge into waterways, prevention of emissions from sulphur recovery units and constraints on the fluorspar industry by regulations on the production of chlorofluorocarbons.

## REGULATIONS

In general EU regulations for mines and quarries are similar to those of the major industrialised nations and are well understood and complied with by operating companies. Recent regulations on free competition have been blamed for the demise of some small operations, most notably the base metal mines in Sardinia. Leading companies are starting to gain registration for EU standards and codes in quality and environmental areas.

## OUTLOOK

The current outlook for iron ore mining is not optimistic with low quality, high cost and strong international competition threatening the future of the industry in the EU. The non-ferrous area is more robust, and new projects in the planning stage should boost output of zinc and gold. In both metals mining areas improved prices are being experienced as 1994 progresses, and improvements to output and profitability in the non-ferrous metals ore mining sector are likely for 1994 and immediately beyond.

The EU will continue to be a major player in construction raw materials, the fortunes of which are linked to the level of building activity, particularly in Europe. The short-term future is thus seen as one of modest improvement. Unfortunately, the prospects for the chemical industrial minerals sector appear less bright in the short term as the recession has provided large stocks of products which are bound to restrain prices and new material demand. The outlook for physical industrial minerals is reasonable, and the international influence of EU companies is likely to extend.

The entire non-energy mining and quarrying sector will be significantly impacted by the addition of three new EU members. Iron ore dependency will improve 19 % by virtue of Sweden joining and non-ferrous metal ores will improve by about 10 % with lead, zinc and copper from Sweden and Finland, nickel and chromite from Finland. All three countries will contribute to industrial minerals operations, in particular, in the construction raw materials and physical industrial minerals areas. At present these countries provide around 10 % of EU imports in the sector and receive around 20 % of exports.

Generally speaking, the EU Council conclusions of 18 November 1993 on a "Community approach to the development of the non-energy mining industry", which is aimed at reinforcing the competitiveness of this sector, have confirmed the fact that this sector is increasingly been considered as important by the EU; in the framework of these Council conclusions, the Commission has been invited to focus particularly on four different aspects: access to information (transparency); environmental considerations commensurate with economic requirements; adaptation of training to the industrial needs; and deepening of the co-operation with non-EU countries.

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The industry is represented at the EU level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel (32 2) 755 6311; fax (32 2) 779 0523.

# Iron ore

## NACE 211

The EU is a major consumer of iron ore, requiring in 1993 around 125 million tonnes as raw material for its world class iron and steel making industries. Restrictions on the reserves, quality and cost of production and distribution of EU iron ore mines limit their production to only around 5 % of this figure, a level which is expected to further decline. The entry of Sweden into the EU will reduce import dependency to 80 % and increase to three the number of EU countries with active iron ore operations.

### INDUSTRY PROFILE

#### Description of the sector

NACE 211 covers the mining and physical processing of iron ore and the primary feedstock for iron and steel making. Mining may be from open pits or underground and mineral processing techniques are employed to concentrate the ore. Agglomeration and sintering are not performed by iron ore producers in France and Spain, the only countries in the EU which mine iron ore. The products are mainly iron oxide ores of relatively low grade.

#### Recent trends

Production within the EU continues to fall, with tonnages being at 70 % of 1992 levels. In France, Usinor's last operation, the Moyeuve mine in the Lorraine closed leaving the Montrouge mine at Tressange, owned by ARBED (L) the last mine in operation. In Spain work was suspended at Aznalcollar. World production was around 932 million tonnes in 1993, of which 5.7 million tonnes were produced in the EU.

International growth was good in 1993 but prices were at the second lowest levels in ten years. Consumption of iron ore in the EU remained virtually unchanged from 1992 (136.7 million tonnes against 133.5 million tonnes) with declines in France and Germany being offset by increases in the United Kingdom, the Netherlands, Italy and Spain. Short-term prospects for iron ore are good with recoveries expected in several countries as they come out of recession and continuing high demand from China. Prices for good quality ferrous scrap are also high which would favour the use of iron ore in steel making.

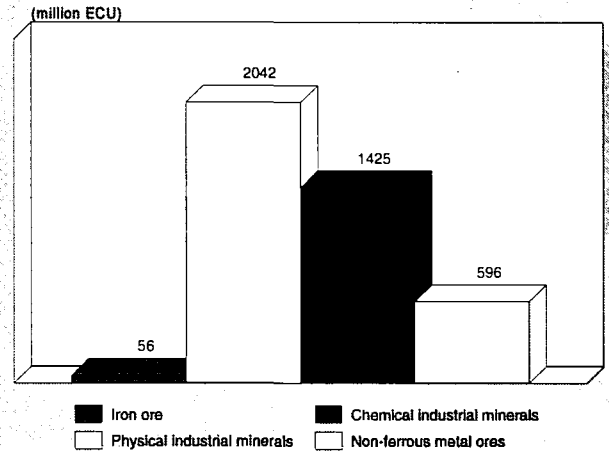
#### International comparison

In Japan, despite the softening of the economy and weak domestic demand, iron ore imports and steel production remained similar to 1992 levels and the country is now the largest single importer of iron ore at around 114 million tonnes, about 4 million tonnes lower than the EU total in 1993. Consumption in Japan is similarly at 94 % of the EU level which in turn is 58 % higher than that in the USA. In global terms the EU produces less than 1 % and consumes around 13 % of world output.

#### Foreign trade

The negative trade balance improved slightly as the value of consumption was lower in 1993, mainly due to weaker prices. EU imports continue to originate most significantly from Brazil, Australia and Canada. Extra-EU exports of iron ores are nominal only. No significant change is expected in this pattern.

Figure 1: Iron ore Production In comparison with related industries, 1993



Source: B.M.Coope & Partners

### MARKET FORCES

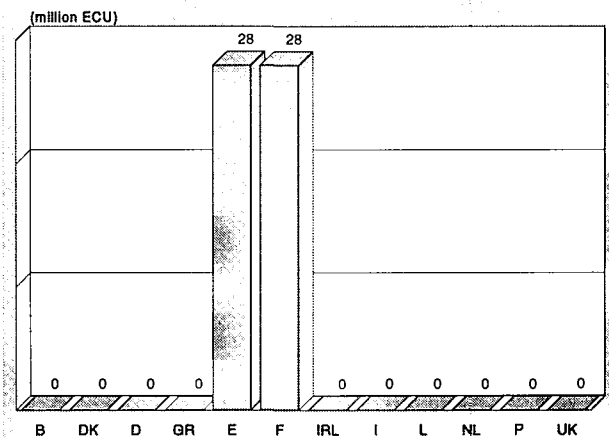
#### Demand

Iron ore demand in the EU is dominated by the fortunes of the EU steel makers who are subject to a number of mergers and are experiencing significant restructuring with consequent capacity cutbacks. Despite this the net consumption remained very close to that of 1992, and although there were widespread job losses in the steel sector, stocks were reduced and the supply/demand situation came more into balance.

#### Supply and competition

In spite of the massive demand in the EU for iron ore, there appears little prospect of iron ore production in the EU arresting its decline. A combination of the relatively low quality of EU ores and the economies of scale achieved in production and transport of high grade ores to Europe from America and Australia in particular is leaving little scope for continued economic production in the EU.

Figure 2: Iron ore Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Iron ore**  
**Main indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	3 573	2 999	3 142	2 945	3 202	2 804	2 151	2 538	2 536	2 633	2 630
Production	277.0	113.0	141.0	108.0	138.0	79.0	56.0	40.0	36.0	33.0	30.0
Extra-EU exports	1.0	5.4	2.2	4.8	3.3	4.3	2.3	2.0	2.0	2.0	2.0
Trade balance	-3 296	-2 886	-3 001	-2 837	-3 064	-2 725	-2 095	-2 498	-2 500	-2 600	-2 600
Employment (thousands)	4.5	2.5	2.1	1.9	1.8	1.6	1.3	1.2	1.0	1.0	1.0

(1) B.M.Coope & Partners estimates.

(2) Rounded DRI forecasts.

Source: B.M.Coope & Partners, DEBA

**Table 2: Iron ore**  
**Breakdown by sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Unagglomerated ore	1 662	52	2
Agglomerated ore	484	0	0
Pyrites	4	4	0

Source: B.M.Coope & Partners, Eurostat

**Table 3: Iron ore**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-3.7	3.0	-0.8	-6.9
Production	-15.4	-22.5	-18.6	-28.3
Extra-EU exports	9.0	14.0	11.2	-39.8
Extra-EU imports	-2.6	4.1	0.3	-6.5

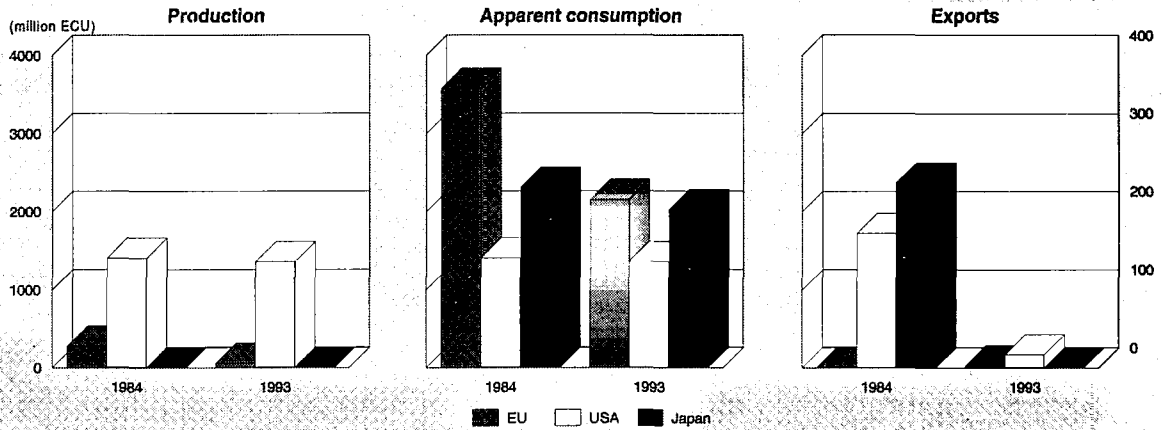
Source: B.M.Coope & Partners, Eurostat

**Table 4: Iron ore**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1.00	0.80	1.20	1.00	5.40	2.20	4.80	3.32	4.28	2.32	N/A
Extra-EU imports	3 297	3 721	2 880	2 443	2 891	3 003	2 842	3 068	2 730	2 098	N/A
Trade balance	-3 296	-3 721	-2 879	-2 442	-2 886	-3 001	-2 837	-3 064	-2 725	-2 095	N/A
Ratio exports / imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A

Source: DEBA

**Figure 3: Iron ore**  
International comparison of main indicators in current prices



Source: B.M.Coope & Partners, DEBA

**Table 5: Iron ore**  
Breakdown by size of enterprise, 1993

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment
Less than 20 employees	0	0.0	0.0
20-99 employees	1	20.0	5.0
100 or more employees	4	80.0	95.0

Source: B.M.Coope & Partners

**Production process**

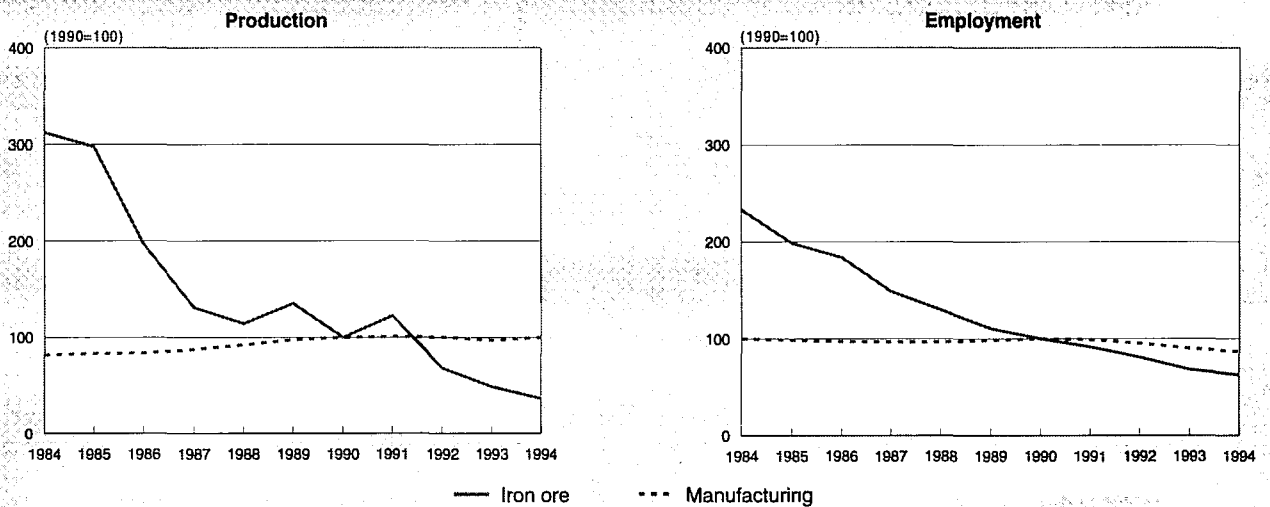
There has been little investment activity among EU iron ore producers in recent years, and although there have been no significant changes in the technology employed internationally, overseas mines employ newer equipment on a much larger scale.

**INDUSTRY STRUCTURE**

**Companies**

Only 5 companies now remain of the nearly 200 which were in operation thirty years ago. Apart from the low quality of EU iron ores, the cost of delivery of ores from intercontinental origins is lower than that within the EU, and with the largest

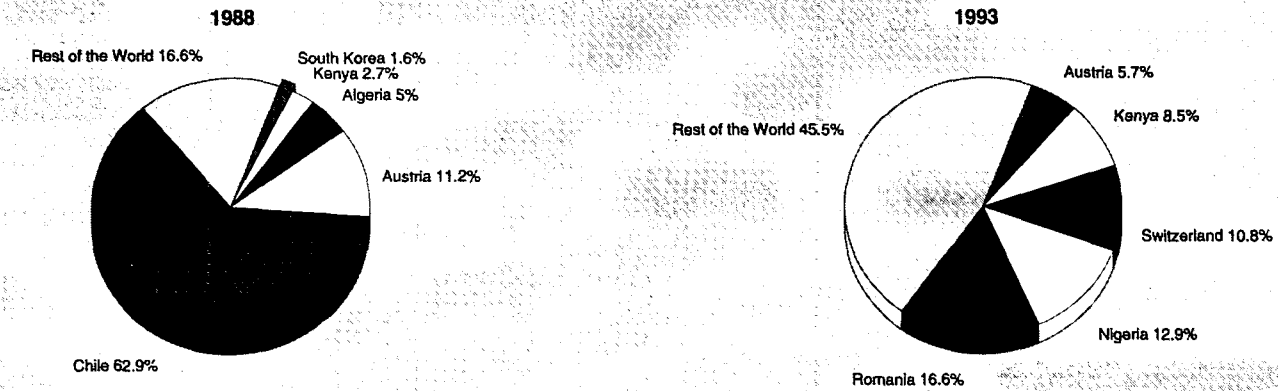
**Figure 4: Iron ore**  
Production and employment compared to EU total manufacturing industry



1994 are B.M.Coope & Partners and Eurostat estimates.  
Source: B.M.Coope & Partners, DEBA



**Figure 5: Iron ore  
Destination of EU exports**



Source: Eurostat

**Table 6: Iron ore  
The four largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Employment
ARBED (Montrouge mine)	L	28	500
Compania Andaluza de Minas (CAM)	E	20	500
Agrupacion Minera (Agrupinsa)	E	5	150
PRESUR	E	2	100

Source: B.M.Coope & Partners

company (CVRD, Brazil) operating at a throughput over 30 times higher than any EU mine, the competition from overseas is overwhelming. Only 2 significant producers remain in the EU, CAM in Spain and ARBED in Luxembourg, although the entry of Sweden into the EU would increase iron ore extraction four-fold.

### Impact of the Single Market

The iron ore industry in the EU is small and the only significant operations are captively owned by iron and steel companies.

The Single Market is highly relevant to the EU's iron and steel industry, of course, and in comparison the impact on existing EU iron ore operations is insignificant to the point of irrelevance. On the other hand, the entry of Sweden into the EU means that Single Market issues will assume greater importance to Swedish iron ore producers, which are substantial in size and international by nature.

### REGIONAL DISTRIBUTION

Apart from the two areas currently exploited, the Lorraine in France and Andalucia in Spain, no economic iron ore deposits are believed to exist within the EU.

### ENVIRONMENT

Virtually all iron ore mining is at established sites and from oxide ores which pose minimal environmental threat. Sulphide mining, with the potential for acid mine drainage is almost extinct. Environmental impacts addressed by the operations include dust and noise and the ingress of particulate solids into local waterways. Energy consumption in the extraction of EU iron ores is high because of the low grades.

### REGULATIONS

Although mining and environmental legislation is less stringent and applied to a lower degree in some countries producing iron ore, EU regulations are similar to those in force in the USA, Canada and Australia and allow responsible mining developments.

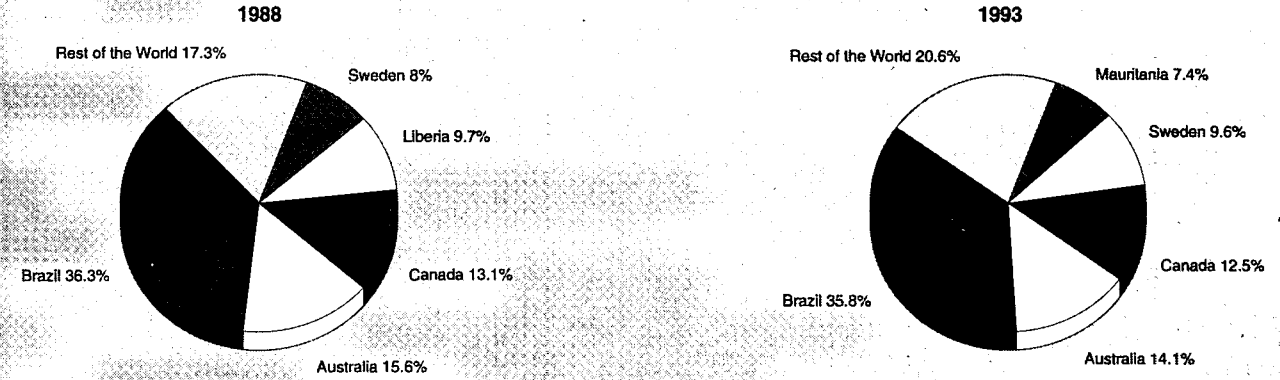
**Table 7: Iron ore  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.0	0.0
Danmark	0.0	0.0
BR Deutschland	0.3	0.0
Hellas	0.0	0.0
España	6.3	7.1
France	1.6	2.7
Ireland	0.0	0.0
Italia	0.0	0.0
Luxembourg	0.0	0.0
Nederland	0.0	0.0
Portugal	0.0	0.0
United Kingdom	0.2	0.0

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

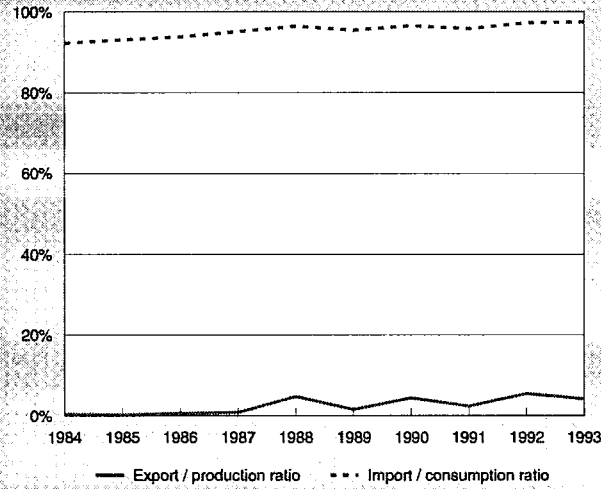
Source: B.M.Coope & Partners, DEBA

**Figure 6: Iron ore  
Origin of EU imports**



Source: Eurostat

**Figure 7: Iron ore  
Trade intensities**



Source: B.M.Coope & Partners, DEBA

## OUTLOOK

There appears little change in prospect from previous forecasts which point to a continuing and possibly terminal decline in iron ore mining in the existing EU, excepted the good prospects for the Swedish mining industry. This outlook is not based on EU demand, which is strong and exceeds production more than twenty fold, but on the inherently weak competitive position of EU mines with limited, low grade reserves and comparatively high distribution costs. In the short term closure of further operations cannot be precluded.

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# Non-ferrous metal ores

## NACE 212

The non-ferrous metals mining sector in the EU has suffered, along with the metals industry internationally, a year of abundant supply and muted demand, resulting in low prices and profitability. The major copper, lead and zinc operations which dominate the sector have shown good resilience to the adverse conditions, however, and provided 23 % of the EU's primary raw material requirements for metals production. No significant changes in the behaviour of this mature sector are predicted in terms of tonnage output, although increased revenues from higher metal prices should be forthcoming as the tide of recession turns.

### INDUSTRY PROFILE

#### Description of the sector

NACE 212 covers the mining and physical processing of all non-ferrous metal ores. In the EU significant mining operations exist for lead/zinc, copper, bauxite, nickel and tin. Gold and silver are recovered as credits with lead/zinc concentrates, and there remains a small output of tungsten ore. The EU has world class deposits of lead/zinc and copper which account for 5.2 %/16.5 % and 2.0 % of world production respectively. Other operations are small in world terms, and the EU is 100 % dependent on imports for all other non-ferrous metals.

Products from the sector provide the raw materials for the production of non-ferrous metals (NACE 224). In 1993 the total value of non-ferrous metal ores and concentrates produced in the EU was just under 600 million ECU. The main production is from Portugal, Spain, Greece and Ireland in descending order, these four countries accounting for 91 % of EU output. Lead/zinc production is projected to increase in Ireland where two major developments are at the planning stage. Output of lead, zinc and copper will also increase when Sweden and Finland enter the EU. Finland is also a nickel ores and chromite producer.

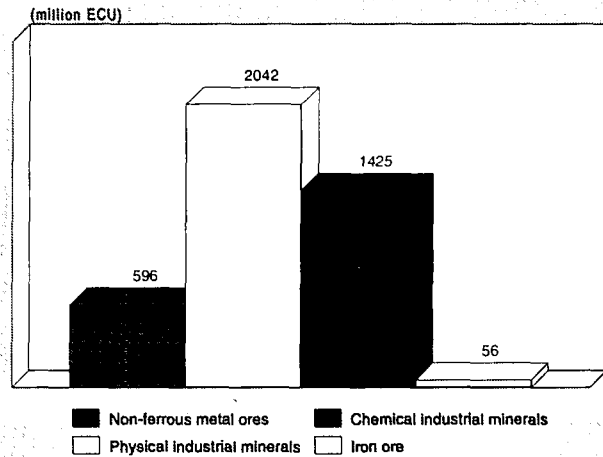
#### Recent trends

1993 was a poor year for the metal mining industry in general, with falls from 1992 average price levels being registered by copper (16 %), lead (28 %), zinc (21 %), nickel (25 %) and tin (16 %). Only silver and gold registered increases of 9 % and 5 % respectively. In addition stocks were generally high as were exports of certain metals from China and the CIS. Notwithstanding, the turn from recession in some important world economies has provided encouragement to the mining sector and 1994 price levels are expected to be higher across the board. The major EU mining operations maintained production levels during 1993 and proved resilient to price falls, although further damage was suffered by fringe operations.

#### International comparison

South-East Asia and South America have established themselves as the growth areas in non-ferrous metals mining, with the advent of free market economics also beginning to encourage development in Africa and Eastern Europe. In each of these areas, together with traditional mining countries such as Australia, USA and Canada, geological factors favour the finding and exploitation of economic orebodies which are scarce within the boundaries of the EU. Nevertheless the EU produced 23 % of the non-ferrous metallic minerals required by its metals industries in 1993, compared to 10 % in Japan, while the USA remains largely self sufficient.

Figure 1: Non-ferrous metal ores  
Production in comparison with related industries, 1993



Source: B.M.Coope & Partners

#### Foreign trade

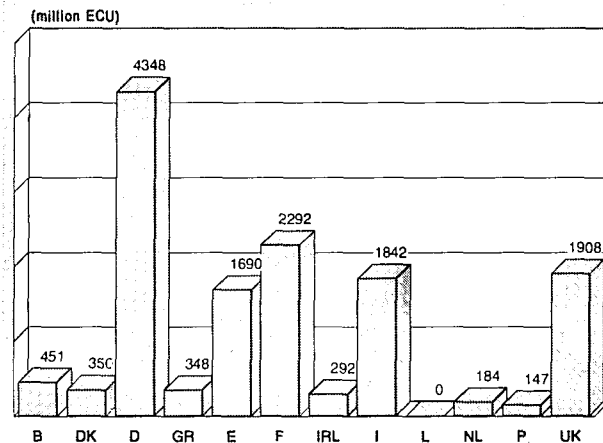
Despite producing less non-ferrous metal ores than are needed in the EU, over 45 % of production was exported in 1993, demonstrating the international nature of concentrate markets. This is in part due to overseas involvement of EU operations and the sending of concentrates to group smelters, as is the case with Irish lead/zinc to Finland. But in the main, this reflects the fact that concentrates are sold on the basis of grade and price irrespective of source location, shipping costs not being a major factor, a point further borne out by the wide range of locations from which ores are imported.

### MARKET FORCES

#### Demand

Non-ferrous metal ores are consumed in the manufacture of metals which in turn provide the raw materials for industries such as construction, machinery, transportation and electrical engineering. Demand for the ores is thus directly related to

Figure 2: Non-ferrous metal ores  
Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Non-ferrous metal ores**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	3 897	3 269	4 448	3 662	3 078	2 971	2 576	4 277	4 470	4 620	4 860
Production	800.0	632.0	987.0	855.0	665.0	701.0	596.0	650.0	660.0	660.0	680.0
Extra-EU exports	286.6	169.6	427.3	351.4	296.8	297.4	273.1	283.5	300.0	310.0	330.0
Trade balance	-3 097	-2 637	-3 461	-2 807	-2 413	-2 270	-1 980	-3 627	-3 810	-3 960	-4 180
Employment (thousands)	18.8	14.5	14.4	14.3	14.2	13.5	10.0	11.0	11.0	11.0	11.0

(1) Data from 1992 onwards includes gold and silver credits.

(2) B.M.Coope & Partners estimates.

(3) Rounded DRI forecasts.

Source: B.M.Coope & Partners, DEBA

**Table 2: Non-ferrous metal ores**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Zinc	683	188	46
Tin	13	34	23
Copper	426	155	90
Lead	95	22	2
Bauxite	350	62	19
Nickel	35	35	0
Tungsten	3	3	1
Others	972	97	92

(1) Data includes gold and silver credits in the others category.

Source: B.M.Coope & Partners, Eurostat

**Table 3: Non-ferrous metal ores**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.5	-7.1	-1.9	-9.5
Production	1.0	-13.9	-5.9	-14.0
Extra-EU exports	10.2	0.9	6.0	0.3
Extra-EU imports	3.6	-4.4	0.0	-7.3

(1) Data from 1992 onwards includes gold and silver credits.

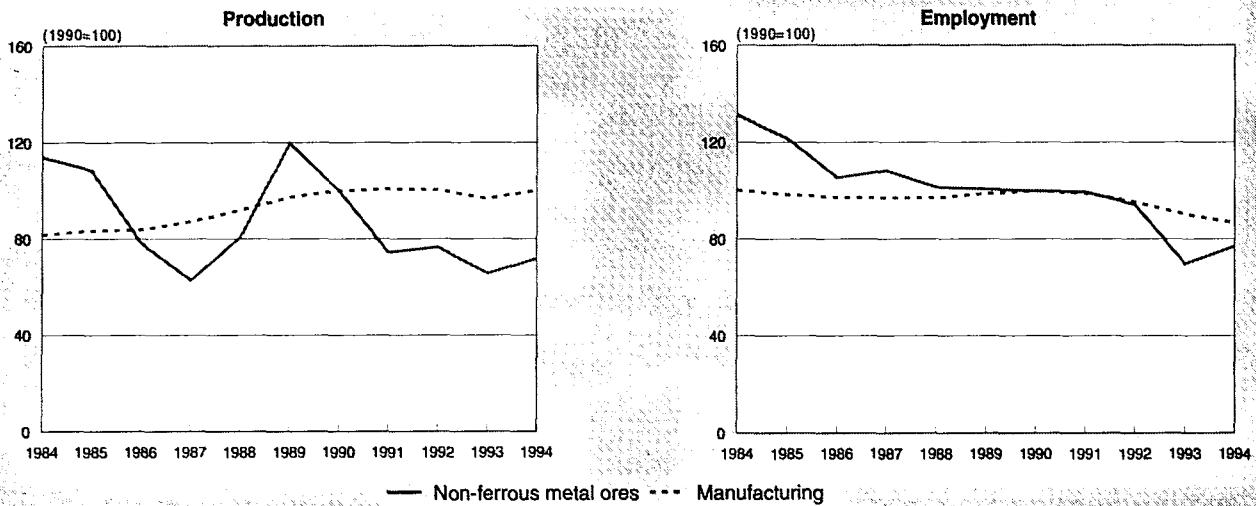
Source: B.M.Coope & Partners, DEBA

**Table 4: Non-ferrous metal ores**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	286.6	245.0	157.6	153.4	169.6	427.3	351.4	296.8	297.4	273.1	N/A
Extra-EU imports	3 384	3 376	2 438	2 295	2 807	3 889	3 159	2 710	2 567	2 253	N/A
Trade balance	-3 097	-3 131	-2 280	-2 142	-2 637	-3 461	-2 807	-2 413	-2 270	-1 980	N/A
Ratio exports / imports	0.08	0.07	0.06	0.07	0.06	0.11	0.11	0.11	0.12	0.12	N/A
Terms of trade index	111.5	122.1	121.8	119.0	111.3	106.2	100.0	96.9	97.4	94.1	N/A

Source: DEBA

**Figure 3: Non-ferrous metal ores  
Production and employment compared to EU total manufacturing Industry**



1994 are B.M.Coope & Partners and Eurostat estimates.  
Source: B.M.Coope & Partners, DEBA

world economy which was muted in 1993 due to continuing recession in Europe and Japan and only modest growth in the USA, although growth was exceptional in south-east Asia. World overcapacity for the production of many ores, together with large sales of mostly metals from the former Soviet Union have combined with weak demand to create substantial stocks of several metals. The emergence of more countries from recession, some plant closures and trade reductions give an expectation that a stronger performance from the sector can be expected in 1994 and immediately beyond.

**Supply and competition**

As indicated there is no shortage of supply from overseas and the advantages to be gained by virtue of location have to be assessed in purely economic terms. Thus for an EU mining operation to be successful it must compete in terms of quality and cost, features which exist at the leading large-scale EU mines, but hinder development of smaller operations unless some local niche opportunity exists. The expectation of expanding the number of operations in the present EU is

good in the short term in terms of lead and zinc, but the level of exploration expenditure across the region is minimal compared to that overseas, and it is thus unlikely that the EU non-ferrous metals mining sector supply position will change significantly.

**Production process**

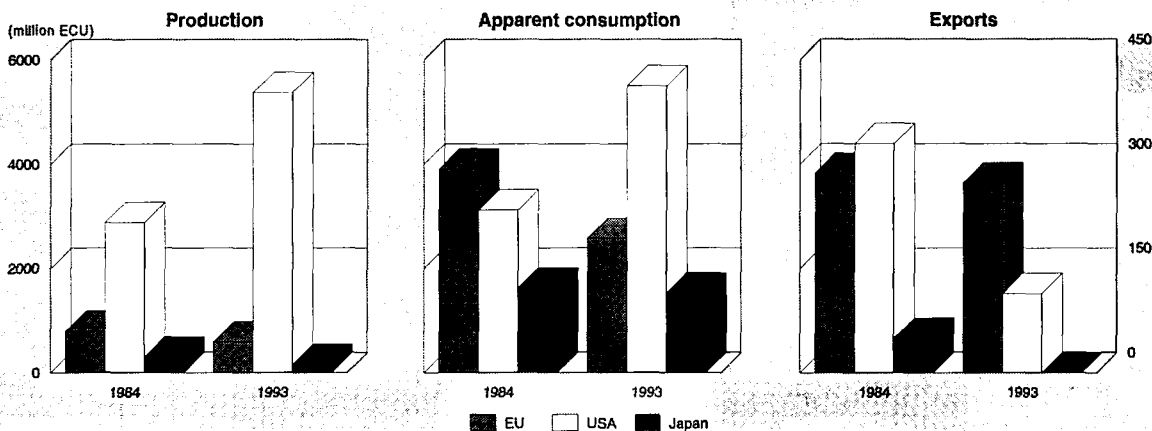
Productivity gains are significant, not so much as an outcome of major changes in the techniques used in mining or minerals processing, but out of continuous improvements in diverse stages of the mining and processing technologies. In this regard, the leading EU operations compare favourably with overseas mines in the application of technology and in production efficiency.

**INDUSTRY STRUCTURE**

**Companies**

Whereas the leading EU mining companies are weathering the recessionary period, a number of casualties have been

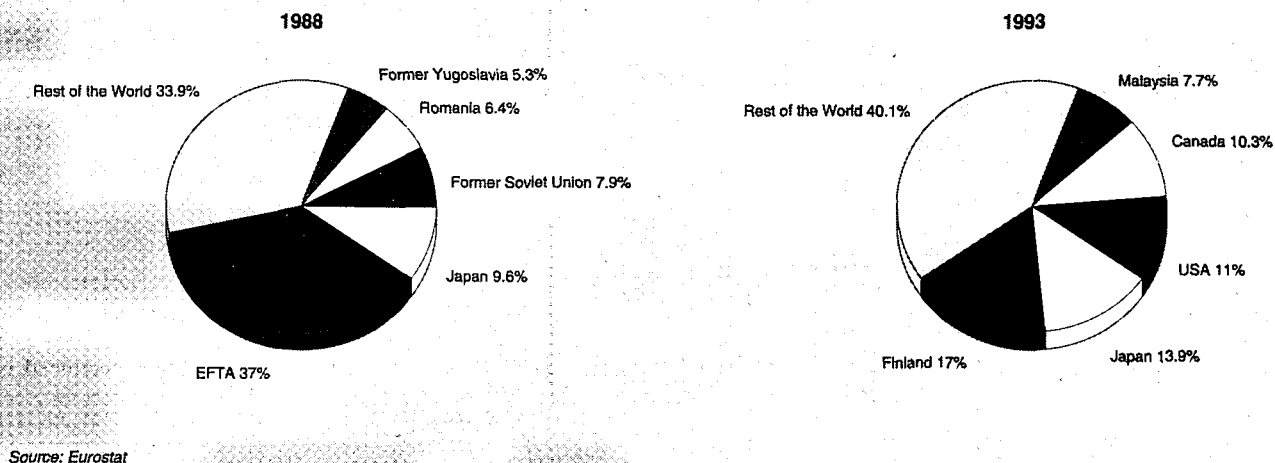
**Figure 4: Non-ferrous metal ores  
International comparison of main indicators in current prices (1)**



(1) In previous years the USA figures were quoted from the USBM; this year they are based on tonnages and metal contents, which have been factored to provide more consistent and accurate values.  
Source: B.M.Coope & Partners, Eurostat



**Figure 5: Non-ferrous metal ores  
Destination of EU exports**



Source: Eurostat

experienced amongst smaller operators. In Portugal the Panasqueira tungsten mine remains on a care and maintenance basis and the zinc operation at Aljustrel has closed, although there are plans to re-open in 1995. The last zinc mine at Noailhac St Salvay in France has also shut, as has the gold and silver operation at Rouez. In Spain the lead/zinc production at Reocin has been limited and the Troya mine closed. Copper production at Sotiel has also been suspended. Italy has been forced to shut its Sardinian lead and zinc operations, and no new mine has come on stream within the EU, although the Salsigne precious metal mine in France is scheduled to re-open in 1994. As indicated, new lead/zinc mines are under development at Lisheen and Galmoy in Ireland, and a new gold mine at Omagh (UK) is also possible.

It should not be forgotten that although mining operations within the EU are at a modest level, the community is the home of a number of international mining companies who between them are responsible for over 10 % of world non-ferrous metals ore production. One of these companies, Billiton of the Netherlands, has sold its assets to Gencor, a South African mining group. Metallgesellschaft of Germany is also undergoing major restructuring, but the other majors continue to play a strong role in the sector internationally, with RTZ (UK) and Minorco (L) in particular expanding their operations.

On a smaller scale, the privatisation of the downstream operations of BRGM is worth to mention: it created a new international company, based in Europe, with BRGM retaining a 40 % share, together with Normandy Poseidon of Australia which controls the remaining 60 %.

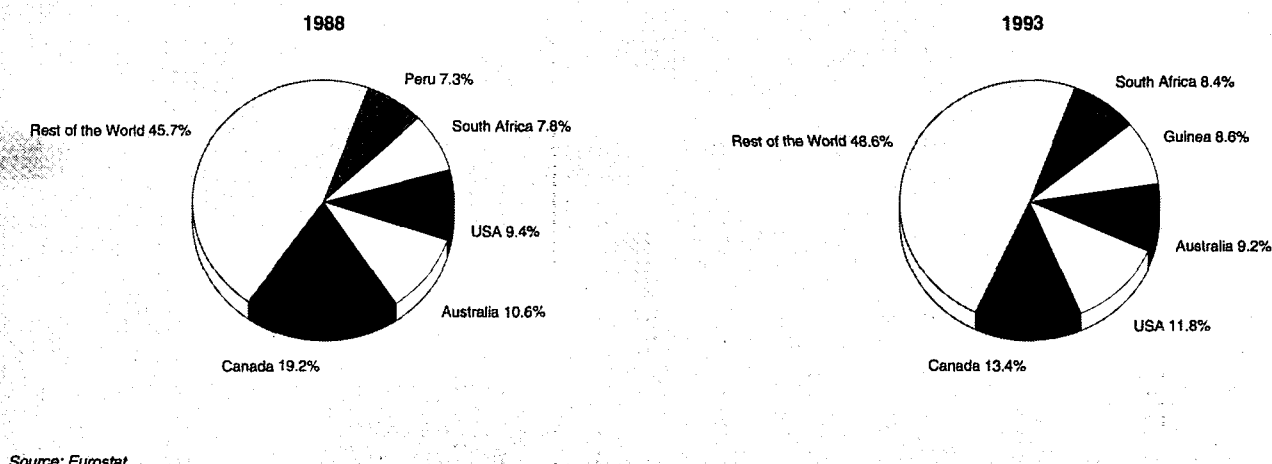
**Strategies**

The strategies pursued by all mining companies in the sector are similar, that is the location, development and operation of profitable orebodies irrespective of location, as long as political and financial stability exists in the region. Their policies reflect the international nature of the industry and are unlikely to deviate in the future. For the industry in the EU, this means that new developments must fulfil international criteria of profitability and enjoy no favoured status because of location.

**Impact of the Single Market**

The impact of the Single Market on the non-ferrous metal ores industry has been significant and positive. This sector has always operated on an international scale and most of the companies involved are multinationals working to international standards. Thus the freedom of movement of goods,

**Figure 6: Non-ferrous metal ores  
Origin of EU imports**



Source: Eurostat



**Table 5: Non-ferrous metal ores  
Breakdown by size of enterprise, 1993**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	10	40.0	1.0	1.0
20-99 employees	4	16.0	5.0	3.0
100 or more employees	11	44.0	94.0	96.0

Source: B.M.Coope & Partners

**Table 6: Non-ferrous metal ores  
The five largest companies in the EU, 1993**

(million ECU)	Country	Employment
Somincor	P	1 100
Tara	IRL	750
Parnasse	GR	700
Esturiana de Zinc	E	600
Exminesa	GR	500
Share in EU total (%)		37

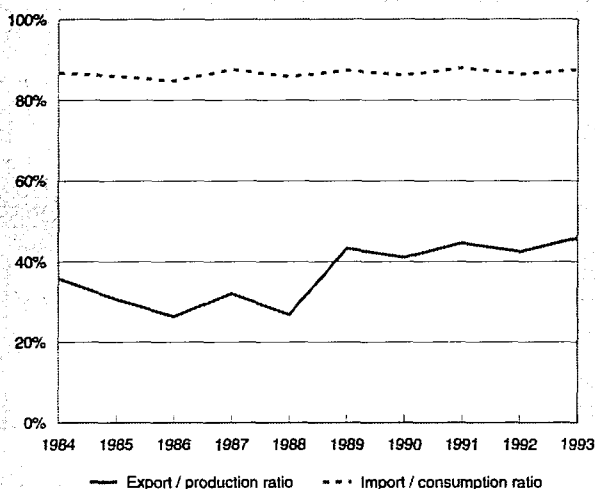
Source: B.M.Coope & Partners

services, and capital are seen to be of paramount importance to the successful operation of this industry.

Energy and environmental issues also loom large in the industry's consciousness and there is strong concern that European legislators take proper account of the international framework in which companies must operate.

With regard to future priorities it is felt that more progress can be made to liberalise capital, insurance, and energy markets. Further attention also needs to be paid to overseas payments, and investment guarantees. The political clout of the EU should be used to promote cooperation with and open up the markets of other nations.

**Figure 7: Non-ferrous metal ores  
Trade Intensities**



Source: B.M.Coope & Partners, DEBA

## REGIONAL DISTRIBUTION

As indicated, EU non-ferrous metals ore production is dominated by Portugal (copper), Spain (zinc), Greece (bauxite) and Ireland (zinc). The importance of the last mentioned is set to grow and may make Ireland the largest contributor by the end of the decade. There is little likelihood of the United Kingdom or Italy improving output, and whereas France's production should improve with the re-opening of Salsigne, any major new deposits which emerge will probably be in the currently dominant regions.

The entry of Sweden and Finland into the EU would expand the base of non-ferrous metals mining, and significant increases in the output of copper (61 %), lead (107 %) and zinc (43 %) would arise, as well as additions from silver, nickel, chromite, cadmium, cobalt, gold, mercury and selenium. Sweden accounts for between 60 % and 95 % of the potential extra production of lead, zinc and copper.

## ENVIRONMENT

The non-ferrous metals mining sector is under environmental pressure in two areas, namely the extraction of minerals and their subsequent use. In the first case, environmental pressure groups continue to oppose new ventures, most notably in 1993 at the gold prospect at Omagh. Environmental planning and husbandry at EU operations is, however, of a high standard, and compares well with international practice.

**Table 7: Non-ferrous metal ores  
Production specialisation (1)**

(ratio)	1984	1993 (2)
Belgique/België	0.0	0.0
Danmark	0.0	0.0
BR Deutschland	0.3	0.0
Hellas	6.0	25.1
España	4.2	3.8
France	0.7	0.2
Ireland	23.1	14.3
Italia	0.2	0.2
Luxembourg	0.0	0.0
Nederland	0.0	0.0
Portugal	5.8	22.9
United Kingdom	0.3	0.1

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

(2) Includes gold and silver credits.

Source: B.M.Coope & Partners, DEBA

In the case of some uses, opposition exists in particular to the use of lead, cadmium and mercury. In these cases the proponents of change include official national organisations, and it is certain that much work will be necessary by the metals industries to resist material substitution.

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## REGULATIONS

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EU regulations pertaining to exploration, mining, processing and the environment are similar to those in other advanced mining regions and are well understood and complied with. As indicated, mining in Europe is in the forefront of environmental concern and, being a natural science activity with a long history, its experience can help in separating what is essential from what is superfluous in the increasing inflation of regulations. The major operations are little affected by single market regulations, although implementation of the EU's rules on free competition has been blamed for the closure of some operations, notably in Sardinia.

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## OUTLOOK

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The sector has survived some difficult times of late and the leading operations, which account for the vast majority of production, have shown good resilience. With improvements in international economic performance predicted, albeit cautiously, the industry is expected to continue to play a minor but significant part in years to come. The level of self-sufficiency in non-ferrous metals ore production should remain at around the same 20 % level, although this will increase to nearly 30 % when the three new proposed entrants join the EU. The levels of mining investment being attracted to regions worldwide with better geological conditions precludes the likelihood of significant change to the status quo.

Written by: B.M. Coope & Partners

The industry is represented at the EU level by: International Association of European Mining Industries (EUROMINES). Address: Avenue Broqueville 12, B-1150 Brussels; tel (32 2) 775 6311; fax: (32 2) 779 0523.

# Stone

## NACE 245

The European stone industry is still the world leader. The European industry produces, transforms, trades and consumes all kinds of stone materials including marble, granite, travertine and other similar stone. These products are destined for various uses although the largest consumer is the building industry, particularly the upper end of the industry, where there is strong competition from alternative materials such as ceramics and glass which have greater investment capacities for research, development and marketing.

### INDUSTRY PROFILE

#### Description of the sector

The ornamental stone industry is divided into two main sections, that is the excavation of raw materials and their subsequent transformation into the various finished products. In the 1980s, the industry experienced a real boom. From 1981 to 1992, world quarry production rates rose from around 20 to over 31 million metric tonnes and this was accompanied by an equally significant increase in the number of producing countries. At present, only ten countries exceed an annual production of one million metric tonnes and six of these belong to the European Union (see Table 1). Up until 1992, the EU ornamental stone industry accounted for over 50 % of world production and around the same percentage of global international exchange in terms of volume. The products exchanged within and outside the European Union include rough blocks and a wide variety of finished articles.

The processed materials are mainly calcareous (marble, travertine, etc.) or siliceous (granite, sandstone, porphyry, slate, etc.) and their relative uses differ to some extent. Granites are principally employed for exteriors or wherever greater resistance is required to stand wear and tear and atmospheric pollution; marbles are principally destined for interiors or where there is greater protection from external elements.

The development in processing technology has widened the field for the use of stones, especially in the building and furnishing industries, and this development has been accompanied by improvements in stone laying and maintenance techniques. The new uses have emerged mainly thanks to the techniques for obtaining minimal thickness units and for applying them, which have enabled stone products to penetrate the avant-garde markets such as the removable floorings for electronic processing centres and the light vertical claddings. Marbles and granites can therefore be used inside lifts, in ships, on skyscraper facades in areas subject to typhoons and in other situations which would otherwise be inconceivable for traditional methods.

Alongside these avant-garde uses, there are of course the more traditional, well-established areas of usage, such as funeral art, furnishings, monuments, decorative architecture, where production processes have also undergone a radical technological transformation.

For some of the traditional uses, the processing of stone is part of production in other industrial sectors. Particularly in the case of furniture production, marble and granite cutting and polishing workshops for vanity tops, kitchen table tops and bathroom furniture coverings are an integral part of the production line of finished furniture.

However, the most interesting market as regards the quantity of material sold and the value added absorbed is still the

**Table 1: Stone  
Rough production**

(thousand metric tonnes)	1981	1988	1992	1993
Belgique/België	2 070	467	364	340
Danmark	N/A	N/A	N/A	N/A
BR Deutschland	N/A	137	200	210
Hellas	900	1 700	1 900	1 900
España	2 730	2 155	3 400	3 100
France	734	920	1 058	1 019
Ireland	N/A	N/A	N/A	N/A
Italia	6 700	7 480	7 300	7 250
Luxembourg	N/A	N/A	N/A	N/A
Nederland	N/A	N/A	N/A	N/A
Portugal	401	640	1 163	1 145
United Kingdom	N/A	715	1 100	715
EU (1)	13 535	14 214	16 485	15 679
Former COMECON countries	1 000	2 600	1 150	1 787
Sweden	92	143	97	100
Finland	200	257	417	414
Norway	177	100	150	160
Austria	25	40	30	22
Turkey	150	485	850	850
USA	875	1 062	1 350	1 350
Brazil	850	970	1 500	1 200
Mexico	165	263	550	712
South Africa	330	700	720	600
India	400	700	2 500	2 956
China	N/A	N/A	1 500	2 545
South Korea	N/A	687	1 250	145
Others	2 000	2 800	3 500	4 500

(1) Excluding countries where data is not available.  
Source: National Statistical Institutes



**Table 2: Stone  
Imports of blocks and slabs**

(thousand metric tonnes)	1988	1992	1993
Belgique/België	73	110	N/A
Danmark	281	221	N/A
BR Deutschland	416	416	600
Hellas	9	6	4
España	143	248	N/A
France	191	243	203
Ireland	8	6	N/A
Italia	1 467	1 525	1 515
Luxembourg	N/A	N/A	N/A
Nederland	57	66	N/A
Portugal	12	41	N/A
United Kingdom	133	48	N/A
EU (1)	2 790	2 929	2 323
Japan	1 101	1 272	1 290
USA	415	58	473
South Korea	75	123	N/A

(1) Excluding countries where data is not available.  
Source: Various sources

traditional building industry including new buildings, restoration and maintenance work.

### Recent trends

Present production figures amount to an average of around 31-32 million metric tonnes per annum with a recent, constant upward trend mainly due to the entry of new producer countries into the world market. Since the early 1980s at least ten new producers of some significance have emerged and become self-sufficient. This phenomenon has also led to an increase in machine production for the quarrying, sawing and processing of stone. This stone industry sector has been flourishing and is mainly based in the EU, particularly Italy followed by Germany and France. The EU countries in the Mediterranean basin form the heart of the sector at both European and world level, even though other areas in the world are now also developing. In 1992, the greatest producer country of blocks for ornamental use was Italy which has always

held the leading position in the market, followed in the EU by Spain, Greece, Portugal and France.

### Foreign trade

Trade in volume mainly involves raw and semi-raw materials. The leading importer was Italy, closely followed by Japan (see Table 2 and 3) which has only recently attained this position. Both these countries import mainly blocks of raw granite, but in Japan this is mainly destined for funeral art whereas in Italy it is for all possible uses. Important exporters apart from Italy include Spain, Greece, China and South Korea. China and South Korea are the only countries to have recently (1988-89) penetrated the market as a producer, transformer and consumer.

EU exports mainly consist of finished products, which are principally destined for the building industry. They are intended for non-EU European countries and non-European countries, mainly North America and the Far East (see Table 4 and 5). Right up until 1982-83, there was also a strong demand from the Middle East. Subsequently, external factors led to an abrupt decline in demand to a mere 35 % of its most memorable peak. The effects of the international crisis in the Persian Gulf are mostly responsible for the most recent figures. Nevertheless, the most important export market is still within the EU, first and foremost in Italy and Germany, followed by Spain and France. This is true for semi-finished products, but Italy is a major net exporter of finished products.

### MARKET FORCES

#### Demand

The demand for stone materials is varied. It ranges from the large importers of blocks which amount to only a few dozen firms throughout the world, concentrated in Italy and Germany, to the large North American building firms and developers and the final consumers for all the other sections of the market.

The greatest problems for the sector arise from the extreme fragmentation of the consumer market together with the very limited average size of companies. Moreover, the lack of capital to invest in research, development, promotion and marketing makes it difficult to exploit this dispersed consumer market which is often regional. On the other hand, the factors which sustain the demand are above all the intrinsic factors regarding the products themselves such as their reputation.

**Table 3: Stone  
Imports of finished products**

(thousand metric tonnes)	1988	1991	1992	1993
Belgique/België	253	N/A	75	N/A
Danmark	N/A	N/A	16	18
BR Deutschland	352	510	567	400
Hellas	N/A	2	5	4
España	132	279	133	N/A
France	72	164	155	65
Ireland	2	2	N/A	5
Italia	15	35	43	38
Luxembourg	N/A	N/A	N/A	N/A
Nederland	50	65	85	97
Portugal	N/A	N/A	3	N/A
United Kingdom	78	293	63	N/A
EU (1)	955	1 350	1 145	627
Japan	342	416	542	580
USA	875	N/A	338	330
South Korea	75	83	48	46

(1) Excluding countries where data is not available.  
Source: Various sources



**Table 4: Stone  
Exports of blocks and slabs**

(thousand metric tonnes)	1988	1991	1992	1993
Belgique/België	6	20	19	20
Danmark	N/A	61	69	70
BR Deutschland	56	160	92	93
Hellas	23	41	58	67
España	405	635	547	470
France	21	57	44	35
Ireland	N/A	1	N/A	11
Italia	398	478	466	657
Luxembourg	N/A	N/A	N/A	N/A
Nederland	18	13	19	N/A
Portugal	157	292	265	N/A
United Kingdom	N/A	N/A	N/A	N/A
EU (1)	1 084	1 758	1 577	1 423
Sweden	265	280	319	315
Finland	248	260	237	251
Norway	62	179	88	116
Austria	25	5	4	7
Turkey	23	32	30	47
USA	N/A	150	114	144
Brazil	460	378	558	557
South Africa	550	650	600	469
India	560	650	650	1 233
China	250	410	868	N/A
South Korea	324	250	227	N/A

(1) Excluding countries where data is not available.

Source: Various Sources

response to technical problems, aesthetic variety and image rather than the few sporadic promotional campaigns effected by marble and granite companies.

Stone constitutes a natural resource which almost all European countries possess to varying degrees; also many developing countries have already begun or are beginning to exploit this natural resource by quarrying the raw material. Quarrying technology is relatively simple and problems can only arise

from the lack of infrastructures. Countries capable of offering technologically advanced finished articles at competitive prices are however very few. With the exception of Italy and Spain and to a lesser extent the other EU countries, all the other significant stone consumers are far from being self-sufficient even within their own home markets.

Japan is a good example. Since 1985, Japan has been a very significant importer mainly of granites which are primarily

**Table 5: Stone  
Exports of finished products**

(thousand metric tonnes)	1988	1991	1992	1993
Belgique/België	9	19	29	N/A
Danmark	N/A	12	12	N/A
BR Deutschland	44	11	13	11
Hellas	89	166	183	180
España (1)	130	160	168	N/A
France	26	43	39	38
Ireland	N/A	N/A	N/A	N/A
Italia	1 628	1 811	1 832	2 031
Luxembourg	N/A	N/A	N/A	N/A
Nederland	15	17	N/A	N/A
Portugal	132	195	197	N/A
United Kingdom	1	11	9	N/A
EU (2)	2 073	2 444	2 482	2 260
South Korea	270	181	152	N/A
Taiwan	N/A	23	33	28
Hong Kong (3)	15	33	37	48

(1) Data does not include "pizzaras".

(2) Excluding countries where data is not available.

(3) Figures include re-exported products.

Source: Various sources



**Table 6: Stone  
Employment and number of companies**

(units)	Number of companies	Number of employees
Belgique/België	374	6 500
Danmark	N/A	N/A
BR Deutschland	350	N/A
Hellas	4 000	50 000
España	3 343	30 000
France	900	10 000
Ireland	N/A	N/A
Italia	11 000	70 000
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	2 448	15 000
United Kingdom	505	5 090
EU (1)	22 920	186 590
Sweden	21	1 000
Finland	72	1 500
Norway	40	750
Turkey	765	10 000
South Africa	30	N/A
China	3 000	50 000
India	300	200 000
South Korea	1 142	13 643

(1) Excluding countries where data is not available.  
Source: Various sources

destined for funeral art. It prefers to procure lower-range semi-processed or finished articles from Taiwan and South Korea, but imports stone for complex work which requires the expert use of sophisticated production techniques and a wide range of different products from Italy.

The same picture applies to the USA, even though it has high national production rates. However, since 1988 the USA witnessed a gradual reduction in demand for finished products, especially in granite, due to the slump in the market which most used them, that is non-residential building. The strong decline in this sector, which has been compensated to some extent by the increase in residential housing, has influenced international trade in terms of sales and volumes.

In South East Asia there is a tendency towards self-sufficiency which is likely to continue over the next few years. The great buying power of the Japanese market, the extensive building activities in some of the newly industrialised countries, the availability of low-cost labour, the proximity of areas with high raw material production rates such as India, South Africa and more recently China, all create a depletion of the outlets for products which excludes all small niches in the market, save a few privileged ones. The EU industry occupies a strong position as far as the latter are concerned.

The main market for the European stone industry is the EU itself. The traditional usage, the extensive and intensive production, the ability to transform raw materials, a building industry very much oriented towards maintenance and restoration, all favour the use of stone. It is often considered a material which adds prestige to buildings where it is used, be they residential or non-residential. The difficulties of a sector which is not in a position to invest sufficient capital in promotional and marketing activities may affect its development over the next few years. Sections of the market which are in a position to expand despite the recession which has been threatening certain countries are still confronted with the deep penetration of the market by their competitors such as glass and ceramics.

Indeed, the general increase in the competitiveness from substitute products has already adversely affected the price trends, which had to decrease in real value to retain a hold in the major markets.

## INDUSTRY STRUCTURE

### Companies

The average size of companies in the sector is generally very limited. In Italy, for example, the average company has no more than ten employees, although there are various groups of companies which have joined forces to develop a common strategy and pool resources. Recent and reliable statistics are not available for all the EU countries, but it is calculated that there are now at least 189 840 employees in the EU (including Sweden and Finland, but excluding countries for which data are not available, i.e. Denmark, Germany, Ireland, Luxembourg and the Netherlands), about half of whom working in the quarries. There have been great changes in the production methods, speed and costs in recent times due to the mass introduction of diamonds in the quarrying and processing of marble at the beginning of the 1980s. The greatest concentration of productive firms is in Italy, where stone materials are available in nearly all its regions: it is calculated that there are over 70 000 quarry workers, plus those working in industries connected to quarrying, transformation and commerce. The same situation as regards the structure of the sector can be seen in Spain, France, Greece and Portugal.

A problem which affects almost all EU countries, however, is the ageing labour force. The turnover of the generations of workers is very slow indeed and this is a problem which may become very serious in the future for a sector which often requires a long period of complete professional training. The biggest question mark in the sector remain the economic and commercial prospects. The sector is inevitably dependent on the building industry, and especially the upper end (residential, non-residential, urban landscape, restoration of old town centres, renovation). The tendency towards even partial self-sufficiency be it even partial, of certain extra-EU markets could reduce the overall market of the European stone industry and limit it more and more to the EU market itself. As far as stone companies are concerned, all this could lead to even more problems for smaller companies which would be forced to specialise still further or opt for subcontracting, leaving the larger companies to deal with the more complicated contracts and the more distant markets. The major companies and groups are already working as corner-stones on the international market. They are directly present on distant markets, have local associates and among other things coordinate complex projects.

### Impact of the Single Market

The creation of the Single Market has had limited direct impact on the stone industry, but is regarded in positive terms because of the overall effect on general economic activity. Few of the measures in the Internal Market package were of direct relevance to this sector - with the exception of environmental policy measures. The sector is not very trade intensive, due to the high cost of transport.

## ENVIRONMENT

Important environmental issues involve the stone industry in both its productive divisions, i.e. quarries and workshops. There are serious problems as regards the respect for and restoration of the structure of the mountains where quarrying activities are carried out. Various countries and regions do actually impose a programme of temporary management of the quarry dumps and at least partial reconstruction of the natural habitat to be included in the quarrying plans. This is not always feasible and sometimes leads to the interruption

of activities due to the impossibility to comply with regulations in force.

Respect for the environment must continue after the quarrying process. This requires compliance with the regulations regarding interior working environments (microclimates inside the workshops, noise levels, dust, mud, complete safety) and mutual respect between workers and inhabitants. Thus, the management of reflux slurry, the protection against noise, the protection of water courses from polluted waste, overloaded roadways, are problems which concern technical researchers, machine manufacturers and environmentalists alike. Technical researchers are in fact working towards finding the best solutions (for example, the re-utilisation of marble rubble) while manufacturers are trying to produce machines with lower noise levels and less dust production (sound-proof machines, purified plants at the design stage, etc.) and environmentalists are involved in imposing respect for the environment and the regulations in force.

The ecological issue goes hand in hand with the problems regarding safety in the quarries. Unfortunately, every year in spite of both the workers and the employers' awareness of safety measures, accidents continue to occur and are sometimes fatal.

## REGULATIONS

The EU industry is subject to the regulations which in general cover building material products and has resisted to the dumping accusations made by the North American firms at the end of the 1980s. Now, it has to face two major restraints:

- as regards production, the respect of the environmental and workers' safety regulations both inside and outside the quarry and the workshops;
- as regards usage, the respect of special safety regulations regarding anchorage systems for vertical cladding and the development of a joint set of regulations for the EU for certain production methods.

There are various technical committees within the EU, some of which began working in 1988 and 1989 and have an internal sub-commission which deals with processed stones. Among these, we can name:

- TC 125, which deals with masonry, and plans to set up a sub-commission for natural stone masonry;
- TC 128, which deals with building coverings, and has a work group for slates;
- TC 178, which deals with roadways and curbs, and has a sub-committee for natural stone;
- TC 246, which deals with floorings in natural stone, interiors, stairs, terraces, balconies, etc., and exterior facades. It is the most recent group (1990) and it shares its tasks with more established groups. It is however already organised into three subgroups, one for terminology and classification, one for test methods and one, the most important one, for the prerequisites and limits for specific products. During 1993 and 1994, much work has been done to give the stone products the necessary characteristics so as to be able to circulate freely within the EU and withstand competition from substitute materials.

## OUTLOOK

The present economic trends and the recession in some of the major markets trouble producers in the sector. The crisis was felt hard in 1992 and 1993. Now, however, there are some signs of recovery.

The world stone industry is in constant but modest overall expansion. However, the European sector's future is closely linked to the general tendencies of the European economies and their building activities. The unification of the European markets will not really affect the firms already operating outside their own region. At worst, these companies will have to conform to the standardised regulations and the consequent quality certification prerequisites. EU trade relations with extra-EU countries will prove to be more difficult as the latter are tending to form autonomous production systems. It is predicted that it will be more complicated for individual firms, especially smaller ones, to gain a place on foreign markets without having privileged partnerships with local firms and the necessary support in the form of assistance, services and credit facilities.

On the other hand, the opening of new quarrying activities in third world countries and the consequent increase in familiarity with using natural stones, is gradually creating much better prospects for new markets. Whether or not the European stone market will be able to continue to expand in the 1990s depends on how effectively it addresses these new realities.

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# Construction raw materials

## NACE 231

The EU is one of the world's major regions for the production and consumption of construction raw materials. In the construction raw materials sector, the EU is theoretically self-sufficient for virtually all mainstream products, and external trade tends to be in material chosen on aesthetic grounds. The economic performance of this industry is tied directly to the level of building and construction activity in the EU, which appears to be on the rise again after a four-year dry spell. Some minerals which predominantly are used for construction - notably limestone, dolomite and silica sand - are also widely used in industrial sectors such as glass and ceramics, metallurgy, paper, paints, plastics, etc. The proportion of minerals used in industry is generally less than 10 %.

### INDUSTRY PROFILE

#### Description of the sector

The mainstream products comprising most of the categories under NACE 231 (apart from clays) include: crushed stone for construction and road aggregate; sand and gravel for construction and road aggregate; limestone and chalk for cement and lime; gypsum for plaster and cement; and dimension stone (including marble and granite).

Construction aggregates and cement are the bulk raw materials used in the building of roads, railways and buildings, and value added data tend to be in line with overall economic activity. Thus, Germany displays the largest value followed by France, the UK, Italy and Spain.

Many larger operations are owned by important construction and civil engineering groups. However, the abundance of deposits and the localised nature of their markets (most operations serve markets within a 50 km radius) also allow for the existence of many small enterprises.

Limestone, chalk silica and alumina are the main raw materials used in cement. Lime manufacture and quarries for these end-products are invariably captively-owned by the large cement (or lime) manufacturing groups featured in Chapter 5.

#### Recent trends

Production and consumption levels increased gradually throughout the 1980s, peaking in 1989 and declining thereafter in 1990. There was minimal growth between 1991 and 1993. The pattern during the 1990-1994 period has varied from country to country according to the level of construction activity in each, e.g. strong in Germany, weak in the UK. Nevertheless, the long-term trend is upward, and both production and consumption are expected to show renewed growth in 1994 and beyond.

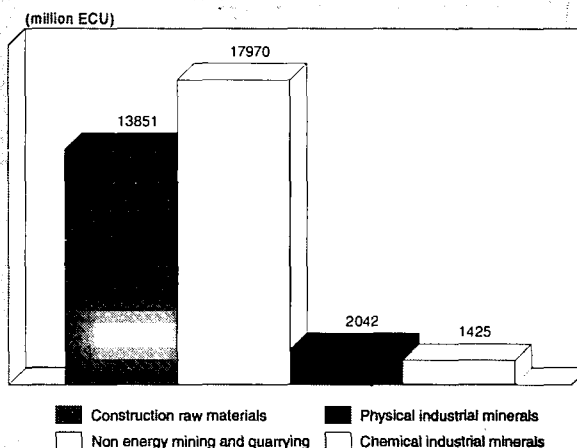
#### International comparison

The EU is the world's leading producer of construction raw materials with an output 50 % higher than the US and three times that of Japan in 1993. Both the USA and Japan displayed a similar pattern of production and consumption over the past ten years with growth in 1983-89 period followed by decreases in the 1989-1993 period.

#### Foreign trade

Foreign trade represents only a small part of the total commercial activity in construction minerals - with imports accounting for about 6 % of total consumption and exports 3 %

Figure 1: Construction raw materials Production in comparison with related industries, 1993



Source: B.M.Coope & Partners

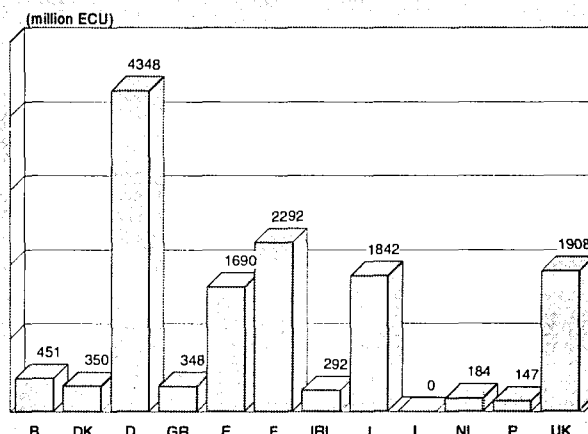
of total production. Nevertheless, the sheer size of the sector means that tonnage measured in tens of million of tonnes are involved.

Thus, the EU is highly active in both the importing and exporting of these materials but in recent years has become a net importer. This is primarily due to a surge in the imports of dimension stone granite from countries such as Norway, South Africa, Brazil and India. At the same, these imports have tended to be in raw form and have provided a boost in the value added activity of the EU's domestic stone processing industry (particularly in Italy).

Exports are dominated by shipments to EFTA countries, particularly of construction aggregates to Switzerland. Highlights in export trade to non-EFTA countries are the shipments of dimension stone marble and granite to Japan, the US and the Middle East.

As far as sources of 1993 imports are concerned, the EFTA countries accounted for about two-thirds of the total, with the main prominence on dimension stone granite and crushed

Figure 2: Construction raw materials Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Construction raw materials**  
**Main indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	10 515	12 795	13 979	13 357	13 497	13 783	14 178	14 919	15 220	15 590	15 930
Production	10 479	12 677	13 846	13 174	13 273	13 502	13 851	14 517	14 730	15 010	15 240
Extra-EU exports	273.0	305.7	378.4	347.5	372.3	362.8	370.6	370.6	410.0	440.0	480.0
Trade balance	-36.0	-118.5	-133.1	-182.9	-223.8	-281.4	-327.3	-402.0	-490.0	-580.0	-690.0
Employment (thousands)	133.1	136.4	138.8	148.1	150.2	144.2	139.0	133.9	140.0	140.0	140.0

(1) Eurostat estimates.

(2) Rounded DRI forecasts

Source: B.M. Coope & Partners, Eurostat

**Table 2: Construction raw materials**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Limestone	3 508	3 502	2.8
Dolomite	441	443	10.8
Other stone	3 393	3 050	55.3
Gypsum	200	213	14.1
Slate	113	111	4.1
Sand and gravel	6 238	6 104	74.5
Silica sand	417	428	48.4

(1) Trade may occur in products not produced within the EU, hence figures are not additive with respect to Table 1.

Source: B.M. Coope & Partners, Eurostat

**Table 3: Construction raw materials**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.6	-2.0	0.5	3.7
Production	2.4	-2.3	0.3	3.7
Extra-EU exports	2.5	-0.6	1.1	4.8
Extra-EU imports	8.6	6.0	7.5	4.0

Source: B.M. Coope & Partners, Eurostat

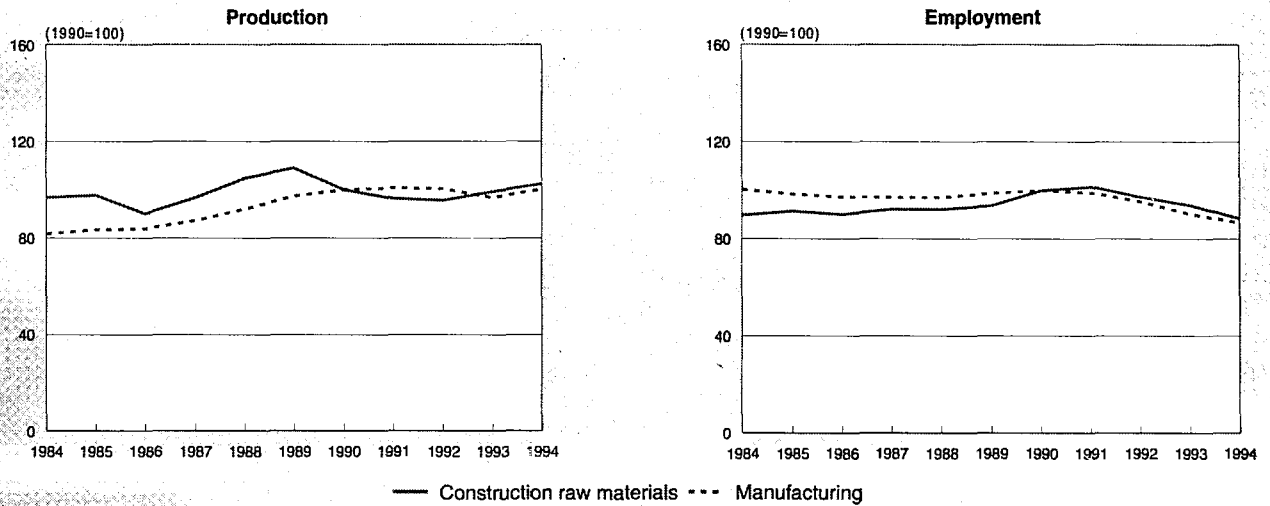
**Table 4: Construction raw materials**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	273.0	260.5	242.5	262.4	305.7	378.4	347.5	372.3	362.8	370.6	N/A
Extra-EU imports	309.0	333.5	282.8	299.3	424.2	511.5	530.3	596.1	644.3	698.0	N/A
Trade balance	-36.0	-73.0	-40.4	-36.9	-118.5	-133.1	-182.9	-223.8	-281.4	-327.3	N/A
Ratio exports / imports	0.88	0.78	0.86	0.88	0.72	0.74	0.66	0.62	0.56	0.53	N/A

Source: Eurostat



**Figure 3: Construction raw materials  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: B.M.Coope & Partners, DEBA

stone aggregate from Sweden and Finland. This traffic will become intra-EU trade in 1995. Presently, intra-EU trade is dominated by cross border movement of aggregates and industrial limestone/dolomite products between Germany, the Netherlands, Belgium and France, and by trade in dimension stone products in which Italy, Spain, Portugal and Greece are prominent.

## MARKET FORCES

### Demand

The construction industry is clearly significant to any discussion of markets for this group of raw materials. Demand for the major product lines is directly dependent on overall construction activity, as they are fundamental to the construction of roads and buildings. However, it should not be forgotten that the industrial grades of limestone, dolomite and sand are consumed primarily in the chemicals, metallurgical, glass and ceramics industries. These industries are also affected by recession, although to a lesser extent than the construction industry is.

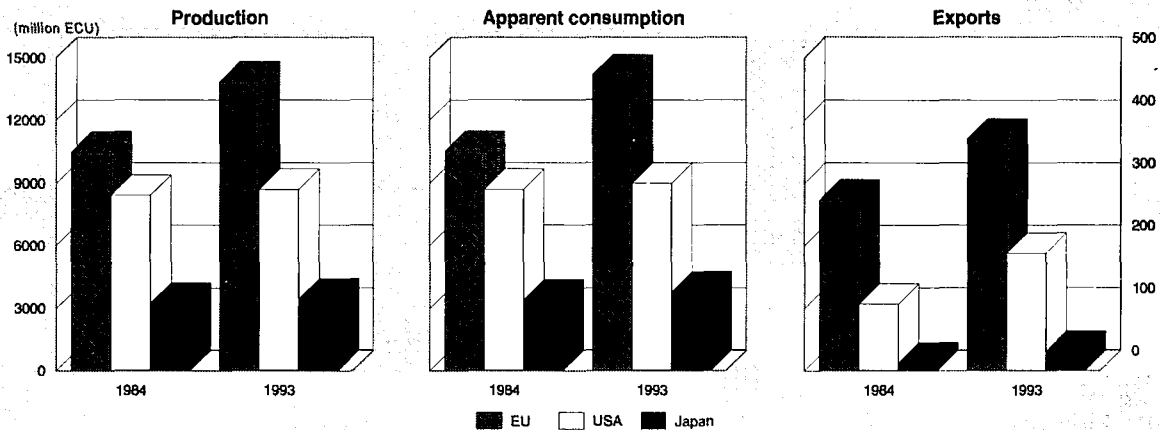
No major technological changes have taken place recently in construction materials, although on aesthetic grounds the increasing use of natural stone (as represented by dimension stone granite and marble) for the exterior and interior surfaces of buildings already has been noted.

### Supply and competition

The EU is a major world producer and is theoretically self-sufficient for virtually all of the minerals and rocks in this group. Thus, prices tend to be based on contracts negotiated between producer and consumer at the intra-EU level. Indeed, because of the high degree of captive ownership in the construction minerals domain, many prices tend to be an intra-company affair.

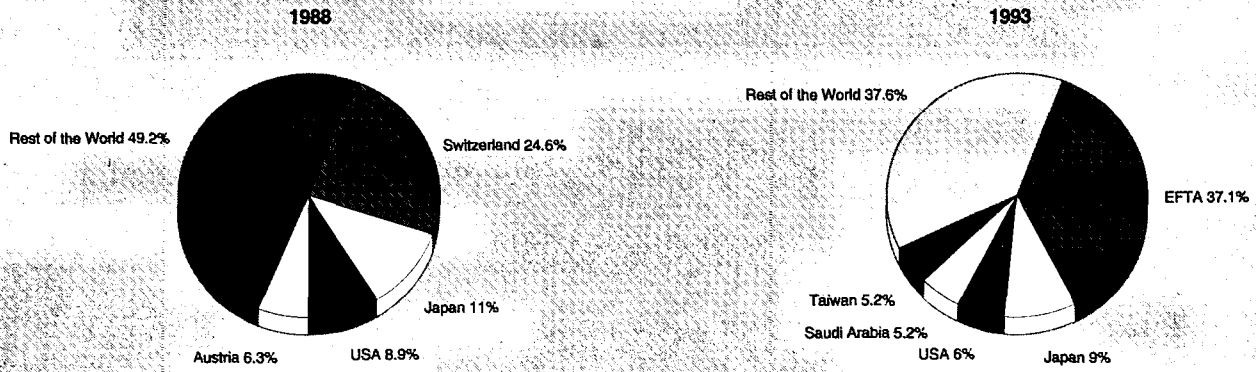
Transportation is a major consideration in bulk raw material markets and therefore, producers often operate their own trucks and sell on a delivery basis. In many cases, producers sell semi-finished or finished products such as ready-mixed concrete, coated roadstone and plasterboard. Sales of these value-added products plus the strong element of service offered to

**Figure 4: Construction raw materials  
International comparison of main indicators in current prices**



Source: B.M.Coope & Partners, DEBA

**Figure 5: Construction raw materials  
Destination of EU exports**



Source: Eurostat

the customer often combine to give attractive operative margins for companies operating in the sectors.

Transportation costs can rule out foreign competition in bulk construction raw materials. The exceptions to this rule cover situations where non-EU countries are neighbours (e.g. Norwegian and Swedish stone shipped to Denmark and Germany), where "superquarries" have been set up to export stone in low-cost bulk carriers (e.g. Glen Sand in Scotland, Wimpey in Ireland) and where high value items are preferred on aesthetic grounds (e.g. dimension stone granite from South Africa, Brazil and India).

**Production process**

Construction raw materials extraction is often in the hands of large construction groups whose activities may range from cement and plaster products manufacture to civil engineering. The quarrying divisions of such groups tend to be large-scale, highly mechanised operations with quality control systems to cover what is in essence a crushing and grading exercise. Much attention has been focused on improving the efficiency of the crushing process and new or improved technologies are being used to cut costs and maximise the output of high grade products.

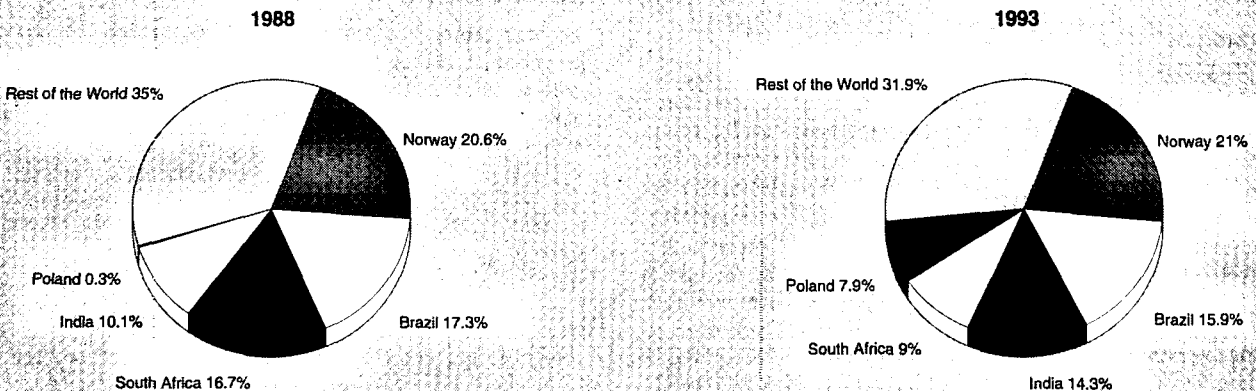
**INDUSTRY STRUCTURE**

**Companies**

The largest enterprises operating in the construction raw materials sector are the major cement and aggregates groups such as Lafarge Coppee of France; RMC, Redland, Tarmac, Tilcon (BTR), Blue Circle, Hanson, and Bardon of the UK; Heidelberger Zement, Dyckerhoff, and Basalt AG of Germany; Holderbank of Switzerland; Italcementi of Italy; CBR of Belgium; and CRH of Ireland. All of these companies have staffs numbering in the thousands or tens of thousands.

Other major enterprises extracting limestone include the lime specialists such as Lhoist (B), Carmeuse (B), Rheinische Kalkstein-Werke owned by Wulfrath (D) and Buxton Lime owned by Minorco (UK); and calcium carbonate specialists such as Pluess-Stauffer (CH), English China Clays (UK), Provençale (F), Faxe Kalk (DK) and Reverte (E). In the gypsum and plaster sector the major enterprises are BPB Industries (UK), Lafarge Coppee (F) and Gebr. Knauf (D). Major players in the industrial sands industry are Sibelco (B), Quarzwerke (D) and Hepworth (UK).

**Figure 6: Construction raw materials  
Origin of EU imports**



Source: Eurostat



**Table 5: Construction raw materials  
The largest companies in the EU, 1992**

(million ECU)	Country	Sales	Employment (thousands)
<b>Groups</b>			
Lafarge Coppee	F	4 635	29.7
RMC	UK	4 018	26.3
Tarmac Group	UK	3 755	28.6
Redland	UK	2 419	22.1
Ciments Français	F	2 268	18.0
Blue Circle	UK	1 753	22.2
Heidelberg Zement	D	1 533	9.7
BPB Industries	UK	1 439	12.6
CRH	IRL	1 389	10.6
CBR Cimenteries	B	1 168	9.0
Knauf Gips	D	868	2.5
Marley	UK	728	9.8
<b>Divisions</b>			
Redland Aggregates	UK	1 250	N/A
Tarmac Quarry Products	UK	737	6.3
Lafarge Cement Division	F	675	2.4
ARC (Hanson)	UK	527	3.8
Evered Bardon	UK	430	3.6
Tilcon (BTR)	UK	263	2.8
ECC Construction	UK	235	N/A
Lafarge Gypsum Division	F	N/A	1.4
<b>Cement companies</b>			
Lafarge Coppee	F	4 635	29.7
Ciments Français	F	2 268	18.0
Blue Circle	UK	1 753	22.2
Heidelberg Zement	D	1 533	9.7
CRH	IRL	1 389	10.6
CBR Cimenteries	B	1 168	9.0
Italcementi	I	966	6.7
Calcestruzzi	I	952	6.5
Dyckerhoff	D	870	4.8
Rugby Group	UK	832	7.1
Unicem	I	485	3.0
Aalborg Portland	DK	334	2.6
Heracles General	GR	212	2.0
Titan Cement	GR	180	1.6

Source: B.M. Coopes & Partners

In each of the sub-sectors in which they operate, the above-named enterprises represent over 60 % of total EU turnover. All these companies are either European or international in character. Most of the large cement and aggregate groups maintain major international interests, particularly in North America.

### Strategies

In the construction raw materials sector, the market strategies of the larger enterprises are bound up in their downstream activities. Nevertheless, there has been a marked consolidation of the industry in the EU itself, as major groups have continued to increase reserves of raw material and influence downstream products by acquisition.

In the aggregates sector the acquisition of quarries (or sand gravel pits) is a chief aim - i.e. the best way to increase aggregate reserves (with planning permission) and to maximise involvement in major construction activity is to acquire existing operations and invest to expand or modernise as required. Important recent developments include the purchase by Basalt AG (D) of a 50 % share in a new aggregate plant in Sweden, which followed earlier acquisitions in the former East Germany, Hungary, Czechoslovakia and Poland. Two companies

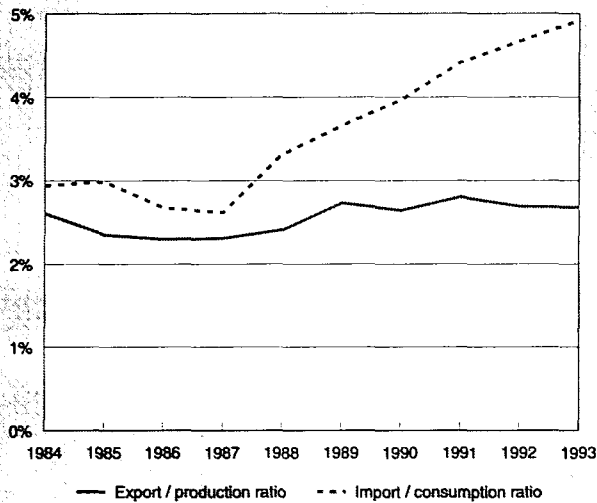
pursuing the coastal superquarry concept are Tarmac (UK) at Jossingfjord in Norway and Redland (UK) at Harris in Scotland. Attention should also be called to a "de-merger" in which English China Clays (UK) spun off its aggregate-related activities in a new company, Camas plc, with operations in the UK and the US.

The restructuring of Europe's cement industry is a continuous process and although the primary objective of major groups is to acquire cement manufacturing capacity and associated markets, the secondary purpose is to concentrate limestone operations (and reserves) within the major groups. In the past five years, intra-European acquisition and merger activity has involved major companies such as Italcementi (I) acquiring a majority of Ciments Français plus ownership of Halyps Cement (GR) and three companies in Spain (SFM, Cementos Rezola and Cementos Molins); Holderbank (CH) taking over Cedest (F); Heidelberg Zement acquiring 42.4 % of Cimenteries CBR (B); Calcestruzzi (I) taking over the two Greek cement producers, Heracles and Halkis Cement; and Lafarge Coppee (F) taking control of Perlmooser Zement (A).

Lafarge also has been active in China, where it is setting up a cement manufacturing joint venture in Beijing and has made further cement acquisitions in Morocco, Brazil and Venezuela.



**Figure 7: Construction raw materials  
Trade intensities**



Source: B.M.Coope & Partners, Eurostat

It has also bought into the US plasterboard producer, National Gypsum. Meanwhile, Europe's largest gypsum and plasterboard producer, BPB Industries, announced plans to build a major new plant in Berlin.

In the calcium carbonates sector Pluess-Stauffer (CH) increased its share of European markets by acquiring Ernstrom Mineral of Sweden.

### Impact of the Single Market

The impact of the creation of the Single Market on Europe's construction minerals industries has been mixed but essentially positive. Many of the industry's products such as aggregates are high bulk, low-cost commodities which serve local markets and are generally unaffected by international trade -- either intra-EU or extra-EU. However, many of the companies involved in their production operate on an international scale and tend to view all measures which facilitate the movement of goods and services in a positive light.

Among the more important Single Market issues are technical harmonisation and mutual recognition of rules, public procurement policies, and administration in small and medium sized enterprises. Planning and environmental issues are also particularly relevant to this highly visible industry. A major priority for the future would involve EU recognition of the extractive industries to allow full consultation of Single Market legislation or fiscal initiatives.

### REGIONAL DISTRIBUTION

Aggregates and cement are produced throughout the EU with all Member States (including Austria, Sweden and Finland) reporting production. With regard to aggregates, sand and gravel are more prevalent in low-lying regions, and crushed stone is more common in highland areas. Dimension stone workings tend to be highly concentrated, for instance in the Carrara marble district of Italy and the Pontevedra/Badajoz granite district of Spain. Gypsum is not nearly so widespread as limestone, but large deposits exist in Germany, France, Spain and the UK. Mining (both open cast and underground) and processing (including plaster and plasterboard) tend to be carried out at single sites. Sand deposits are fairly widespread, although the better quality industrial grades are obtained from deposits located in Belgium and in northern Germany and France.

**Table 6: Construction raw materials  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.9	0.9
Danmark	1.4	1.6
BR Deutschland	1.0	1.0
Hellas	4.1	3.3
España	1.2	1.7
France	1.0	0.9
Irland	1.2	1.9
Italia	1.0	0.9
Luxembourg	0.0	0.0
Nederland	0.2	0.3
Portugal	1.4	0.8
United Kingdom	0.9	0.9

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Production has been estimated.  
Source: B.M. Coope & Partners, DEBA

### ENVIRONMENT

Most of the minerals and rocks in this group are mined by open cast methods. Therefore, operations consist of a quarry (or sand and gravel pit) with an associated processing plant. Many such operations are thus highly visible and subject to the so-called NIMBY factor (Not In My Back Yard, a term coming from the USA).

The modern quarrying industry has an excellent record for dealing with potential problems such as dust emissions and noise pollution during an operation and for restoration of the land once the extractive process is finished. Nevertheless, the restrictions imposed on new workings in some Member States will result in some areas of the Community having to import materials at a high cost. Although the use of waste materials as aggregates is growing, it will remain modest because of the stringent performance requirements which specify only high-grade aggregate. Recycling of aggregates shows more promise and is becoming a common part of road maintenance.

This sector also supplies major products for use in environmental processes - most notably limestone and lime in water and air treatment, and silica sands for water filtration. Paradoxically, many limestone and lime-based processes to remove sulphur from gases or waste streams yield chemical gypsum as a by-product. The use of this by-product gypsum will reduce demand for natural gypsum; nevertheless, this variety is not well adapted to all uses as the natural type is.

### REGULATIONS

Producers of construction minerals are actively engaged in the broad initiative to increase harmonisation of building codes and standards in Europe through the EURONORMS programme of CEN (European Committee for Standardisation). The scheme involves not only the EU countries but also EFTA countries. The former COMECON members of Eastern Europe are also following events closely.

### OUTLOOK

The EU will continue to be a major centre for the production of construction raw materials and EU enterprises operating in this sector will continue to be major players on the world

scene. Future development of EU production and consumption will be closely tied to the overall level of building activity.

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# Chemical industrial minerals

NACE 232, 233, 239

The EU is a major producer of salt, potash and sulphur (mainly from secondary sources) and is a significant producer of fluorspar and barite. However, it is a major importer of phosphate rock and borate (and their derivatives), since it is lacking in these minerals. Currently, the markets for several of these items are severely depressed, particularly those for sulphur, phosphates and potash, which are heavily influenced by fertiliser demand.

## INDUSTRY PROFILE

### Description of the sector

The chemical industrial minerals are major raw materials for the chemicals and fertiliser manufacturing industries covered in Chapter 6. The products are covered under the new NACE Rev 1 codes 1430 and 1440, but under the current system, they are listed as NACE 232, 233 and NACE 239. The principal bulk items are salt, potash, phosphates and sulphur. Other significant products include fluorspar, barite and borates.

The EU is a leading world producer of salt and potash and is a significant player in world markets for sulphur, fluorspar and barite. However, it has no phosphate or borate mineral production of its own.

Germany, France, the UK, Italy and Spain are the principal EU producers of chemical industrial minerals and are all active to some degree in potash, salt, sulphur, fluorspar and barite production. The Netherlands is also notable for its major contribution to EU salt production.

### Recent trends

The production and consumption values for this group of minerals show a major decline since 1985. This was due to a combination of falling tonnage and decreasing or stagnant prices. In particular, sulphur prices in 1993 were less than one-quarter of those prevailing in the mid-1980s.

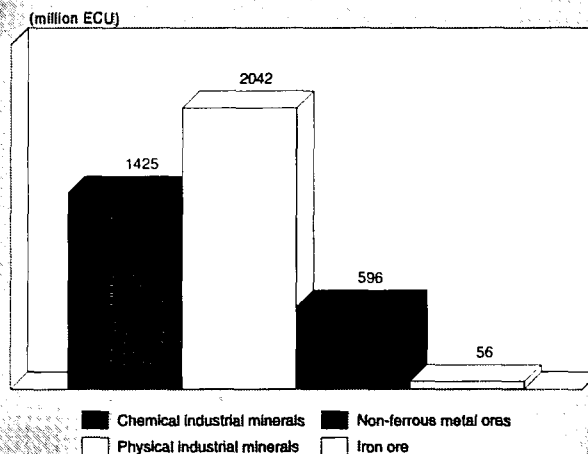
The fall in consumption has been more marked in the fertiliser sector than in the industrial chemicals sector. The decline in fertiliser consumption in the EU has reduced the demand for all fertiliser minerals, but especially for phosphate rock. Further, it should be noted that much of EU phosphate imports now consist of phosphoric acid rather than phosphate rock and this has been one major factor in reducing the trade deficit apparent in the figures presented in Table A. A sharp reduction in sulphur imports has been another major factor. In fact, the EU's increasing output of by-product sulphur will turn it into a significant sulphur exporter in the later 1990s.

### International comparison

The US is the world's leading producer of salt, sulphur, phosphate rock and boron minerals, and is an important producer of potash and barite. Thus, its production of chemical industrial minerals exceeds that of the EU by a factor of three. Total production values have been maintained over the period of 1984-94, with declines in some commodities such as sulphur and barite balanced by increases in the production of potash, soda ash, bromine, etc. Meanwhile, Japan's only significant contribution as a producer is for sulphur (and the small volume, high value product, iodine), and it is a major importer of all the other commodities, including salt.

Consumption trends in Japan have been similar to the EU as reflected in overall value decline and falling tonnages in the

Figure 1: Chemical industrial minerals  
Production in comparison with related Industries, 1993



Source: B.M.Coope & Partners

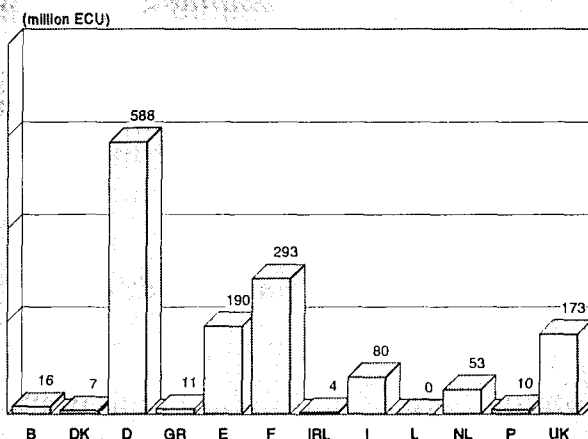
fertiliser sector (seen most strongly in reduced phosphate consumption). In the US, demand for fertiliser minerals has held up better and thus overall consumption shows a somewhat smaller decline in value terms.

### Foreign trade

The EU is active in both import and export trade of the chemical industrial minerals. Major export items are potash, salt and sulphur and major import items are phosphate rock, potash, borates and sulphur. Although the EU continued to show a negative trade balance in 1992 the deficit is now quite small compared to that of the mid-1980s. This is due to both reduced imports - particularly of phosphate rock and sulphur - and increased exports of potash and salt. In the future, exports in sulphur are expected to increase as well.

The most important supply countries to the EU are Morocco (phosphates), the US (phosphates), Israel (phosphates and potash), the former Soviet Union (potash), Turkey (borates), South Africa (phosphates) and Canada (potash), Poland (sulphur), Egypt (salt) and China (fluorspar).

Figure 2: Chemical Industrial minerals  
Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Chemical industrial minerals**  
**Main indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	3 836	2 967	2 988	2 553	2 262	1 950	1 554	1 616	1 600	1 700	1 800
Production	2 737	2 096	2 017	1 870	1 811	1 746	1 425	1 483	1 500	1 500	1 600
Extra-EU exports	209.0	347.8	384.6	382.4	516.3	561.0	476.0	648.1	600.0	500.0	500.0
Trade balance	-1 099.1	-871.1	-970.8	-682.8	-451.0	-204.4	-129.0	-132.6	-100.0	-200.0	-200.0
Employment (thousands)	30.6	23.7	22.4	22.0	21.8	20.0	18.1	17.0	16.0	16.0	16.0

(1) Eurostat estimates.

(2) Rounded DRI forecasts.

Source: B.M. Coope & Partners, Eurostat

**Table 2: Chemical industrial minerals**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Sulphur	203	219	31
Barite	42	33	5
Fluorospars	96	45	5
Kieserite	47	72	25
Potash	525	647	263
Salt	328	407	98

(1) Trade may occur in products not produced within the EU, hence figures are not additive with respect to Table 1.

Source: B.M. Coope & Partners, Eurostat

**Table 3: Chemical industrial minerals**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-6.7	-18.1	-11.9	-24.8
Production	-8.9	-10.5	-9.6	-17.5
Extra-EU exports	10.2	1.6	6.3	-3.3
Extra-EU imports	1.6	-23.9	-10.6	-29.1

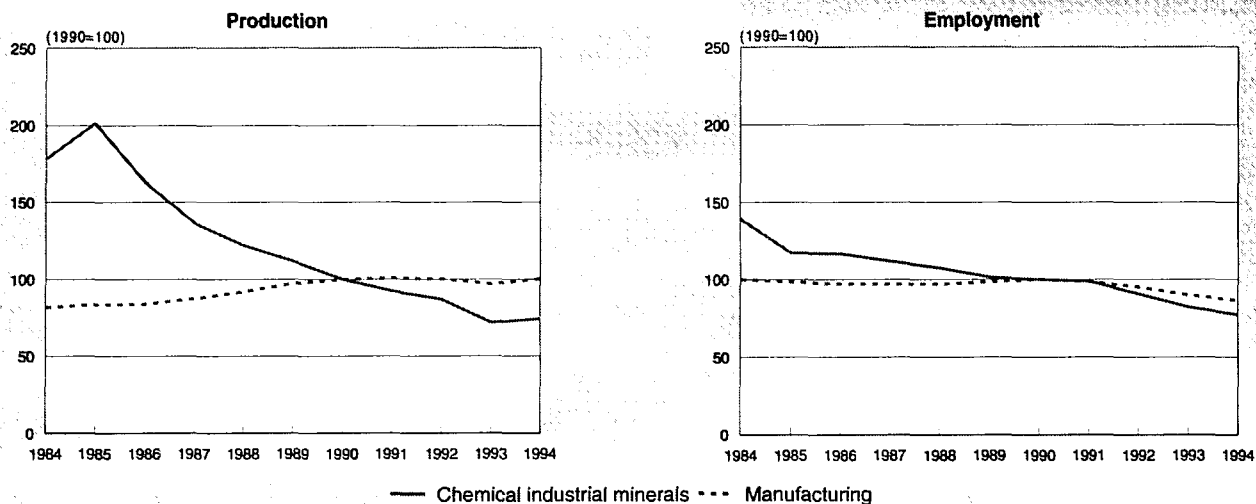
Source: B.M. Coope & Partners, Eurostat

**Table 4: Chemical industrial minerals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	209.0	219.2	166.3	178.2	347.8	384.6	382.4	516.3	561.0	476.9	N/A
Extra-EU imports	1 308.2	1 429.6	1 173.1	930.1	1 218.9	1 355.4	1 065.2	967.3	765.4	605.9	N/A
Trade balance	-1 099.1	-1 210.4	-1 006.8	-751.9	-871.1	-970.8	-682.8	-451.0	-204.4	-129.0	N/A
Ratio exports / imports	0.16	0.15	0.14	0.19	0.29	0.28	0.36	0.53	0.73	0.79	N/A

Source: Eurostat

**Figure 3: Chemical industrial minerals  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: B.M.Coope & Partners, DEBA

**MARKET FORCES**

**Demand**

The main consuming industries for these minerals are the bulk inorganic chemical and fertiliser industries. Salt is the main raw material of the chlor-alkali chemical sector, which includes chlorine, caustic soda and soda ash. Such products and their derivatives are used not only within the inorganic chemicals sector, but also in plastics (PVC), soaps and detergents, glass, paper manufacturing and in a wide range of general industrial processing.

Sulphur is the source of sulphuric acid, probably the most versatile chemical used in chemical and other industrial processes. Nevertheless, it should be pointed out that about 60 % of sulphuric acid is consumed by the fertiliser industry. Thus, EU fertiliser manufacturing, which in turn is highly dependent on demand from EU agriculture, is a major influence on the EU markets for sulphur, phosphates and potash. These three minerals have all been adversely affected by EU agricultural reforms and environmental legislation concerning fertiliser usage.

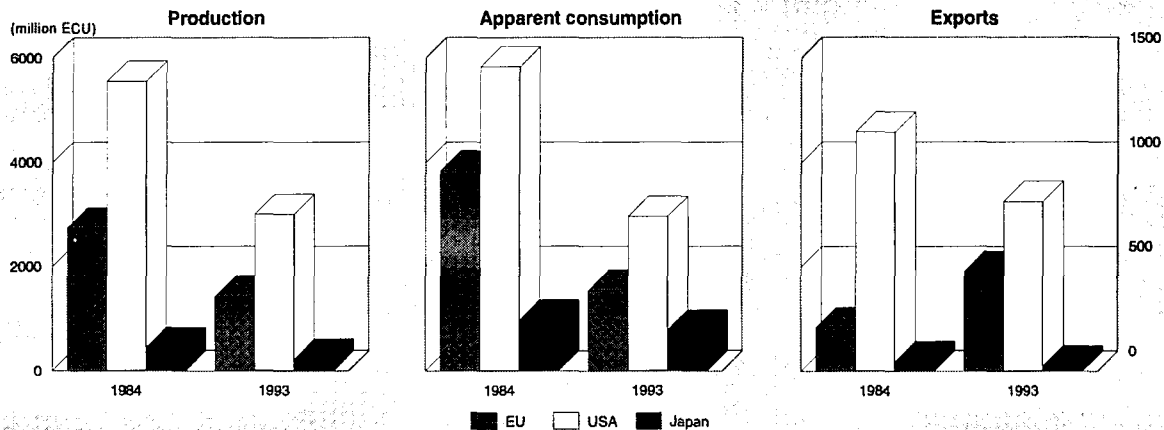
**Supply and competition**

It is probably fair to say that there is a major world oversupply in all the major products of this grouping, although perhaps less so for salt than for potash, phosphate rock and sulphur. The downward pressure on prices that this has created is certainly hurting some of the more vulnerable producers of these minerals, i.e. the smaller, relatively high-cost producers.

The sulphur supply situation is further complicated by the high proportion of co-product and by-product output in world production. The bulk of EU sulphur production is from secondary sources ranging from elemental sulphur recovered from sour natural gas and oil (particularly in Germany and France) to sulphur recovered as sulphuric acid from metal smelters. Production from primary resources is limited to the now modest output of sulphuric acid produced from natural pyrite in Spain, Portugal and Greece.

The EU potash industry has faced major challenges in recent years from low price competition from the former Soviet Union and the integration of the former East German potash industry into a unified German market. The EU imposed anti-dumping

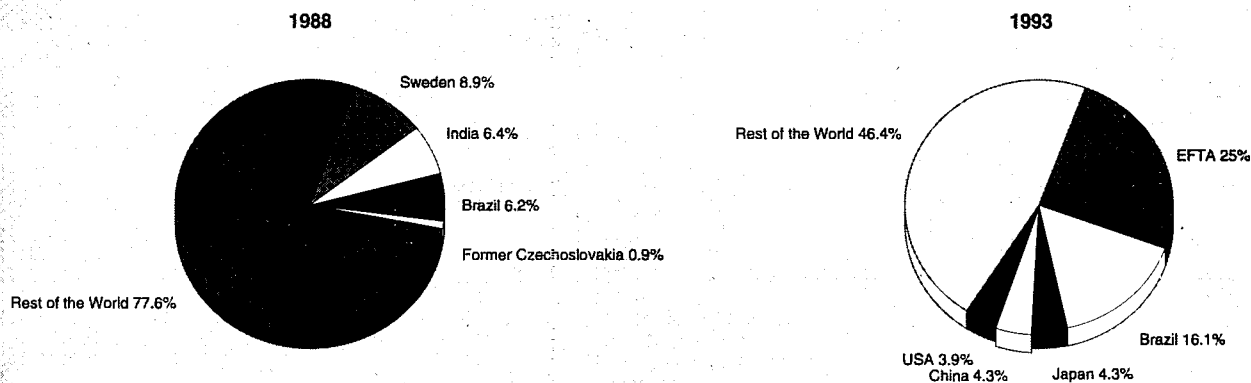
**Figure 4: Chemical industrial minerals  
International comparison of main indicators in current prices**



Sources: B.M.Coope & Partners, Eurostat



**Figure 5: Chemical industrial minerals  
Destination of EU exports**



Source: Eurostat

duties on potash from the former Soviet Union during 1992. The industry also has to compete with low-cost producers in Canada (with its economies of scale) and Israel (with its low-cost brine operations).

As a high volume, low value commodity, salt tends to be less vulnerable to foreign competition; most bulk grades of salt - i.e. for chemicals and road de-icing - are consumed close to the point of production. Much of this production is captive or subject to long-term contract agreements. However, salt consumption has been adversely affected by the move away from chlorine-based products - particularly paper pulp bleaching agents - for environmental reasons.

The EU's domestic fluorspar industry has been cut drastically in recent years as a result of exposure to low-priced competition from foreign countries (especially China) and because of the phasing out of chlorofluorocarbons (CFCs), as provided by the Montreal Protocol (1992). In fact, the main source of these imports, China, continued to be subject to anti-dumping duties by the EU in 1993 and 1994.

### Production process

No major technological developments have taken place in the processing of chemical industrial minerals. However, the

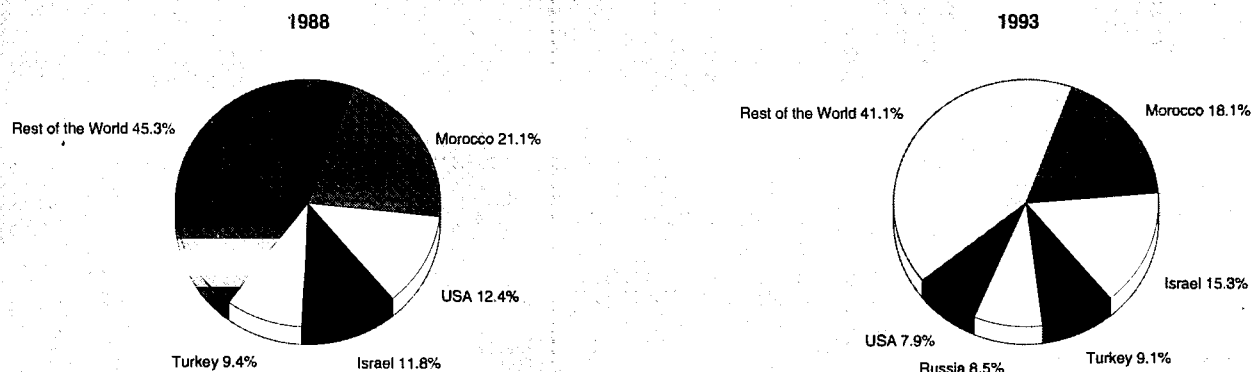
trend towards larger-sized equipment and the treatment of finer material has continued, together with efforts to save energy and improve environmental compliance.

## INDUSTRY STRUCTURE

### Companies

EU production of chemical industrial minerals is concentrated in a few large organisations. The salt industry involves major chemical groups such as AKZO (NL), Solvay (B), BASF (D) and SKW Trostberg (D), as well as salt specialists such as CSME-Salins du Midi (F), Salt Union (UK), British Salt (UK) and Union Salinera (Spain). The EU potash industry consists of five operating companies: the BASF subsidiary, Kali and Salz (D); the Entreprise Minière et Chimiques subsidiary, MDPA (F); the two INI subsidiaries, Suria K and Potasas de Subiza (E); and the Minorco subsidiary, Cleveland Potash (UK). The operations of the IRI subsidiary, Italkali (I), remained closed during 1993/94. Most potash producers are also significant producers of by-product salt, and Kali and Salz produces another important by-product, the magnesium sulphate mineral, kieserite. Meanwhile, sulphur is recovered from sour gas by two energy companies: Elf-Aquitaine (F) and BEB (D).

**Figure 6: Chemical industrial minerals  
Origin of EU imports**



Source: Eurostat

**Table 5: Chemical industrial minerals**  
**The largest companies in the EU, 1992**

(million ECU)	Country	Sales	Employment (thousands)
<b>Potash</b>			
EMC	F	2 392	13.5
Kali und Salz	D	650	7.0
Cleveland Potash	UK	85	0.9
Suria K	E	45	0.7
Potasas de Subiza	E	25	0.5
<b>Other chemical minerals</b>			
Elf Aquitaine	F	30 533	88.0
Elf Atochem	F	6 953	34.2
Solvay	B	6 325	44.8
BEB	D	526	1.9
Rio Tinto Minera	E	324	1.2
BHS	D	180	2.0
Sudwestsalze	D	91	0.6

Source: B.M. Coope & Partners

Major EU fluorspar producers include Sogerem of the Pechiney group (F); Laporte (UK); Nuova Mineraria Silius (I); Minersa (E); and Sachtleben of the Metallgesellschaft group (D). The most important barite producers are M-I (UK and IRL), Barytine de Chaillac (F) and Sachtleben (D).

With regard to borates, it should be noted that the world's largest producer, RTZ (UK), is a EU-based company and thus there exists a significant boron compounds capacity and technology in Europe. Furthermore, the second largest borate producer is based in Turkey, a neighbouring country with close associate status to the EU.

### Strategies

One of the most significant strategic developments in this sector has concerned the restructuring of the former West and East German potash industries under the single ownership of Kali und Salz Beteiligung AG. The last few years already have seen a number of mine closures. Further rationalisation will concentrate production on five main mine/plant units with

a total output of around 3 million tonnes per annum, which compares with a combined output of over 6 million tonnes per annum for the two Germanys in the 1980s. Meanwhile, the sales joint venture between MDPA of France and Kali und Salz has been at the centre of a dispute between the companies and the French government on one side and the European Commission on the other. This results from the EU requiring Kali und Salz to withdraw from the arrangement as a condition of the German merger.

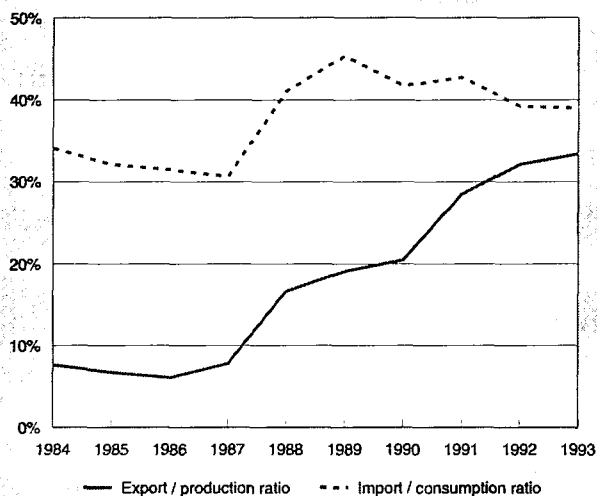
It should be noted that the French industry is due to phase out producing operations over the next ten years (because of a lack of new reserves). The continuing role of EMCs in the potash business thus will depend increasingly on its commercial arrangements with Kali und Salz and its joint operating subsidiaries such as Potacan of Canada.

In the salt sector AKZO (NL) has been active in taking over Dansk Salt and Icelandic Salt, setting up joint venture operations in China and merging its combined salt/soda ash operations with Rhone-Poulenc (F). It should be noted that Rhone-Poulenc, which was privatised in December 1993, is active in other mineral-related fields such as rare earths, titanium dioxide pigments and phosphates. Meanwhile, the US company which took over ICI's salt operations in the UK - D George Harris Associates - has acquired the salt/soda ash operations at Duisburg, which were formerly operated by the Henkel subsidiary, Methes & Weber.

### Impact of the Single Market

The creation of the Single Market has had limited direct impact on the chemical industrial minerals sector but is regarded in positive terms because of the overall effect on general economic activity. Some companies operating in this sector are multinational chemical companies who would regard the Single Market as highly relevant to their principal activities but only of marginal significance to captive salt operations. The medium-sized potash and salt specialists, many of which are active in international trade, see the Single Market as important with regard to freedom of movement of goods and capital. Single market policies concerning competition, small and medium size enterprises, and most of all environmental protection are also highly relevant. Future priorities would include common environmental standards and dumping issues concerning minerals such as fluorspar.

**Figure 7: Chemical industrial minerals**  
**Trade intensities**



Source: B.M. Coope & Partners, Eurostat

**Table 6: Chemical industrial minerals  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.4	0.3
Danmark	0.2	0.3
BR Deutschland	1.2	1.3
Hellas	1.2	1.0
España	2.4	1.9
France	1.5	1.1
Ireland	0.6	0.3
Italia	0.4	0.4
Luxembourg	0.0	0.0
Nederland	0.6	0.8
Portugal	1.1	0.5
United Kingdom	0.4	0.8

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU.

Production has been estimated.

Source: B.M.Coope & Partners, DEBA

## REGIONAL DISTRIBUTION

The underground potash and salt operations are associated with the Zechstein geological formation in northern Europe. Salt operations based on the solar evaporation of sea water are located in the more arid climates of the Mediterranean EU countries.

## ENVIRONMENT

Recently, the principal environmental issue facing the EU potash industry has concerned the disposal of waste salt from processing operations, particularly into water courses or rivers such as the Rhine and the Werra. Legislation has forced producers either to adopt alternative means of disposal, increase production of saleable salt, or close down offending operations.

The introduction of phosphates to water courses through fertiliser and detergent products also became a major issue in the 1980s and has been a contributing factor towards the reduced levels of fertiliser application in recent years.

The by-product nature of most of EU sulphur production has already been commented on, and it is worth noting that sulphur recovery units are required by legislation to prevent emissions. Some sulphur control processes yield gypsum rather than sulphuric acid as their by-product.

Environmental constraints have made a major impact on the EU fluorspar industry through drastic cuts in the production of chloro-fluorocarbons (CFCs) in response to the requirements of the Montreal Protocol. The ozone-depleting CFCs once provided the major market for fluorspar. While certain hydro-fluorocarbons (HFCs) are already providing ozone-friendly replacements in some applications, fluorspar purchases are unlikely to reach former levels.

The concern over chlorine has focused on the release of carcinogenic dioxins by chlorine-based bleaching processes, including paper pulping and water treatment.

## OUTLOOK

The outlook for the chemical industrial minerals does not look very bright in the short term. The existing lack of demand caused by industrial recession, combined with major over-supply for the major internationally traded products, is expected to prolong this period of low prices and trade disputes for some time to come. Further mergers, rationalisation and closures may be necessary before any major recovery occurs, perhaps in the late 1990s, in response to renewed demand in the former Eastern Bloc and in the agriculturally less mature areas of the world.

Written by: B. M. Coope & Partners

The industry is represented at the EU level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.



# Crystallised salt

## NACE 233

European salt manufacturers are far from seeing signs of recovery. Demand remains sluggish in most of the market outlets. The most significant features of EU enlargement are the integration of the Nordic countries, where there is no salt production, and the dismantling of the salt monopoly still existing in Austria. Food grade salt appears to be a very popular carrier of both iodine and fluorine used in the prevention of health disorders. This development meets the requirements of UNICEF and WHO. Generally speaking, overcapacity remains one of the main features of the industry.

### INDUSTRY PROFILE

#### Description of the sector

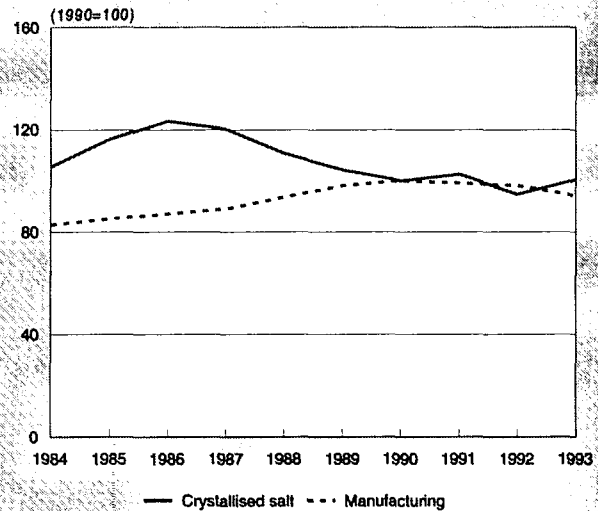
The activities of the sector are based on solar evaporation (sea salt), conventional mining operations (rock salt) and solution mining (vacuum salt, salt in brine). The description "crystallised salt" also includes salt that is recovered as a co-product in potash mining. In the monograph, salt in brine will be excluded unless otherwise specified. The crystallised salt types are interchangeable in most of the major end-use sectors.

#### Recent trends

Total production capacity for crystallised salt represents about 40 million tonnes. Based on the period 1991-93, production averaged 19.2 million tonnes. In 1993 there was a slight improvement (+6 %) in comparison with 1992 due to the increased demand in road de-icing. Weather conditions explain both market and output ups and downs. However, the negative trend prevailing in the former continues to affect the latter, with overcapacity being evident in various studies. Forecasting for the 1994-97 period remains difficult because climate dictates directly (sea salt) and indirectly (impact of winter maintenance on crystallised salt) output levels.

A breakdown by the main methods of production shows that in 1993 rock salt (including by-products) accounted for 39.3 % of the total crystallised salt production, sea salt (solar) for 17.8 % and vacuum salt for 42.9 %. The move from rock salt to vacuum salt for chloralkali use, which had been forecast,

**Figure 1: Crystallised salt**  
Production in volume compared to EU total manufacturing industry



Source: European Committee for the Study of Salt, Eurostat

will not be as pronounced as had been estimated for the period under review. And, the net effect on the production of vacuum salt is likely to be small, because its use as road salt will decline.

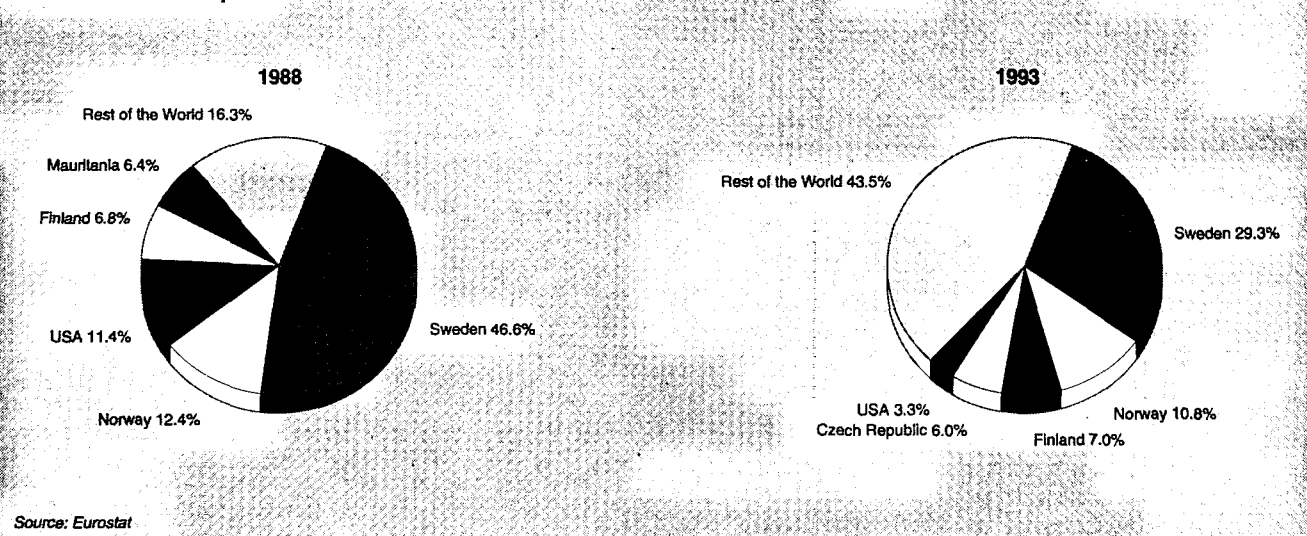
#### International comparison

For the United States, the results for 1993 are remarkable. Severe North American snowstorms in March 1993 resulted in heavy salt usage, a record 17.1 million tonnes. This represents 59 % of total sales of 28.9 million tonnes.

Production of salt in Central and Eastern Europe is estimated at 25 million tonnes. The main producing countries of Romania, Russia, Ukraine and Poland have aggressive export traditions. As a result of revamping and modernisation of salt facilities, increased competition is to be expected from these countries.

Demand for salt is declining in several end-use sectors in Europe and the United States. Meanwhile, strong regional growth in Asia and the Middle East is likely to boost salt

**Figure 2: Crystallised salt**  
Destination of EU exports



Source: Eurostat

**Table 1: Crystallised salt  
Main indicators in volume**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	19.3	21.4	22.4	22.1	20.4	19.4	18.3	19.6	16.4	16.9
Production	20.4	22.4	23.8	23.2	21.4	20.1	19.3	19.8	18.3	19.4
Extra-EU exports	1.4	1.5	2.0	1.7	1.4	1.3	1.5	2.0	3.2	2.8

Source: European Committee for the Study of Salt, Eurostat

**Table 2: Salt  
Production by sector**

(thousand tonnes)	Rock salt (1)	Solar salt	Vacuum salt	Brine (2)
1984	9 543	2 539	8 281	13 458
1985	11 194	2 456	8 780	12 976
1986	11 806	3 728	8 284	15 290
1987	11 176	3 725	8 332	16 080
1988	8 456	4 068	8 869	15 814
1989	7 707	3 714	8 721	16 256
1990	7 851	3 300	8 151	15 653
1991	8 889	3 665	8 777	15 169
1992	7 321	3 279	8 830	15 338
1993	8 123	3 693	8 867	15 183

(1) Excluding by-products

(2) Excluding Spain and Portugal, 1984-1985.

Source: European Committee for the Study of Salt

**Table 3: Crystallised salt  
Average annual growth rates in volume**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.1	-3.3	-1.5	3.0
Production	-0.2	-0.9	-0.5	6.0
Extra-EU exports	-2.1	18.2	7.5	-13.9
Extra-EU imports	7.2	6.6	4.6	39.2

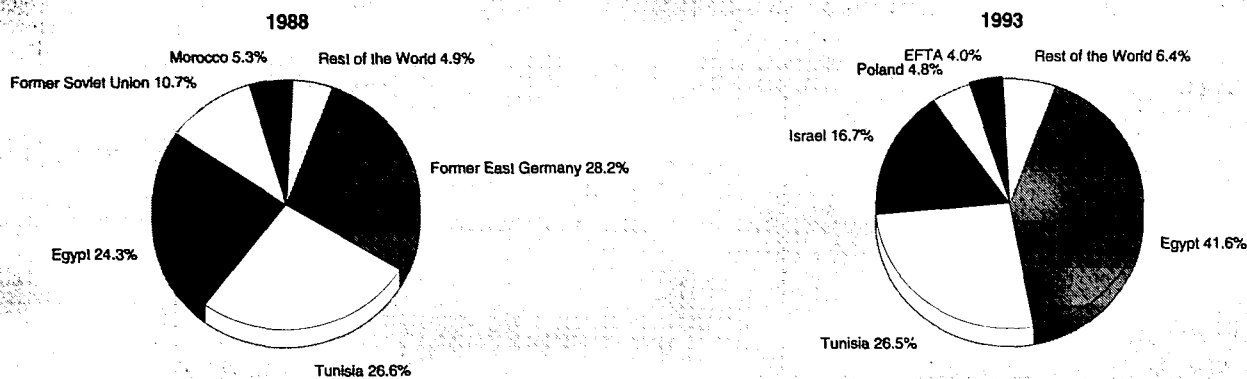
Source: European Committee for the Study of Salt, Eurostat

**Table 4: Crystallised salt  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	72.6	72.1	53.9	65.8	49.6	53.3	51.0	66.2	98.8	97.8
Extra-EU imports	9.6	10.9	12.5	13.4	11.1	14.0	13.0	10.5	13.7	19.0
Trade balance	63.0	61.2	41.4	52.4	38.5	39.3	38.0	55.7	85.1	78.8
Ratio exports / imports	7.56	6.63	4.31	4.92	4.48	3.80	3.92	6.29	7.21	5.14
Terms of trade index	87.0	83.8	95.7	104.0	100.8	102.9	100.0	99.3	114.1	105.1

Source: Eurostat

**Figure 3: Crystallised salt  
Origin of EU imports**



Source: Eurostat

output in these areas. In China, Akzo Nobel is thinking of setting up a salt mine in Changzhou (Jiangsu) with a capacity of 1.5 million tonnes. In addition, a new salt works is to be set up in Thailand with the participation of Solvay, whose current capacity of 330 kt/year will be expanded to 550 kt/year in 1996. In Japan, salt sales amounted to 8.4 million tonnes in 1993, with the chloralkali sector accounting for 85 %. Local production in Japan only meets about 14 % of the total consumption.

### Foreign trade

Salt is a widely found, low value, bulk commodity. However, the cost of transport prevents expansion in trade just as much as the widespread abundance of the natural resource. The Nordic countries constitute an exception because of the absence of any salt deposits and facilities. However, EU salt imports by Finland, Norway and Sweden have shown a 28 % decline since 1988 because of the chlorine phase-out in the pulp and paper industry. Globally, extra EU exports reached 2.8 million tonnes in 1993 and intra EU trade represented 3.7 million tonnes. Imports originating in third countries amounted to 0.5 million tonnes.

## MARKET FORCES

### Demand

Consumption of crystallised salt within the EU amounted to 16.9 million tonnes in 1993. A breakdown of consumption by end-use sectors reveals: chloralkalis with 48 %; miscellaneous industries with 19 %; food grade salt with 13 %; and road salt with a 20 % share of the total consumption for the industry.

Salt has been a basic raw material for the chemical industry since its development at the end of the eighteenth century (salt-based patent by LEBLANC). The development of the chloralkali industry, which uses salt to produce chlorine and caustic soda, boosted the demand for this mineral and increased the multiplicity of its uses in non-food sectors. Chlorine is consumed today by many converters and manufacturers. However, increasing public concern about the use of chlorine has resulted in a marked reduction in certain uses. But, chlorine phase-out would not make sense. In the face of unfounded claims, which foster fear in the public opinion but bring no objective contribution to environmental debate, the industry develops its arguments on scientific grounds. Those consultants who foresee a high-growth scenario for chlorine, anticipate a resumption of demand; especially for PVC, although mainly outside Europe.

"Miscellaneous industries" include animal feeding and water softening. From a statistical point of view, however, both are subject to variations dependent on external factors. Due to the catch-all nature of this heading, it looks like a sector where the demand remains static.

The healthy organism is characterised by a great flexibility in its adaptation to a number of variables, including the dietary intake of sodium chloride. For the population at large, some attention must be paid to adequate salt intake, taking into consideration that Health Authorities have selected this mineral substance as a carrier of iodine and fluorine.

For snow and ice control, salt was first used in the 1930s. Today, salt is considered everywhere as an efficient de-icer because it is readily available, easy to store, handle and spread, and is less expensive when compared with alternatives like abrasives and chemicals. Salt also saves lives by reducing accidents and response time to medical emergencies. A study entitled, "Accident, Analysis of Ice Control Operations", performed in 1992 by Marquette University, found that costs related to accidents decrease by 88 % after the spreading of road salt.

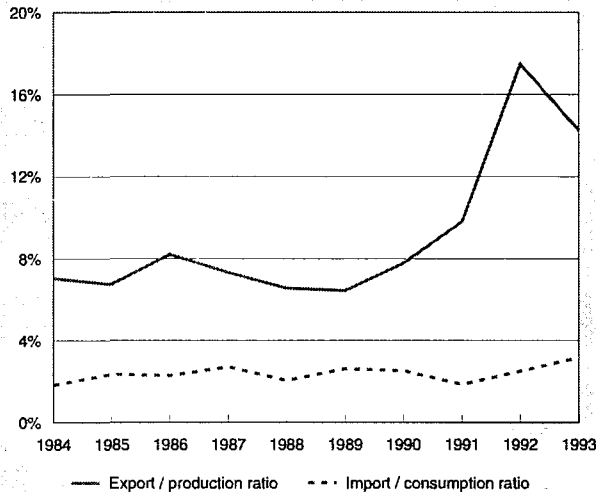
### Supply and competition

Road salt sales were 3.4 million tonnes in 1993, but mean requirements exceeded 4.5 million tonnes. Requirements for this type of salt depend on the severity of winter. The severe winter conditions which prevailed last winter (1993-94) in the American snow belt reveal that, as a result of insufficient local stockpiling, supply can become difficult, even impossible. However, the extraction capability is more than sufficient to keep up with demand.

Salt is also used as a regenerator of resins in water softeners based on the ion exchange process. The effects of ion exchange water softening can impact on several factors for both the environment and households, such as: energy, detergency, maintenance, and comfort. More attention needs to be paid to the advantages of ion exchange in domestic water softening over alternative technologies for hardness modification. Although salt consumption is steady in this end-use subsector, markets differ in the various regions of the EU due to the impact of centralised water softening, physical treatment, and information made available to the consumer. Hence, supply widely depends on such peculiarities.

In certain Member States, food grade salt covers salt which is marketed for non-food uses. In other words, the demand for food grade salt is not equivalent to the requirements of households, caterers and food manufacturers.

**Figure 4: Crystallised salt  
Trade intensities**



Source: European Committee for the Study of Salt, Eurostat

Market conditions differ according to end use. In the chemical and food industries the supply chain is relatively short, making the development of competitive marketing strategies relatively simple. In contrast, the market for special grades of salt for water softening is not so straightforward. Here, the marketing process includes the identification of sales opportunities and after sales follow up of the suitability of the product for various types of equipment. The retail market for salt is still bedevilled by the notion that "salt is bad for blood pressure" and its intake should be reduced. Although scientific thought has moved on from this simplistic statement, medical opinion is still divided as to the precise relationship between salt intake and blood pressure; unfortunately the legacy of the simplistic statement lives on, with harmful effects on public opinion. At the same time, it has been realised that salt is ideal as a carrier for fluorine (to prevent dental decay) and iodine (to eliminate iodine deficiency disorders). However, some countries have been slower to adopt this concept; although it is undoubtedly true that salt can in this way fulfil a vital role in promoting public health.

## INDUSTRY STRUCTURE

### Companies

Producers involved in the salt business can be split into three categories: large multinational chemical groups and/or their subsidiaries; companies specialising in salt (and potash producers who are also producing salt); and low sized firms.

Unfortunately, information on manpower is scarce, and the number of workers is not comparable from one region to another.

### Strategies

Companies involved in the crystallised salt industry are pursuing strategies ranging from privatisation and expansion to mergers and acquisitions. The dismantling of the Austrian salt monopoly as of January 1, 1995, is a preliminary step towards the normalisation of their market; however, since state ownership is fixed by the Austrian constitution, an amendment has to be adopted before there is any further consideration. Recently, the Hellenic Salt Works S.A. in Greece has also been opened to private share holding. In Italy, as of January 1, 1994 a new company started to put salt on the market which was produced by the Amministrazione dei Mo-

nopoli di Stato, which is the company replacing Azienda Italiana Sali S.p.A.

Dansk Salt has been organised as a joint venture in which Akzo Chemicals B.V. participated with a 50 % share of ownership. After agreement between the interested partners, it was decided in 1993 that Dansk Salt's activities would be continued in a limited company owned 100 % by Akzo Chemicals B.V. The European Commission has given an unconditional approval for the acquisition of the bulk of Nobel Industries by Akzo, and Akzo shareholders have given their stamp of approval as well. After this decision, the company's name was changed to Akzo Nobel.

Further to the approval of the European Commission, the planned merger of the rock salt and potash activities of Kali und Salz AG and Mitteldeutsche Kali AG is expected to be implemented in 1994-95.

Finally, Frima B.V. has confirmed it will build a 1.2 million tonnes/year salt plant; although salt demand is feared to fall by a further 3 to 4 million tonnes by the end of the century. The company has applied for various subsidies and incentives.

### Impact of the Single Market

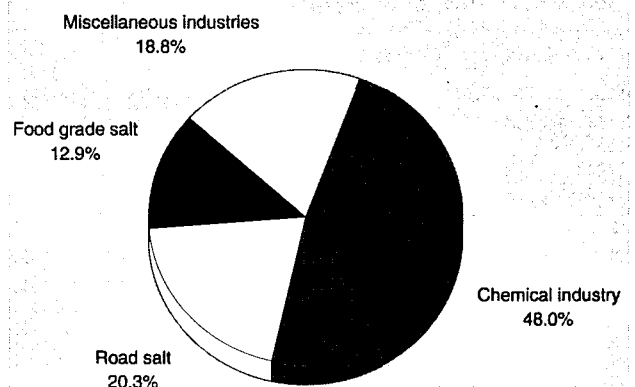
The creation of the Single Market has had limited direct impact on the crystallised salt industry, but is regarded in positive terms because of the overall effect on general economic activity. Few of the measures in the Internal Market package were of direct relevance to this sector.

## ENVIRONMENT

Dietary salt is used in a number of countries as a suitable carrier for micro-nutrients. The supplementation of discretionary salt with iodine and/or fluorine has proved to be an appropriate response to reduce iodine deficiency disorders (IDD), dental decay and to curtail the social costs which have to be paid for the management of such deficiencies. Universal salt iodisation is one of UNICEF's mid-decade goals and, in order to reach it, various steps have been taken to promote consumption and to raise consumer awareness on its benefits.

In December 1993, UNICEF experts met on iodine deficiency disorders (IDD) and universal salt iodisation for European countries and determined priorities for the immediate future. As a follow-up, UNICEF collaborated with the European Salt Producers' Association to organise a forum with the partici-

**Figure 5: Crystallised salt  
Consumption by sector, 1993**



Source: European Committee for the Study of Salt

pation of the World Health Organisation (WHO) and ICCIDD representatives, which took place in July 1994. The main objective was to explore the ways and means of involving salt producers in the IDD elimination campaign and individual households the general prevention of such disorders. American health agencies also indicate that IDD can be eradicated by salt iodisation. This is supported by the recent Quito Declaration which calls for the inclusion of this type of salt in food uses and animal feeding. As far as Europe is concerned, the primary objective is to advocate the harmonisation of existing pieces of law on iodisation in various countries. The supplementation of salt with fluorine (salt is more secure and less expensive than water) is another issue of a similar nature; although the public is already aware of the role played by this micro-nutrient in the prevention of dental decay. However, it is not enough to adopt and to bring into operation the laws requiring iodisation and fluoridation of salt, effective prevention requires a positive process of education and implementation.

Several companies have obtained a certification based on the ISO 9002 standard after auditing their mines and/or surface installations and other facilities.

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## REGULATIONS

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The Codex Alimentarius' aim is to protect consumer health and to ensure fair trading methods. Whether the standards adopted by the Codex Alimentarius Commission are integrated or not into the national law systems, they are gaining in importance due to the new status attributed to them by the GATT negotiations. As a result, national or regional measures are only acceptable if they comply with international standards, or if countries can justify the measures they are contemplating. Food grade salt is covered by the Codex Alimentarius standard (STAN 150/1985). But, generally speaking, this type of salt meets the general provisions valid for foodstuffs (additives, labelling, etc.).

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## OUTLOOK

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Overcapacity remains a problem for the industry. In addition, it is very difficult to forecast the future for the salt industry because the severity of coming winters is unpredictable. Obviously, future sales of road salt are dependent on weather conditions. However, history suggests that sales are generally between 2 and 6 million tonnes. As far as the chloralkali industry is concerned, how the drive to reduce mercury emissions and cell room conversions (membrane technology) will affect salt consumption is unclear at this time. Decreased environmental pressure and technological developments will have to be positively combined with economic recovery in order to reactivate the demand for crystallised salt. Various consultants predict a bleak future for crystallised salt in Europe, which is far from being a buoyant market.

Written by: ESPA

The industry is represented at the EU level by: European Salt Producers' Association (ESPA). Address: 17 rue Daru; F-75008 Paris; tel. (33 1) 47 66 52 90; fax (33 1) 47 66 52 66.

# Physical industrial minerals

NACE 231, 239

The EU is the world's major consuming region for physical industrial minerals and currently produces around 85 % of its own requirements. Major EU producers of these minerals are recognised as world leaders in their fields and are actively involved in operating in other countries. This leadership has been gained through technical expertise and a close understanding of its consuming industries' requirements.

## INDUSTRY PROFILE

### Description of the sector

Physical industrial minerals are defined as those industrial minerals used predominantly for their physical characteristics rather than for their chemistry. They correspond with the minerals covered by the existing NACE codes 231.7 and non-chemical items in NACE 239 (and the more coherent grouping under the new NACE Rev 1 codes 1422 and 1450).

These minerals are used in such fields as ceramics, refractories, and abrasives; as filler/extender pigments for incorporation into paper, paints, and plastics; and, as filters, absorbents, and insulating materials. The range of products includes clays such as kaolin, kaolinitic clays, bentonite, and sepiolite, as well as, a variety of minerals such as diatomite, feldspar, magnesite & magnesia, perlite, pumice, and talc. The EU is a leading producer and exporter of these products.

### Recent trends

EU production and consumption in physical industrial minerals displayed excellent growth during the 1980s followed by declines in 1990, 1991, and 1992. For 1993, the sector displayed modest growth which is expected to be followed by stronger growth in 1994 and beyond. Extra-EU exports increased in 1993, although the trade balance has remained consistently negative.

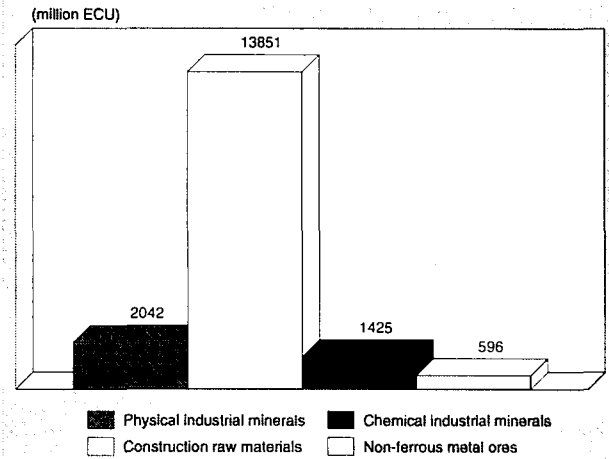
### International comparison

EU production of physical industrial minerals in 1993 was over 21 % higher than that in the USA and consumption was twice that of the USA. However, the USA is a larger exporter of these minerals than the EU. Japan is only a minor producer of physical minerals and thus its consumption (which was less than 30 % of that for the EU in 1993) is heavily based on imported raw materials. Over the period 1984-93 the EU displayed stronger growth in consumption than either the USA or Japan. Indeed the USA appears to show a value decline between 1984 and 1993, although this has more to do with exchange rate movements than any decline in volume terms.

### Foreign trade

The EU is a net importer of physical industrial minerals. Nevertheless, during the period 1984-93 exports grew by 83 % compared to a growth in imports of 35 %, thus lowering import dependence. The major EU export items are the industrial clays - kaolin, ball clay, bentonite, etc. - which, in 1993, made up over 60 % of total exports of these minerals. Ironically, industrial clays are also the major imported items in this group. In fact, the value of imports almost exactly balances exports in most years. It should be noted, however, that for a number of other important EU export items such as magnesia and talc, imports actually exceed exports by a considerable margin.

Figure 1: Physical industrial minerals  
Production in comparison with related industries, 1993



Source: B.M.Coope & Partners

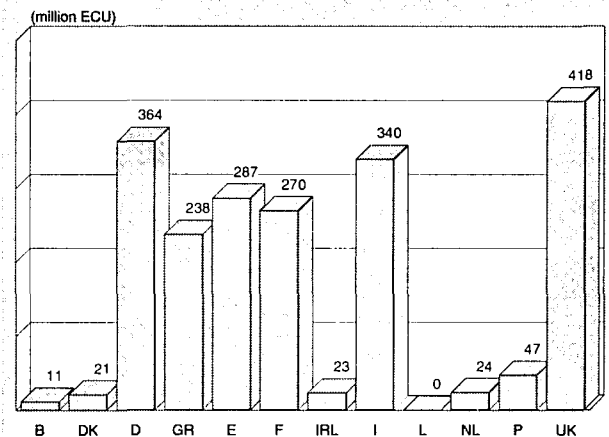
Major sources of EU imports of physical industrial minerals are the USA (kaolin, other clays, diatomite, talc and bentonite), Brazil (kaolin), China (magnesia and graphite), Canada (asbestos), Austria (magnesia and talc), Finland (talc), Norway (feldspathic minerals and quartz(ite)), Turkey (bentonite, perlite, pumice), Cyprus (bentonite) and Switzerland (quartz(ite)). The major destinations for EU exports in 1993 were the EFTA countries, an important element of which is the supply of kaolin to the paper industries of these countries.

## MARKET FORCES

### Demand

Physical industrial minerals are consumed by a very wide range of industries. Prominent among the industries using them are ceramics, refractories, glass, and abrasives; paper, paints, and polymers (plastics, rubber, sealants/adhesives, etc.); and, filters, absorbents, and insulating products. Since the ceramics industry also includes building products such

Figure 2: Physical industrial minerals  
Production by Member State, 1993



Source: B.M.Coope & Partners

**Table 1: Physical industrial minerals**  
**Main indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	2 154	2 472	2 653	2 489	2 430	2 291	2 297	2 436	2 600	2 600	2 700
Production	1 889	2 238	2 335	2 195	2 109	1 965	2 042	2 125	2 200	2 200	2 200
Extra-EU exports	217.4	345.4	359.1	335.8	332.0	327.9	397.1	396.0	400.0	500.0	500.0
Trade balance	-265.1	-233.7	-318.4	-294.2	-321.4	-326.5	-255.0	-311.2	-400.0	-400.0	-500.0
Employment (thousands)	25.6	23.9	23.8	22.0	21.8	20.0	18.1	17.1	17.0	18.0	18.0

(1) Eurostat estimates.

(2) Rounded DRI forecasts.

Source: B.M.Coope & Partners, Eurostat

**Table 2: Physical industrial minerals**  
**Breakdown by sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Kaolin	414	452	177.9
Bentonite	278	283	24.1
Asbestos	63	22	12.5
Diatomite	111	101	7.7
Feldspar	184	171	2.2
Magnesia	292	179	40.3
Perlite	43	29	6.2
Pumice	48	44	9.8
Quartz(ite)	93	92	15.1
Talc	180	123	12.1
Others	592	546	89.3

Source: B.M.Coope & Partners, Eurostat

**Table 3: Physical industrial minerals**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.3	-6.0	-2.0	-0.4
Production	1.0	-5.6	-2.0	5.1
Extra-EU exports	6.2	2.4	4.5	24.2
Extra-EU imports	5.1	-2.8	1.5	-4.3

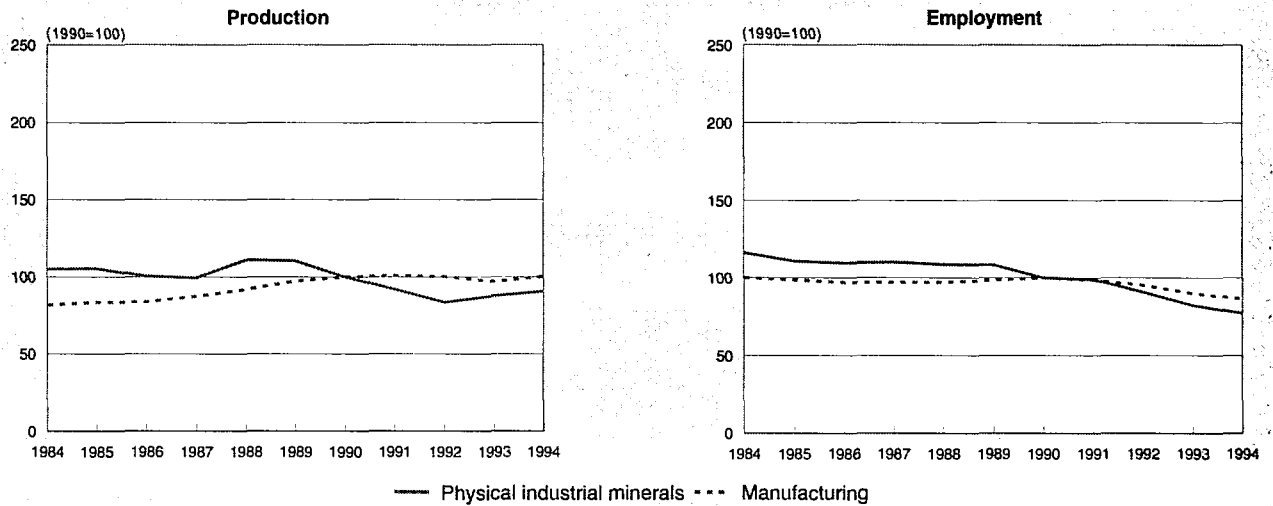
Source: B.M.Coope & Partners, Eurostat

**Table 4: Physical industrial minerals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	217.4	216.4	175.5	159.1	345.4	359.1	335.8	332.0	327.9	397.1	N/A
Extra-EU imports	482.5	512.5	447.9	424.0	579.1	677.6	630.0	653.4	654.3	652.1	N/A
Trade balance	-265.1	-296.1	-272.5	-264.9	-233.7	-318.4	-294.2	-321.4	-326.5	-255.0	N/A
Ratio exports / imports	0.45	0.42	0.39	0.38	0.60	0.53	0.53	0.51	0.50	0.61	N/A

Source: Eurostat

**Figure 3: Physical industrial minerals  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: B.M.Coope & Partners, DEBA

as bricks, tiles and pipes based on common clays, the construction industry looms large as both a direct and indirect consumer of these other products.

The technical requirements of the manufacturers of many of these products have become more stringent with time. As a result, raw material producers have tended to upgrade their products accordingly. Many producers of physical industrial minerals maintain close technical relationships with major consuming companies in order to meet future requirements. Thus, many products are "speciality" rather than "commodity" minerals and long-term contracts between producer and consumer are common.

**Supply and competition**

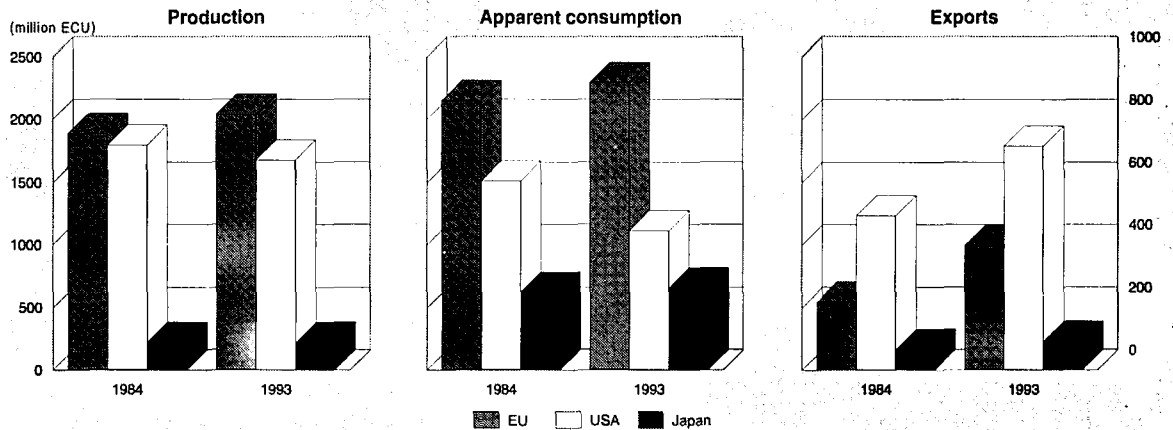
The EU is theoretically self-sufficient for the bulk of its mineral needs in this group. In general, EU producers compare with foreign competition as a result of either the quality of deposits or the processing expertise or a combination of both. However, the high technical input into many of these products is reflected in the USA, Canada, and the EFTA countries, where they are

the major outside suppliers. It should also be noted that certain products such as graphite, mica, and clays are bought in raw form for further processing in the EU before reaching the eventual consumer.

The EU is clearly deficient in certain minerals such as asbestos, vermiculite, and graphite and has to import the bulk of its requirements. Asbestos is no longer quite as vital as it used to be and a range of replacements have been developed (many of them based on indigenous EU raw materials) to overcome the health hazards associated with this mineral.

One area where the EU industry is suffering from foreign competition is in magnesite and magnesia. The EU produces a wide range of grades of magnesia from natural magnesite or from sea water or brines for applications in refractories, construction, general chemicals, and agriculture. But, for most of the past decade, EU magnesia producers have faced strong competition in the lower grade sections of the market due to low-priced products from China. More recently, further competition has become evident in the higher grade sectors of the market from new low-cost production in Australia. In

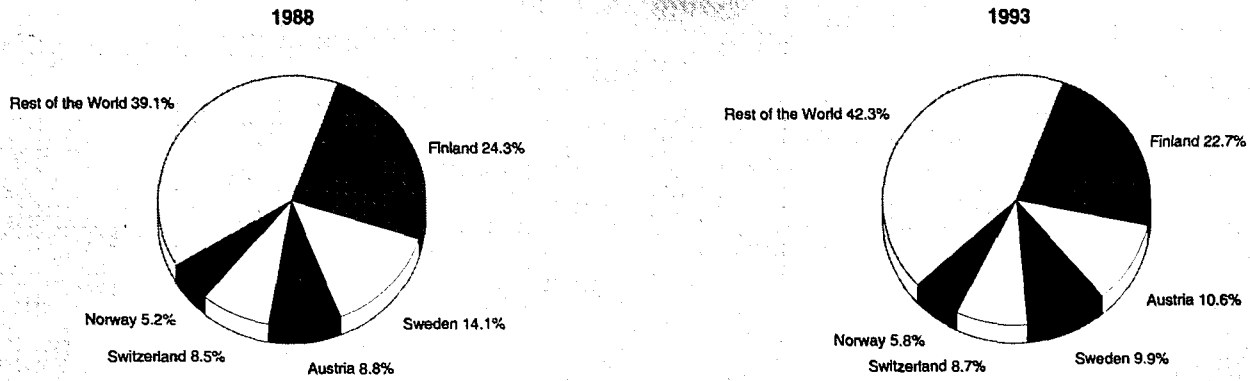
**Figure 4: Physical industrial minerals  
International comparison of main indicators in current prices**



Source: B.M.Coope & Partners, Eurostat



**Figure 5: Physical industrial minerals  
Destination of EU exports**



Source: Eurostat

addition. China has been improving the quality of certain grades as well. During 1992 anti-dumping action was taken against China and a duty was imposed on certain products. Even so, the EU magnesia industry is undergoing a process of rationalisation with producers tending to focus on more specialised grades and value-added products.

**Production process**

Many of the minerals in this group are enhanced by highly sophisticated processing techniques. Kaolin, bentonite, talc, magnesia, and diatomite are all subjected to a wide range of treatments involving such processes as high intensity magnetic separation, acid or alkali treatment, high temperature processing, laser sorting, jet milling, attrition grinding, classification at micron sizes, and surface modification. Such techniques have not only improved product quality in traditional uses but have introduced new grades to new markets and have expanded viable reserves.

**INDUSTRY STRUCTURE**

**Companies**

Most of the companies operating in this sector tend to be industrial minerals specialists although some companies from

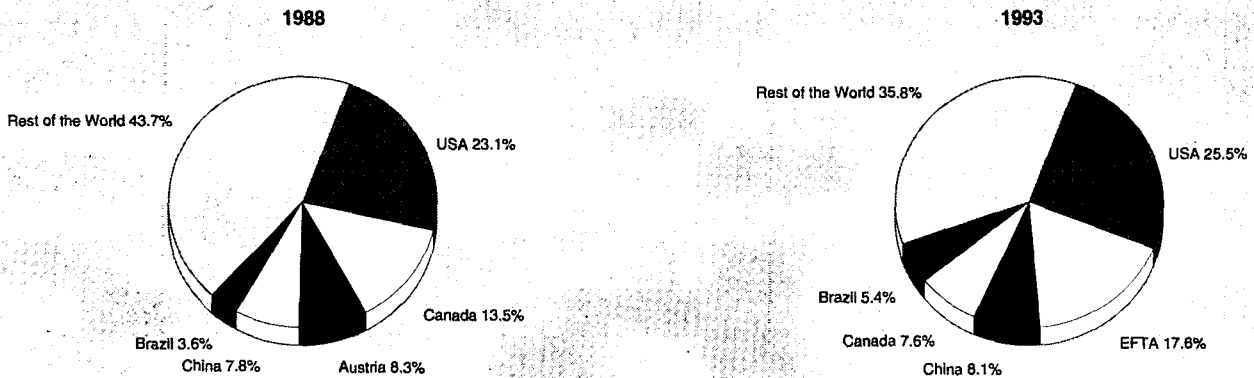
the construction (Redland and CRH), petroleum (Elf-Aquitaine), and metals (RTZ) sectors are involved. In the kaolin and ceramic clays sector major enterprises include English China Clays and Watts Blake Bearne (UK), Amberger Kaolinwerke (D), AGS and Imetal (F), and Group Minerale Harwanne (CH).

Major enterprises in the bentonite and special clays sector are Süd Chemie (D), Laporte and Redland (UK), Tolsa (E), Eliopoulos (GR), and Laviosa (I). Leading companies in other minerals are CECA (F) for diatomite; Grecian Magnesite (GR) for magnesia from natural magnesite; Redland (UK), Sardamag (I), NedMag Industries (formerly Billiton Refractories - NL), and Premier Periclase (part of CRH - IRL) for magnesia from sea water and brines; and the RTZ subsidiary, Talc de Luzenac (F).

**Strategies**

Several of the companies mentioned in the previous section operate on an international level and are justly recognised as world leaders in their own particular fields. English China Clays (ECC), Watts Blake Bearne (WBB), RTZ/Luzenac, Laporte, Sud Chemie, and Imetal all have important operations in North America and other parts of the world including the Far East and Africa.

**Figure 6: Physical industrial minerals  
Origin of EU imports**



Source: Eurostat



**Table 5: Physical industrial minerals  
The largest companies in the EU, 1992**

(million ECU)	Country	Sales	Employment (thousands)
Redland	UK	2 419	22.1
English China Clays	UK	1 236	10.8
Hepworth	UK	803	9.5
Sud Chemie	D	445	4.4
Ibstock Johnsen	UK	355	4.2
CECA	F	311	1.6
London Brick	UK	103	2.4
Amberger Kaolin (&Kick)	D	98	1.1
Watts Blake Beame	UK	90	1.1
Agrob Fliesen	D	55	0.8
Argiles et Mineraux	F	47	0.5
Talc de Luzenac	F	47	0.4
Tolsa	E	40	0.3
Grecian Magnesite	GR	22	0.6
Silver & Barite	GR	18	0.3

Source: B.M.Coope & Partners

The world's largest kaolin producer, ECC of the UK, recently sold off its Construction Materials Division (as Camas plc) in order to concentrate on white minerals (kaolin and carbonates) and a developing interest in speciality chemicals (typified by its acquisition of Calgon chemicals in the USA).

Germany's main kaolin producer, Amberger Kaolinwerke (AKW), has been active on the acquisition trail. They have bought some of the more important kaolin operations in former East Germany (Kemmlitz and Caminau) and, more recently, a near neighbour in Bavaria, Eduard Kick GmbH. Meanwhile, WBB successfully avoided a take-over by Sibelco (B), which was, until recently, only a minority shareholder.

Other companies growing by acquisition include Talc de Luzenac (F), which increased its share of the North American talc market by taking over Montana Talc in 1994; Harwanne (CH) which added Kaolin due Finisterre to its existing kaolin, feldspar, quartz, and mica operations in France and Portugal; and Imetal (F), which added the synthetic graphite operations of Lonza in Switzerland to its growing portfolio of assets in

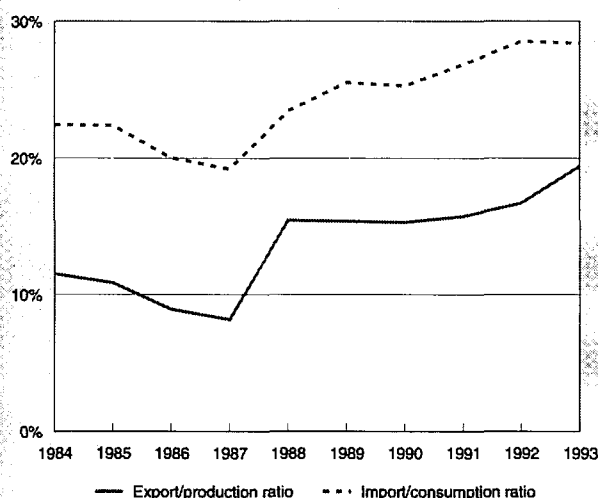
the fields of andalusite, refractory and ceramic clays, and natural graphite in Europe, North America, and South Africa.

### Impact of the Single Market

The Single Market has had a positive impact on the physical industrial minerals sector due to the overall economic activity it has induced. The free movement of goods, personnel, and capital are all highly relevant, and in an area of the minerals industry concerned with speciality products (i.e. with strong product differentiation) rather than commodities the aspect of intellectual property is also important.

Regarding barriers, although paperwork concerning intra-EU exports has been simplified there is still room for improvement. For extra-EU exports the administrative and customs procedures remain cumbersome. The question of EU external barriers causes considerable concern since it is felt that the implementation of the Single Market has not been accompanied by sufficient control regarding the entry into the Union of products from third countries. As a result, a low price policy

**Figure 7: Physical industrial minerals  
Trade intensities**



Source: B.M.Coope & Partners, Eurostat

**Table 6: Physical industrial minerals  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.3	0.1
Danmark	0.2	0.7
BR Deutschland	0.8	0.6
Hellas	12.1	15.4
España	1.5	2.0
France	0.6	0.7
Ireland	1.2	1.0
Italia	1.1	1.2
Luxembourg	0.0	0.0
Nederland	0.2	0.3
Portugal	2.5	1.8
United Kingdom	1.3	1.4

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: B.M.Coope & Partners, DEBA

is developed by such countries where social and environmental regulations are limited or even non-existent. As far as the Single Market is concerned it seems necessary to impose European standards regarding the production of goods entering the Union.

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## REGIONAL DISTRIBUTION

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Clays which are suitable for the production of bricks and tiles are to be found in many regions of the EU, although the more specialised industrial clays are much rarer and more localised. The Cornwall and Devon regions of England account for about two-thirds of total EU kaolin output, while other important regions include Bavaria in Germany and Brittany in France. The main ball and ceramic clay producing districts in the EU are Westerwald in Germany, Charente in France, and Devon in the UK. For bentonite the main centres are Bavaria in Germany, Milos Island in Greece, Sardinia in Italy, and south-east England, while the region around Madrid is the sepiolite capital of the world. In addition, the volcanic regions of Greece and Italy are well-known for their deposits of perlite, pumice, and pozzolana.

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## ENVIRONMENT

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The main environmental issues concerned with quarrying physical industrial minerals are shared with those of the construction raw materials sector (NACE 231), and indeed most of the EU mining industry. The modern quarrying industry has an excellent record in overcoming potential problems of dust, noise, waste disposal, and land reclamation.

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## OUTLOOK

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The EU will continue to be a major producing and consuming area for physical industrial minerals. Likewise, the influence of major EU producers will continue to spread well beyond Europe. Technical expertise and innovation will continue to play a major role in the development of the industry. Consequently, projects in other countries - notably in Eastern Europe and the Far East - will benefit from the involvement of EU-based expertise. Within the EU itself most new developments are likely to be extensions to existing producing areas rather than new greenfield projects.

Written by: B M Coope & Partners

The industry is represented at the EU level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel (32 2) 755 6311; fax (32 2) 779 0523; Industrial Minerals association (IMA). Address: Av. de l'Indépendance Belge 75, B-1080 Brussels; tel. (32 2) 414 20 60; fax: (32 2) 414 11 88.



## Overview

### NACE 221, 222, 223

Despite rationalisation and continuous labour and production cutbacks during the 1980s, the EU ferrous metals industry suffers from world-wide overcapacity. After upswings in 1988 and 1989, EU production of ferrous metals continuously declined. Weak demand and increased competition contributed to this decrease. In the near future, however, increases in EU apparent consumption and production are expected as demand in downstream markets and extra-EU exports has started to rise again. New EU investments will increasingly be directed towards improvements in quality and productivity, which will be accompanied by a further drop in employment.

### INDUSTRY PROFILE

#### Description of the sector

The ferrous metals industry is divided into three sectors: the iron and steel industry (NACE 221); the manufacture of steel tubes (NACE 222); and, first processing of steel (NACE 223).

This monograph covers the activities of the iron and steel industry, as defined in the European Coal and Steel Community (ECSC) Treaty, the manufacture of steel tubes, cold drawing, cold rolling and cold folding of steel, steel-wire drawing and manufacture of steel-wire products. The share of iron and steel production in the total industry of ferrous metals is approximately 70 %, leaving 14 % for the manufacture of steel tubes and about 16 % for first processing of steel.

EU production of ferrous metals is mainly concentrated in Germany, Italy, France and the United Kingdom. These four countries account for about 84 % of total value added. With a 38 % share of total value added, Germany is the largest ferrous metals producing country within the EU, followed by Italy with a 16 % share. Employment in the EU ferrous metals industry has been declining over the years. In 1993, 524 000 people were employed in this sector against 847 000 people in 1984.

#### Recent trends

In the early 1990s, EU production and consumption decreased as a result of the economic recession. From 1989 to 1993 consumption dropped by 31 %, while production declined somewhat less (28.5 %) as EU manufacturers were able to increase their extra-EU exports.

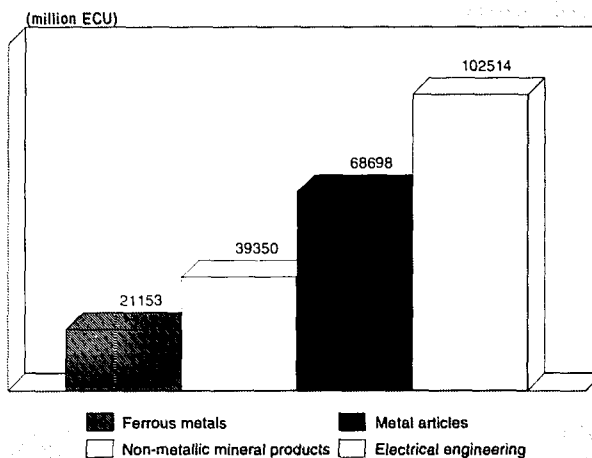
In 1993 the world steel market remained extremely depressed, due to weak demand in the industrialised countries. Steel export prices slid more than 35 USD/metric tonne since the Chinese stopped buying in June 1993. The shortfall of orders from China is a result of growing self-sufficiency for ferrous metals in the Chinese economy. Since demand of the Western countries for mill products totalled about 430 million tonnes last year, the 35 million tonne reduction in Chinese buying created serious oversupply.

In the course of 1994, EU demand and production started to recover, resulting in more favourable prospects for the coming years. In the near future, growing demand is expected from the Far East, Oceania and North America.

#### International comparison

In 1993 Japan was the largest manufacturing country of ferrous metals with a production value of over 109 billion ECU. The

Figure 1: Ferrous metals  
Value added in comparison with related industries, 1993



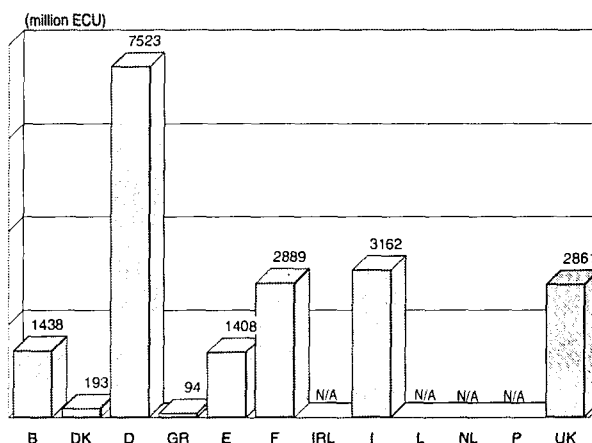
Source: DEBA

EU and the USA followed at a distance with production values reaching 74 and 65 billion ECU, respectively. The latter two countries have recorded production declines since 1984, while Japan increased its production level by 27 % since 1984. The Japanese production increase, however, is positively influenced by the appreciation of the Japanese yen against the ECU.

The Japanese workforce (259 000) in this industry is less than half of the EU workforce (523 000), while the US counted 356 000 people. As a result, the countries' labour productivity rates differ significantly. In 1993, Japanese production per employee equalled 421 243 ECU, while the corresponding European value only reached 140 759 ECU.

Other major manufacturing countries include: China, the CIS and other East European countries. While the EU and the US have suffered setbacks in their shares of world ferrous metals

Figure 2: Ferrous metals  
Value added by Member State, 1993



Source: DEBA



**Table 1: Ferrous metals**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	71 003	80 777	94 493	86 695	79 243	75 306	64 836	72 779	72 770	74 380	75 990
Production	84 289	89 077	102 956	92 896	85 870	80 612	73 617	80 302	81 910	83 550	85 220
Extra-EU exports	18 027	14 707	16 533	14 017	13 836	12 758	15 176	16 155	16 640	17 050	17 570
Trade balance	13 286	8 301	8 462	6 200	6 626	5 306	8 781	7 523	9 140	9 170	9 230
Employment (thousands)	847.3	661.2	645.2	625.2	596.4	569.6	523.8	478.8	450.0	420.0	410.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Ferrous metals**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
First processing of steel	10 879	11 944	2 177
Iron and steel	45 425	51 600	10 255
Steel tubes	8 532	10 073	2 744

(1) Apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Ferrous metals**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.57	-5.94	-1.31	-10.39
Production	1.18	-4.95	-1.59	-5.62
Extra-EU exports	-4.15	1.70	-1.59	18.38
Extra-EU imports	5.40	-2.03	2.03	-12.65

(1) Some country data for apparent consumption and production have been estimated.

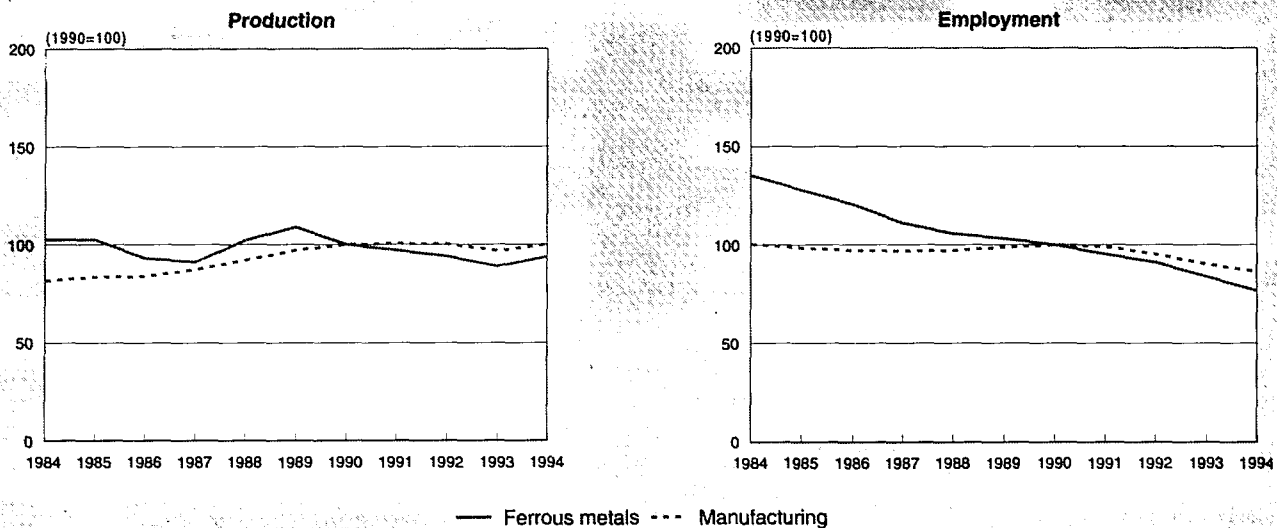
Source: DEBA

**Table 4: Ferrous metals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	18 027	20 403	14 935	13 620	14 707	16 533	14 017	13 836	12 758	15 176	16 155
Extra-EU imports	4 741	5 412	5 817	5 370	6 407	8 071	7 817	7 210	7 452	6 395	8 632
Trade balance	13 286	14 991	9 118	8 250	8 301	8 462	6 200	6 626	5 306	8 781	7 523
Ratio exports / imports	3.80	3.77	2.57	2.54	2.30	2.05	1.79	1.92	1.71	2.37	1.87
Terms of trade index	111.7	111.3	101.9	102.1	97.4	95.3	100.0	95.6	93.0	94.6	N/A

Source: DEBA

**Figure 3: Ferrous metals**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

production since the 1980s, newly industrialised countries (NICs) and developing countries (DCs) gained market share. Often supported by heavy state aid, some of these countries, such as Turkey, Mexico, Venezuela, Brazil, Argentina, Taiwan, Korea and Thailand, have continued to expand production capacity.

In the production of steel tubes, the EU is ahead of Japan and the US. In this subsector, however, the CIS is the largest producing country. With respect to first processing of steel, value added figures in the EU, Japan and the US are of equal size.

**Foreign trade**

The EU is a net exporter of ferrous metals products. During 1984-92, however, the trade surplus declined as extra-EU imports grew faster than extra-EU exports. Recently, due to weak domestic markets, EU manufacturers of ferrous metals have increased their efforts to sell their products in non-EU markets.

As a consequence, extra-EU exports grew, while extra-EU imports suffered from weak EU demand. Both developments resulted in an increase of 65 % in the trade surplus in 1993.

Major suppliers of ferrous metals products for the EU market are the EFTA countries; especially Sweden and Austria. However, the importance of East European countries such as Russia, the Czech Republic, Poland and Slovakia is growing. Furthermore, the growing importance of Libya should be noted. All of these countries are expected to increase their shares in total extra-EU imports.

Major export destinations for EU ferrous metals products are the USA, the Far East and EFTA countries. The importance of the CIS as an export destination declined as a result of the lack of hard currency.

**MARKET FORCES**

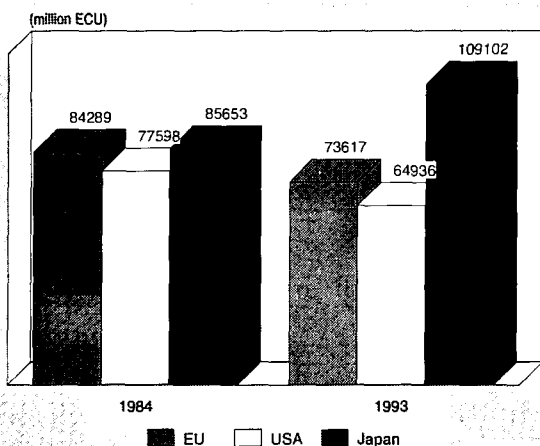
**Demand**

Important ferrous metals consuming sectors are: machinery manufacturing; oil and gas industry; nuclear and other steam generation industries; mechanical engineering; automotive industry; and the building industry.

After increases in apparent consumption in 1988 and 1989, EU consumption declined due to increasing use of substitutes for ferrous metals (other materials) and lower investment activity in downstream markets. In addition to these general factors, the EU ferrous metals industry faced a reduction in demand because of the emergence of new competitors, particularly from NICs, DCs and East European countries. These countries not only succeeded in covering their own needs, but they also competed successfully on the world market.

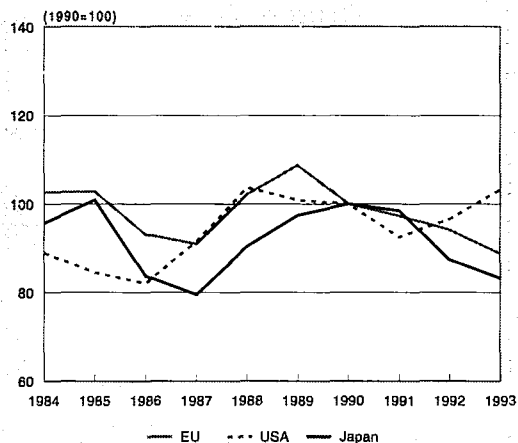
Despite weak demand from the CIS and other East European countries, caused by their lack of purchasing power, the EU industry has been able to increase foreign sales. In the near future, further increases in extra-EU exports are expected. Following the recovery which started in 1994, EU consumption is also expected to record growth in the short and medium term.

**Figure 4: Ferrous metals**  
**International comparison of production in current prices**



Source: DEBA

**Figure 5: Ferrous metals**  
International comparison of production in constant prices



Source: DEBA

### Supply and competition

Reduced demand for steel, induced by structural and cyclical factors, gave rise to a massive restructuring programme. Market controls regulated by Article 58 of the ECSC Treaty and the Steel Aid Code, formed the basis of the restructuring process which took place between 1980 and 1986. The market control measures expired mid-1988. Along with small increases in output in the 1980s, a considerable reduction in production capacity and the labour force of the EU steel industry was attained. Despite capacity reductions, however, the restructuring was not completed. Envisaged capacity reductions, which were even subsidised, were not carried out. However, the sudden improvement of the market in 1988, together with subsidies, enabled less competitive plants to survive.

In the early 1990s, the EU ferrous metals industry suffered from world-wide overcapacity, despite continuous labour and production cutbacks. Other structural problems of the industry were high costs, strong international competition and competition from substitutes.

In order to solve the structural problems, the European Commission came up with a new rescue plan for the EU steel industry in 1992. According to this plan, total EU steel production should be cut by 19 to 26 million tonnes in three

years time. At the end of 1994, however, the Commission's rescue plan collapsed, leaving the industry with excess capacity of 30 million tonnes.

### Production process

EU investment in research and development ensures high quality products and processes. In most EU production facilities, the quality assurance system is certified according to ISO 9001/9002. Continuous rationalisation efforts in production and labour have kept costs at competitive levels.

Looking at trade figures, the competitiveness of the EU industry seems to have improved. The penetration rate of extra-EU imports demonstrates a slightly increasing figure in 1991 and 1992 and has stabilised in 1993. In contrast, extra-EU exports grew by 19 % in 1993.

Improved production techniques, together with reduction of production capacity, have enabled the EU industry to reduce costs and increase efficiency and competitiveness. Over the last ten years, EU labour productivity increased by 30 %, while total unit costs remained stable.

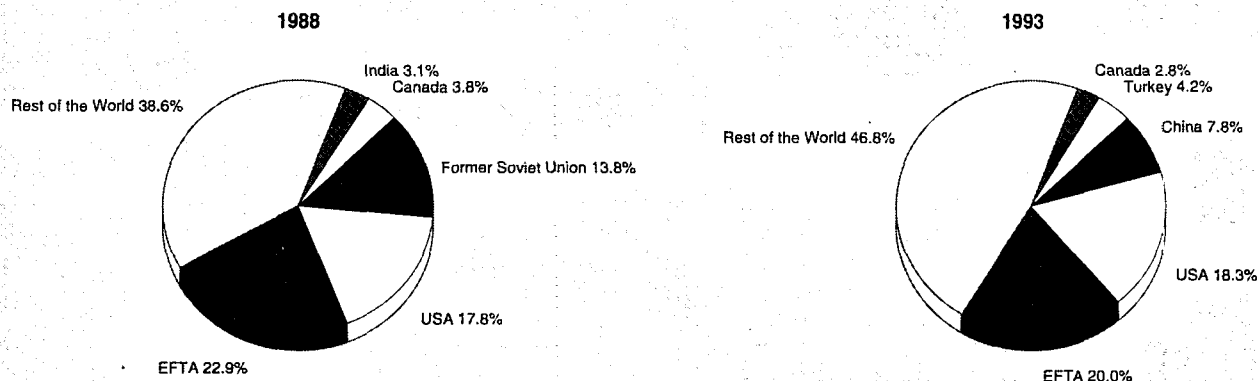
## INDUSTRY STRUCTURE

### Companies

The ferrous metals industry is highly concentrated. In the iron and steel industry, for instance, the ten major European steel producing companies account for about 80 % of total production. Usinor Sacilor (F) is the largest company in crude steel production, followed by British Steel (UK) with 12.3 million tonnes and Thyssen (D). The importance of Germany in this sector is further emphasised by the appearance of three other German companies in the top ten: Krupp Hoesch, Preussag and HKM. Two firms, ILVA (I) and Riva (I) represent Italy in the top ten and the remaining two firms originate from Belgium (Cockerill Sambre) and the Netherlands (Hoo-govens).

In the steel tubes industry Germany, Italy, France, the United Kingdom and Spain account for about 90 % of total production. In some countries a single producer sometimes accounts for 50 % or more of the national output. In 1992, three European companies were among the five largest steel tubes manufacturers in the world: TI Group (UK), Vallourec (F) and Dalmine (I). Some steel tube manufacturers, often small and medium-sized, operate in niche, high value-added markets. At the end of 1993 some 285 production units, owned by an estimated 245 enterprises, were involved in the EU steel tube industry.

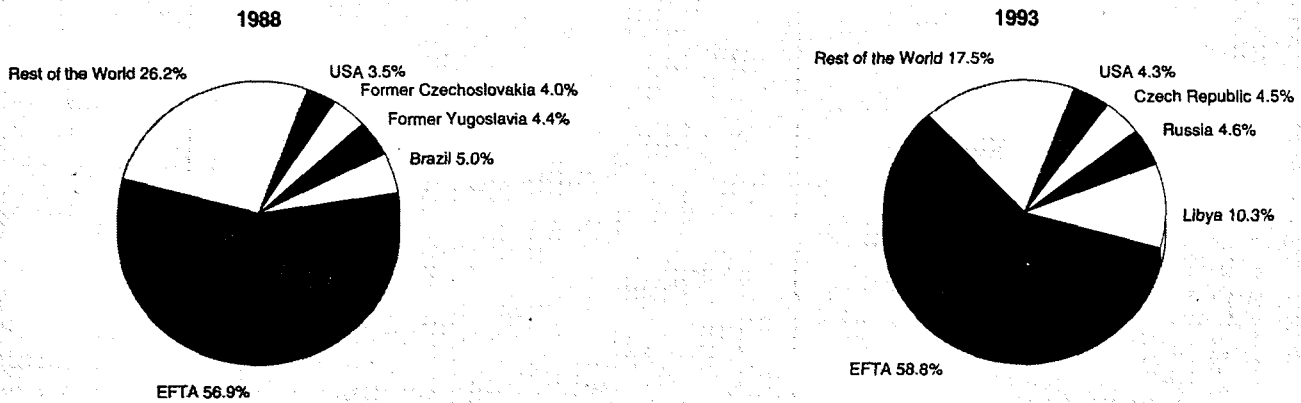
**Figure 6: Ferrous metals**  
Destination of EU exports



Source: Eurostat



**Figure 7: Ferrous metals  
Origin of EU Imports**

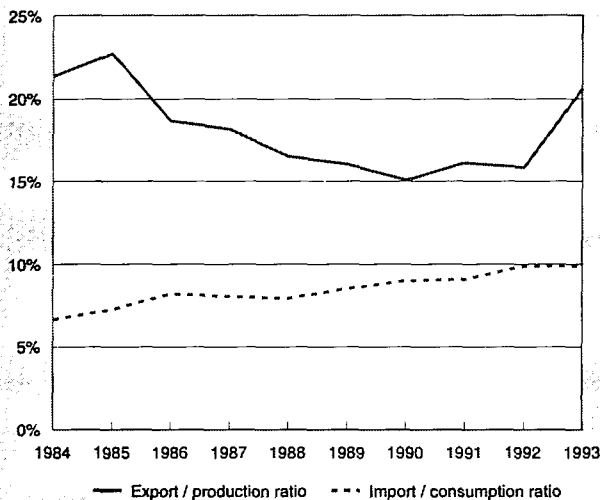


Source: Eurostat

### Strategies

Due to capacity reductions, induced by the difficulties in the market since 1985, investments are directed towards improvements in productivity and quality rather than expanding capacity. The need to be flexible if demand fluctuates is a vital lesson most companies learned during the recession. Other lessons include: paying more attention to customer service and commercial investment; diversifying into other areas; take-overs and mergers; specialising in high-quality products; and more integrated production techniques. EU ferrous metals manufacturers will continue to merge or cooperate during the course of modernisation and restructuring of the industry. Examples in the iron and steel industry are the merger between Usinor and Sacilor in France, the creation of ILVA in Italy, the rationalisation agreement between Krupp and Mannesmann in Germany and the take-over of Hoesch by Krupp. In addition, the Belgium steel producing company, Cockerill-Sambre, recently bought a 60 % stake in Eko Stahl, the largest steel mill of former East Germany.

**Figure 8: Ferrous metals  
Trade Intensities**



Source: DEBA

### Impact of the Single Market

The overall impact of the creation of the Single Market on the ferrous metals industry has been very limited so far. This is mostly due to two factors. Firstly, most impact on the industry was due to ECSC measures instead of Single Market measures. The ECSC Treaty has affected the industry since 1951. Secondly, the persistence of a number of internal barriers which hamper the achievement of a true free internal market for the ferrous metals industry, hinders any impact. These mainly reflect various types of state aid. However, the opening-up of the public procurement market is expected to affect the sector positively. Amongst the next priorities should be the harmonisation of environmental protection legislation in Europe which result in cost and competition distortions, and the liberalisation of upstream industries (energy, transport) which should lead to greater price convergence.

### ENVIRONMENT

The ferrous metals industry intensively developed and generated techniques to reduce environmental pollution long before protection of the environment had been placed on the political agenda. Examples are: low-pollution manufacture of steel products, steel recycling and the utilisation of waste material.

Together with restructuring of the EU ferrous metals industry in the 1980s, attention has been given to the reduction of environmental pollution. Production processes were innovated in such a way that no toxic gases could develop during the production process of steel and steel tube manufacturing and that waste material would be recycled immediately and completely.

In the iron and steel industry, recycling of scrap represents about 45 % of total steel production. This is one of the highest rates for any industry. Furthermore, the steel industry's emissions have been lowered considerably by an overall reduction in energy inputs.

Harmonisation of environmental protection legislation in Europe is essential for avoiding distortion of competition as environmental protection measures increase costs considerably. European steel producers continue to work in the framework of the Environmental Protection Research Programme. The EU Council Directive of 1st February 1993 on the movement of waste (ferrous scrap is on the Green list) within and

**Table 5: Ferrous metals**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	75.7	80.4	77.1	82.1	96.6	105.5	100.0	102.0	103.3	106.1
Unit labour costs index (3)	93.9	94.2	102.6	102.6	92.6	90.3	100.0	104.2	107.6	104.6
Total unit costs index (4)	93.6	97.7	94.8	90.3	91.4	98.3	100.0	98.1	96.1	93.2
Gross operating rate (%) (5)	3.73	5.02	5.10	6.30	11.44	11.73	8.47	5.34	4.13	4.27

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 6: Ferrous metals**  
**The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Thyssen	D	17 230	-212	137.0
Usinor-Sacilor	F	11 353	541	70.0
Fried. Krupp Hoesch-Krupp	D	10 602	58	78.4
Ilva (1)	I	6 305	N/A	43.9
British Steel	UK	5 468	449	41.3
Arbed	L	4 755	60	44.1
Cockerill Sambre	B	3 651	76	26.2
Hoogovens	NL	3 323	250	20.4
Kloekner-Werke	D	3 138	-35	27.7
Preussag Stahl	D	3 025	-43	10.8

(1) Employment, 1992 figure.

Source: DABLE

outside the EU, follows the conclusions of the Basle Convention, as well as other similar conclusions at the OECD level. The steel industry fears that this Directive will include scrap on the waste list rather than consider it as a raw material. The subsequent cost increase (because of penalties) may be

detrimental to further innovation of production processes and may jeopardise further reductions of environmental pollution.

## REGULATIONS

The European Coal and Steel Community (ECSC) was founded in 1952 together with the ECSC Treaty. During 1980-88 (the steel crisis) steel prices were fixed and investments were directed by the EU. At the same time, ECSC institutions set quotas for EU production and imports into the EU from non-ECSC countries.

The ECSC Treaty strictly forbids government subsidies (Article 4c), although this rule was not being enforced until 1986. Since 1986, subsidies may only be geared to the encouragement of research and development, to safeguard the environment and to meet social costs incurred by total plant closure. However, the 'hard' line of the European Commission concerning restructuring of the EU steel industry collapsed at the end of 1994.

Harmonisation of EU standards is well advanced; internal barriers have practically disappeared and do not impede the free circulation of goods within the EU. The EU ferrous metals market remains open for imports from third countries provided they enter under fair trade conditions. Unfair trade practises will be countered by antidumping and countervailing procedures. Future regulations for the steel market and steel policy of the EU are expected to be increasingly geared to liberalisation.

**Table 7: Ferrous metals**  
**Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	1.83
Danmark	0.30	0.44
BR Deutschland	1.02	1.00
Hellas	1.24	1.32
España	1.14	1.13
France	0.86	0.78
Ireland	N/A	N/A
Italia	1.19	1.21
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.61	N/A
United Kingdom	0.83	0.94

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

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## OUTLOOK

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It is expected that apparent consumption of ferrous metals will increase slightly in the short and medium term. Recovery of demand from major downstream markets, such as the automotive industry and mechanical engineering, will stimulate overall consumption of ferrous metals.

EU production is also expected to increase in the short and medium term, although increases will differ among the three subsectors. Production increases in iron and steel will be modest compared to increases in steel tubes and first processing of steel. Despite production increases, excess capacity in EU steel production is expected to persist.

Production increases will be partly induced by growing extra-EU exports, especially iron and steel products. Despite the collapse of the Commission's steel restructuring plan, further rationalisation of production in the iron and steel industry is expected, leading to a decline in employment. However, necessary capacity cuts will probably be postponed until the industry enters its next downturn. Moreover, the steel industry has started to invest in new, modern capacity.

Written by : Netherlands Economic Institute



# Iron and steel

## NACE 221

The year 1994 was marked by an upswing of demand and the withdrawal of the restructuring plan of the European Commission. The result is a postponement of necessary capacity cuts. Together with developments in the regulatory environment, the major challenge for steel producers will be to strengthen up during the period of favourable market conditions. Survival, sometimes accompanied by painful measures to further increase production efficiency, will increase competitiveness in the future.

### INDUSTRY PROFILE

#### Description of the sector

Steel and coal were the subjects of the ECSC Treaty in 1952, one of the first European industry agreements. Special provisions governing these two products remained in force after the two administrative bodies of the Community were merged.

The steel industry encompasses steel production from raw material processing to the production of finished and final steel products. These products include ordinary, special and alloy steels. The steel industry covers the following operations:

- coke manufacture (except if coke is purchased from the coal industry or from independent coking plants);
- ore preparation, especially for the production of sinter and pellets;
- manufacture of pig-iron in blast furnaces;
- manufacture of steel from pig iron in converters and from scrap in electric furnaces;
- continuous casting and/or hot rolling of semi-finished products;
- hot rolling of long products and flat products;
- cold rolling of flat products; and
- metallic and organic coatings.

The finished products of the steel industry, including ordinary, special and alloy steels, can be further divided into hot-rolled (flat and long) and cold-rolled (flat) products.

#### Hot-rolled

- Flat products: sheet strip obtained directly from the hot mill or by slitting of sheet in coils; heavy or medium wall plate obtained directly from the hot mill or by cutting of sheet; and
- Long products: heavy sections, light sections, including concrete reinforcing bars, and wire rods.

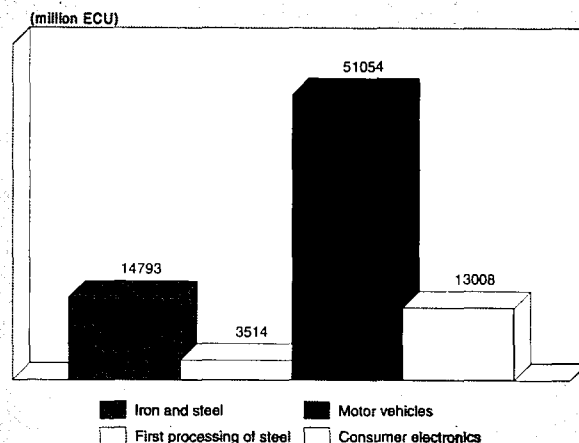
#### Cold-rolled

- Thin wall sheet in coils uncoated or coated with zinc, tin, lead, aluminium, plastic, paint, etc.

EU production of steel is mainly concentrated in Germany, France, Italy and the United Kingdom. These four countries together account for nearly 74 % of total production. With about 38 million tonnes, Germany is the largest steel producing country within the EU, followed by Italy (26 million tonnes).

Compared with other industries in terms of value added, the iron and steel industry is similar in size to the consumer electronics industry, but much smaller than the motor vehicle industry. With a total labour force of 335 300 people, however,

Figure 1: Iron and steel  
Value added in comparison with related industries, 1993 (1)



(1) Including non-ECSC steel products.

Source: DEBA

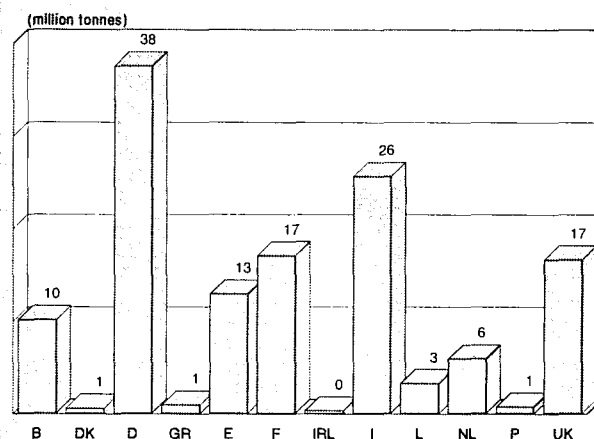
the steel industry is still a major employer. As such, it is not surprising that some Member States attach a high importance to the performance of their domestic industry.

#### Recent trends

Over the period 1984-1989 steel production in current prices increased by an annual average growth rate of 3.1 %, while apparent consumption recorded a somewhat higher average of 4.4 %. Extra-EU exports, in contrast, recorded a declining trend, which only started to turn in 1991.

In the early 1990s, the economic recession negatively affected consumption and production of iron and steel. From 1991 to 1993 consumption dropped by 12 %. Consequently, EU manufacturers started to look for other non-EU markets and thus raised exports. As a result, the production decline was limited to a drop of 4 % in the same time span. In 1994, demand recovered, resulting in more favourable prospects for the coming years.

Figure 2: Iron and steel  
Crude steel production by Member State, 1993



Source: Eurostat

**Table 1: Iron and steel**  
**Main indicators in crude steel equivalent (1)**

(million tonnes)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	102.5	123.5	127.0	125.9	126.6	124.9	111.4	115.0	118.0	120.0	122.0
Net exports (3)	16.8	13.9	11.2	9.5	10.9	9.4	22.2	N/A	N/A	N/A	N/A
Stock variation (4)	1.0	0.2	1.7	1.8	0.3	-2.0	-1.3	N/A	N/A	N/A	N/A
Scrap consumption (5)	0.2	0.2	0.3	0.3	0.2	0.2	0.1	N/A	N/A	N/A	N/A
Crude steel production	120.1	137.4	139.6	136.9	137.6	132.1	132.2	135.0	137.0	139.0	141.0
Employment (thousands) (6)	450.0	408.9	394.6	379.4	388.5	355.7	335.3	310.0	280.0	275.0	270.0

(1) 1984-85 EC10; from 1991 onwards, including former East Germany.

(2) Rounded DRI forecasts.

(3) ECSC steel.

(4) Merchants' and producers' stocks.

(5) In rolling mills.

(6) At the end of the year.

Source: Eurostat

**Table 2: Iron and steel**  
**Breakdown by major product line (1)**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Pig iron	83.3	85.9	85.4	85.6	93.7	95.1	91.7	89.8	84.7	84.2
Crude steel	120.1	120.6	125.6	126.0	137.4	139.6	136.9	137.6	132.1	132.2
Hot-rolled products	97.9	99.6	106.6	109.0	119.7	123.4	121.1	122.6	115.1	111.7
Finished products (2)	94.4	95.7	103.0	105.1	115.1	119.0	116.4	119.0	N/A	N/A

(1) 1984-85 EC10; from 1991 onwards, including former East Germany.

(2) The series does not exist from 1992 onwards, due to a change in the survey.

Source: Eurostat

**Table 3: Iron and steel**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption (1)	4.4	-3.2	0.9	-10.8
Crude steel production	3.1	-1.4	1.1	0.1
Extra-EU exports (1) (2)	-2.9	12.1	3.5	5.1
Extra-EU imports (1) (2)	5.8	-1.3	2.6	-18.2

(1) Crude steel equivalent; 1984-85 EC10; from 1991 including East Germany.

(2) ECSC steel products.

Source: Eurostat

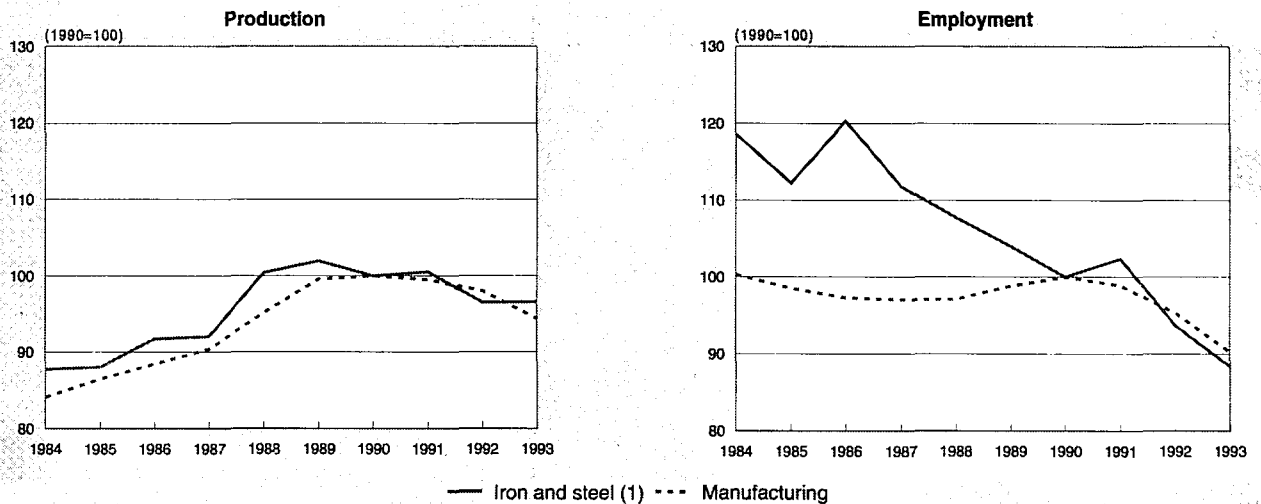
**Table 4: Iron and steel**  
**External trade in volume (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	22 413	25 188	23 025	23 698	21 018	19 339	19 261	19 913	20 296	30 555
Extra-EU imports	8 087	8 616	9 281	8 833	9 694	10 735	11 624	10 709	12 451	10 181
Trade balance	14 326	16 572	13 744	14 865	11 324	8 604	7 637	9 204	7 845	20 374
Ratio exports / imports	2.77	2.92	2.48	2.68	2.17	1.80	1.66	1.86	1.63	3.00
Terms of trade index	100.6	100.0	90.6	90.8	83.1	80.5	88.9	85.9	86.3	N/A
Intra-EU trade	24 713	25 088	29 350	30 647	33 920	36 853	37 905	40 100	38 539	34 688
Share of total imports (%)	75.3	74.4	76.0	77.6	77.8	77.4	76.5	78.9	75.6	77.3

(1) ECSC steel products; 1984-85 EC10; from 1991 onwards, including former East Germany.

Source: Eurostat

**Figure 3: Iron and steel  
Production and employment compared to EU total manufacturing industry**



(1) Including non-ECSC steel products. 1984-85 EC10; from 1991 including East Germany.  
Source: DEBA, Eurostat

Recently, the European Commission intensified its action in the sector. At the beginning of 1994, it seemed likely that important capacity cuts would be negotiated. As time went on, however, it became clear that the Commission would have great difficulty in delivering a package of cuts and measures acceptable to all parties. At the end of 1994, the Commission's steel restructuring plan was withdrawn.

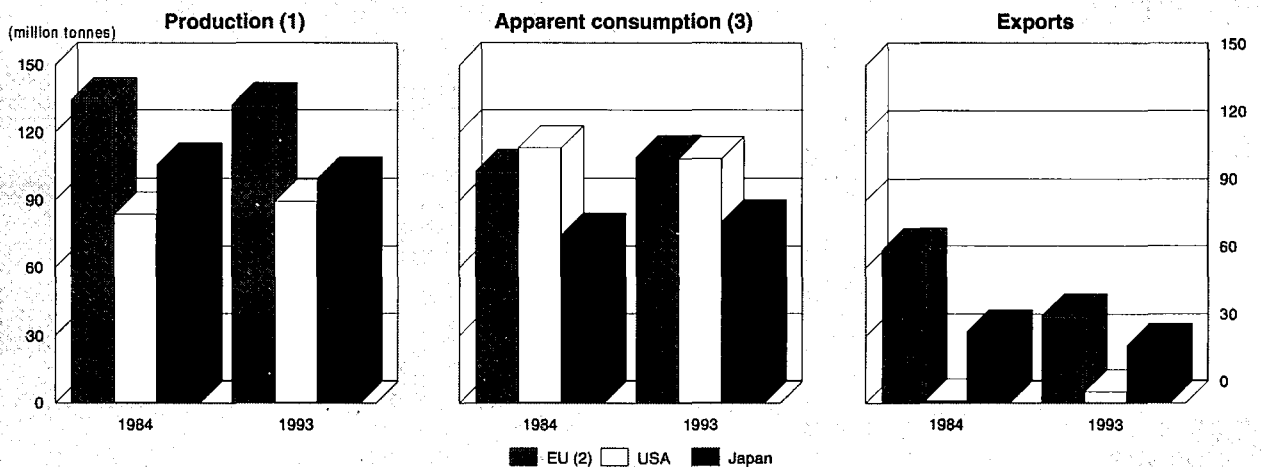
**International comparison**

In 1993, the EU was the leading manufacturer of iron and steel products. With production totalling 132.2 million tonnes, the EU was far ahead of Japan and the USA with production figures of 99.6 and 89.2 million tonnes, respectively.

If compared to 1984, the EU has recorded a production decline of 1.6 % against a decline in Japanese steel production of 5.7 % and, remarkably, an increase in US production of 6.3 %. For US producers, continued growth in their own domestic market is likely as the country is still a net importer of steel products. While 39 % of EU production and 26 % of Japanese production is exported, US exports only account for 5.7 % of total domestic production.

Other major steel manufacturing countries are the former USSR and China with output in 1993 totalling 95.7 and 88.7 million tonnes, respectively. Total steel production in Central and Eastern Europe amounted to 125.4 million tonnes in the same year.

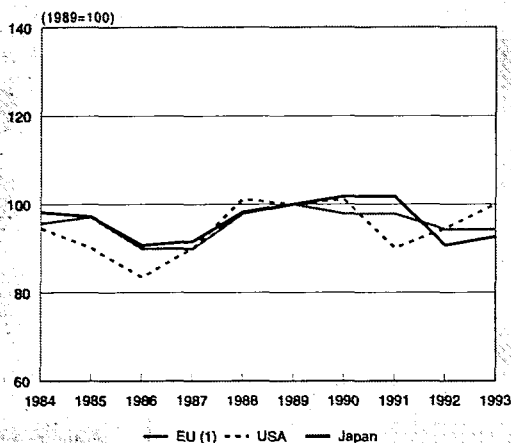
**Figure 4: Iron and steel  
International comparison of main indicators in volume**



(1) Crude steel.  
(2) 1984 EC10; 1993, including East Germany.  
(3) ECSC and non-ECSC products in crude steel equivalent.  
Source: Eurostat, IISI, American Iron and Steel Institute, Japanese Iron and Steel Federation



**Figure 5: Iron and steel**  
International comparison of crude steel production in volume



(1) 1984-85 EC10; from 1991 including East Germany.  
Source: Eurostat

### Foreign trade

The EU is a net exporter of iron and steel products. During 1984-92, however, the trade surplus went from 14.3 million tonnes to 7.8 million tonnes as extra-EU imports grew faster than extra-EU exports. This also caused the exports/imports ratio to drop from 2.77 in 1984 to 1.63 in 1992. Until 1991, intra-EU trade grew even faster than extra-EU imports, increasing its share of total imports from 75.3 % to 78.9 %. Over the 1984-93 period, extra-EU imports recorded a higher average annual growth rate (2.6 %) than apparent EU consumption (0.9 %), demonstrating the growing importance of foreign suppliers on the EU market. Consequently, the penetration rate increased from 9.07 % in 1984 to 10.81 % in 1992. In 1993, however, this rate demonstrated a slight decline.

In search of other markets, EU manufacturers were able to increase their foreign sales by more than 10 million tonnes in 1993, a growth of 50 % against 1992. At the same time, extra-EU imports declined due to weak EU demand. Consequently, the trade surplus recorded an increase of 12.5 million

tonnes and the export/import-ratio increased from 1.63 in 1992 to 3.0 in 1993.

Major export destinations for EU steel products are the USA, the Far East and the EFTA countries. Asian countries such as China, Taiwan, Hong Kong, South Korea and Thailand have become increasingly important as export markets. The Asian share in total extra-EU exports increased from 20.4 % in 1988 to 40 % in 1993.

EFTA countries are major suppliers of steel and iron products for the EU market. In 1993 these countries together accounted for 53.6 % of total EU imports against 43.3 % in 1988. Sweden and Austria are large suppliers to the single market. Eastern Europe also increased its share in total extra-EU imports from 26.1 % in 1988 to 31.6 % in 1993. Major steel producers in this region are Russia, the Czech Republic, Poland and Slovakia.

## MARKET FORCES

### Demand

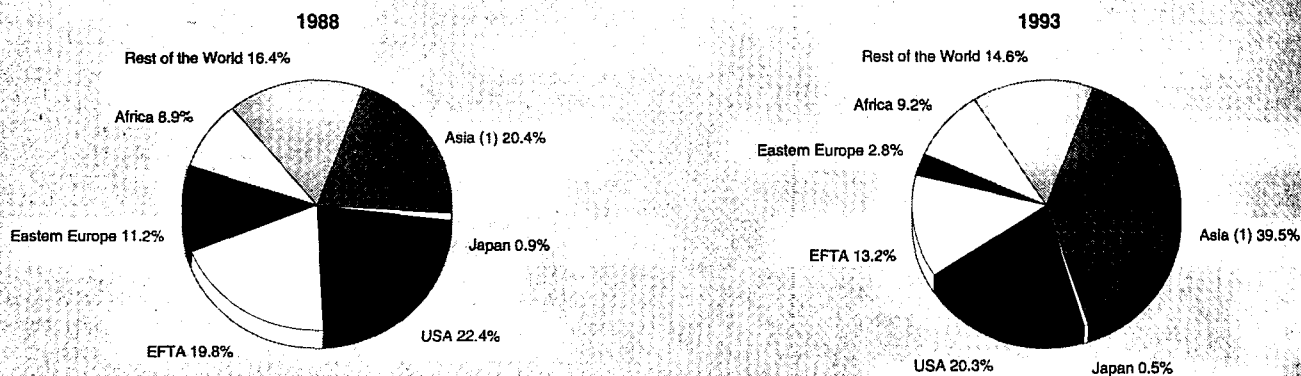
Primary processing industries account for over one-third of ECSC steel used in the EU; most of it is used for the production of steel tubes, wire and bright drawing, and cold-rolling and cold-forming, which allow for 6 % to 14 % of steel requirements. In terms of final internal demand, principal consumers are building and civil engineering and manufacturers of transport equipment and metal goods. Their shares vary from 10 % to 15 %. With shares of 6 % to 7 % mechanical engineering and structural steel work are also important customers.

Since the mid-1970s steel consumption in the EU (and in industrial countries in general) has decreased. Various factors have contributed to this development, such as: recent cuts in the production of a number of steel-consuming industries; technological development, entailing a decrease in the quantity of steel needed for the production of a given product; improvement in quality, i.e. the durability of the steel products themselves; and substitution of steel by other materials (plastics, aluminium etc.). In addition to these general factors, the EU steel industry faced a reduction in demand because of the emergence of new competitors, particularly from newly industrialised countries and more recently Eastern Europe.

### Supply and competition

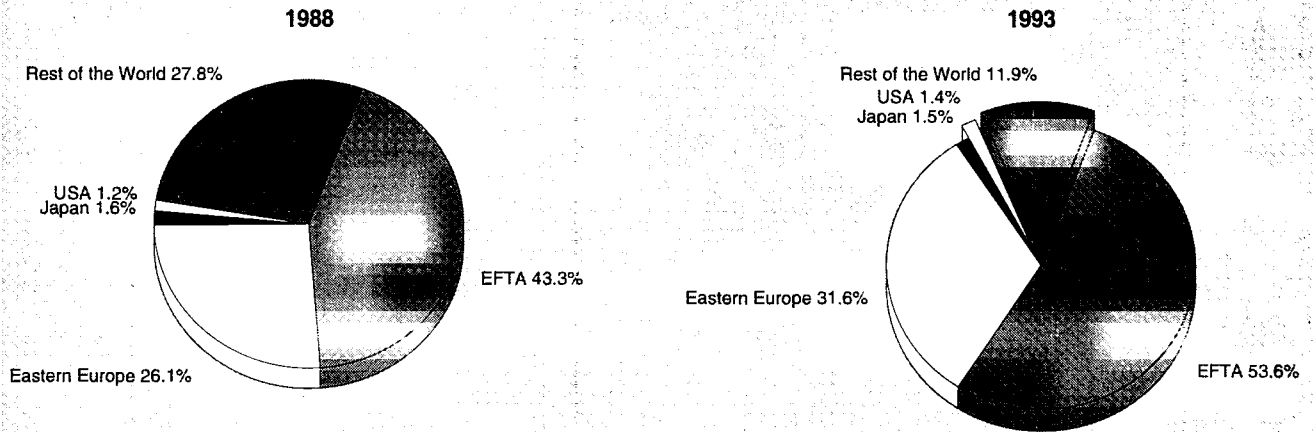
Reduced demand for steel, induced by structural and cyclical factors, gave rise to a massive restructuring programme in

**Figure 6: Iron and steel**  
Destination of EU exports



(1) Excluding Japan.  
Source: Eurostat

**Figure 7: Iron and steel  
Origin of EU imports**



Source: Eurostat

the 1980s. Market controls were regulated by Article 58 of the ECSC Treaty and the Steel Aid Code, which fixes conditions where subsidies can be authorised: research, social and environmental protection. These controls formed the basis of the restructuring process which took place between 1980 and 1986. The market control measures expired mid-1988. The restructuring process brought about a reduction in the EU's production capacity for crude steel of 40 million tonnes (19 %). Moreover, by the end of 1988, hot rolling capacity had been reduced by 34 million tonnes (18 %).

At the same time, however, newly industrialised countries increased their production capacity significantly. Low production costs (cheap labour, energy, and indigenous raw materials) and technological development in steel production (mini-mills) enabled them, apart from satisfying their own needs, to compete successfully with traditional exporters on the world market.

Along with small increases in output in the 1980s a considerable reduction in production capacity and the labour force of the EU steel industry was attained. Despite capacity reductions, however, the restructuring was not completed. However, the sudden improvement of the market in 1988, together with subsidies, enabled the less competitive plants to survive.

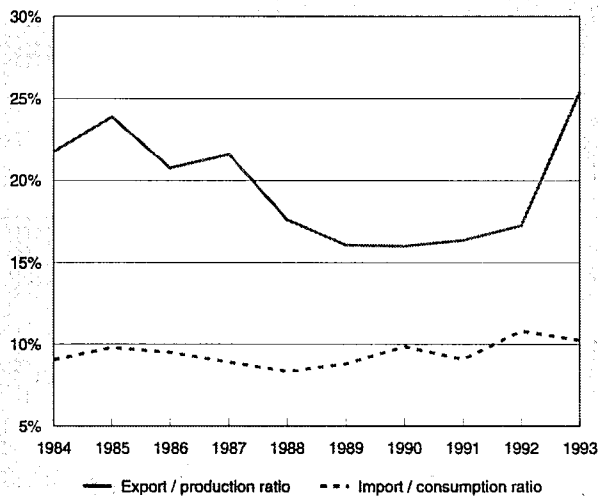
Deteriorating market conditions in the early 1990s forced an additional drop in the industry's employment. Since 1991, total employment has dropped by more than 53 200 or 13.7 %. These developments revealed the specific structural problems of the EU steel industry: overcapacity, strong international competition on the world steel market and competition from steel substitutes. Even some of the best-known steelmakers, such as Krupp and Thyssen (D) and Ilva (I) were in deep financial trouble.

In order to solve the overcapacity problem, the European Commission came up with a new plan in 1992 to help restore the beleaguered industry to health during the recession. According to this plan, total EU production would be cut by 19 to 26 million tonnes in three years time. The steel industry should solve the problem itself, i.e. steel producers would have to indicate which enterprises should reduce their capacity and to what extent. The aim of the exercise was to allow no unprofitable plants to remain in production artificially and to take painful restructuring measures. The only solution to solve this problem was strict control over State subsidies (Art. 4c of the ECSC Treaty): State subsidies should only be authorised by the Commission if they are aimed at achieving substantial reductions in inefficient production capacity. To create a sound EU steel industry, fair competition and market stability, the plants concerned should be identified and dismantled, even in case of a sudden recovery of the market.

At the end of 1994, the Commission's plan was withdrawn. The plan resulted in pledged and implemented cuts in production capacity amounting to 17 million tonnes. In 1993, a significant blow to the plan occurred when a powerful local campaign prevented the closure of the loss-making Klockner works in Germany. Closing this factory would have given an early push toward the 19 million tonne target. On the other hand, a plan for assistance in closures in the Italian region of Brescia was recently approved and is now being enacted.

At the end of 1994, total capacity still equalled 170 million tonnes, involving an estimated excess capacity of 30 million

**Figure 8: Iron and steel  
Trade intensities in volume terms (1) (2)**



(1) 1984-85 EC10; from 1991 including East Germany.

(2) Crude steel equivalent.

Source: Eurostat



**Table 5: Iron and steel**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	72.1	78.3	74.4	80.0	95.6	106.7	100.0	102.4	102.5	106.5
Unit labour costs index (3)	96.0	94.8	103.8	103.2	92.8	89.4	100.0	103.7	108.0	103.7
Total unit costs index (4)	96.2	100.3	96.4	91.1	91.4	97.9	100.0	98.4	96.4	93.2
Gross operating rate (%) (5)	3.0	4.5	5.4	6.6	12.2	13.2	8.9	5.0	3.6	4.3

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

tonnes. Moreover, new modern capacities are going to be built in the European market: Eko Stahl (1.8 million tonnes), Sestao (1.8 million tonnes), Freital (200 000 tonnes), and Siderurgia Nacional (900 000 tonnes), all with state subsidies.

### Production process

Improved production techniques, together with the reduction of production capacity, have enabled the EU steel industry to reduce its costs and increase efficiency. An example is the proliferation of continuous-casting plants, in which one step in the production process is eliminated with a subsequent drop in crude steel requirements.

Technical criteria are not the only decisive factors in international competition though, products must also be competitive from a cost angle. Developments in labour productivity, unit labour costs and total labour costs indicate that efficiency in production increased over the period 1984-1989. Labour productivity in current prices increased while unit labour costs declined. Weak downstream markets, accompanied by lower capacity utilisation, caused a stabilisation of labour productivity in the early 1990s, which could only partly be compensated for by German reunification. This stabilisation has also been accompanied by a reduction in unit costs. Competitiveness of the industry can only be maintained and further improved if production costs are controlled and production is efficient.

## INDUSTRY STRUCTURE

### Companies

The iron and steel industry is a sector with a high degree of concentration. The 10 major European steel producing companies account for about 80 % of total production. Usinor Sacilor (F) is the largest company in crude steel production with output of 17.6 million tonnes, followed by British Steel (UK) with 12.3 million tonnes and Thyssen (D) with 9.6 million tonnes. The importance of Germany in steel production is further emphasised by the appearance of three other German companies in the top ten: Krupp Hoesch, Preussag and HKM. Italy is represented by two companies; ILVA and Riva, and the Netherlands and Belgium are each represented by one.

Two major categories of producers can be distinguished: integrated companies and mini-mills. Integrated mills generally have large production capacities, ranging from 2 to 10 million tonnes of finished products. Although these large production units allow economies of scale, they allow little production flexibility. Mini-mills owe their success to flexibility and the capacity to adapt production to market demand. In certain Member States (Italy and Spain) mini-mills account for a substantial share in total steel production.

### Strategies

Despite political commotion about the withdrawal of the Commission's plan, most steel companies have understood the need to be flexible if demand fluctuates. As a result, steel companies are trying original market solutions. Innovative transnational alliances, reciprocal equity stakes and investments are examples of a trend towards a less nationally-based industry. Other lessons include: paying more attention to customer service and commercial investment; diversifying into areas other than steel; take-overs and mergers; specialising in high-quality products; and more integrated production techniques.

A number of mergers and acquisitions occurred during the course of modernisation and restructuring of the EU steel industry. Examples are the merger between Usinor and Sacilor in France, the creation of Ilva in Italy, the rationalisation agreement between Krupp and Mannesmann in Germany, and the take-over of Hoesch by Krupp. Recently, the Belgian steel producing company, Cockerill-Sambre, bought a 60 % stake in Eko Stahl, the largest steel mill of former East Germany. Together with Treuhand, the German privatisation agency, the Belgians have come up with a plan to modernise Eko Stahl's existing blast furnace and to build a new hot-rolling mill.

### Impact of the Single Market

Whether the impact of the creation of the Single Market has been positive or negative on the industry is not yet clear. The impact of the Single Market could have been positive by providing companies with a greater access to other EU markets for public procurement. A positive impact may also have resulted from reduced administrative costs and increased efficiency of cross-border transactions/ shipments. No true internal market has come into effect yet, however. Existing distortions include the variety of national environmental policies, the continuation of state subsidies and differences in energy prices across Member States - energy being a main input for this sector. In this respect, the liberalisation of energy markets is important. More price convergence in upstream industries (electricity, transport) should be a priority for future. The elimination of unfair competition and the removal of all, internal and external, barriers to free trade are also essential.

## REGIONAL DISTRIBUTION

Steel plants are located throughout the EU with varying levels of production capacity. Originally, steel plants were built inland, usually near coal or iron-ore fields from where they drew supplies, or near steel consumers. More recently, they are built on the coast, where they have easy access to imported raw materials without the cost of land transport. They are also better placed to capture international markets.



**Table 6: Iron and steel**  
**International comparison of electric arc process (EAP) in crude steel production, 1993**

	EU	USA	Japan
Crude steel production (million tonnes)	132.1	101.5	99.6
Oxygen (%)	66.5	62.2	68.8
EAP (%)	33	37.8	31.2

Source: IISI, Eurostat

Whereas Germany is the largest EU producer of steel, the importance of the steel industry for the economy is greater in Luxembourg, where the share of steel production in total industry exceeds 40 %. By contrast, the contribution of steel to total manufacturing production only accounts for about 1 % in Denmark, Ireland and Portugal. With regard to mini-mills, the highest concentrations can be found in Northern Italy and Spain.

## ENVIRONMENT

Long before environmental protection had been placed on the political agenda, the steel industry intensively developed and generated techniques to reduce environmental pollution. These measures include: low-pollution manufacture of steel products; steel recycling; and, the utilisation of waste material. Restructuring of the industry in the 1980s encouraged innovation of the production process; older installations were replaced by modern plants, fully equipped with a whole range of pollution-control equipment. The increasing use of electric arc furnaces (EAF) across Europe is a leading example of such new processes.

The steel industry's dust emissions have been lowered considerably. Emissions of carbon dioxide (CO<sub>2</sub>) have also been strongly reduced by optimisation of process technology and an overall reduction in energy inputs. For example, in mini-mills the average required input of electricity per tonne of steel declined from 510 kWh in 1980 to 380 kWh in 1990.

In recent years, the EU steel sector consumed about 60 million tonnes of steel scrap, the bulk of which was collected from discarded steel-containing products. Recycling of scrap, which represents about 45 % of total steel production, is one of the highest rates for any industry.

Environmental protection places considerable financial burdens on iron and steel companies. In light of the high costs and the fact that requirements and enforcement of environmental protection are not equally strict in all Member States, a harmonisation of environmental protection legislation in Europe is essential for avoiding distortion of competition. European steel producers continue to work with the European Commission in the framework of the Environmental Protection Research Programme established under Article 55 of the Treaty of Paris.

## REGULATIONS

For more than forty years, the European steel industry has been regulated by the European Coal and Steel Community (ECSC). The ECSC was originally established in 1952 to ensure an orderly supply of coal and steel to the common market for coal; to ensure equal access to sources of production; to ensure the establishment of the lowest prices; to encourage undertakings to expand their production potential; to promote improved working conditions; to promote growth of international trade; and to promote the expansion and modernisation of production.

As to recent legislation, particularly in the field of the environment, it is worth noting the EU Council Directive of 1st February 1993 on the movement of waste (ferrous scrap is on the Green list) within and outside the EU. This Directive follows the conclusions of the Basle Convention, as well as other similar conclusions at the OECD level. The industry fears that this Directive will include scrap on the waste list rather than consider it as a raw material. The subsequent cost increase may be detrimental to further innovation of the production process and may jeopardise further reductions of environmental pollution.

The possible introduction of a new tax on CO<sub>2</sub> emissions will have a negative impact on the steel sector. Steel industry efforts to reduce energy consumption are being pursued. For example, in the course of 1994, a large number of new electric arc furnaces started producing, replacing blast furnaces. This could mean a considerable decrease of global CO<sub>2</sub> emissions coming from the steel industry.

## OUTLOOK

The year 1994 was marked by an upswing of demand and the withdrawal of the restructuring plan of the European Commission. Both developments will have an impact on the industry in the short and medium term. Recovery of demand is expected to continue and no further agreements on capacity reductions are expected in the short run.

Despite the withdrawal of the Commission plan, a package of social subsidies, designed to ease the impact of steel plant closures, will continue to apply until the end of 1995.

Together with developments in the regulatory environment, the major challenge for steel producers will be to strengthen up during the present positive market conditions. Survival, sometimes accompanied by painful measures to further increase production efficiency, will increase competitiveness in the future. Nevertheless, moderate increases in demand for and production of steel are forecast for the short and medium term.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Confederation of Iron and Steel Industries (EUROFER). Address: Rue du Noyer 211, B-1040 Brussels; tel (32 2) 736 0100; fax (32 2) 736 3001; and European Independent Steelworks Association (EISA). Address: Rue Belliard 205, B-1040 Brussels; tel (32 2) 230 7962; fax: (32 2) 230 0136.

# Steel tubes

## NACE 222

The steel tube industry has faced a severe volume and financial downturn since the mid-1980s due to world-wide low demand and over capacity. Seamless tubes and welded tubes with an outside diameter of over 406.4 millimetres, in particular, were deeply influenced by import quotas imposed by the USA until March 1992 and later by the harassing threat of trade cases, and the low international value of the dollar. Furthermore, the collapse of the former Soviet Union and other East European markets and reduction of orders from China are of great concern to EU manufacturers. As from 1994, US dumping allegations against several Latin American, EU and other producers have fundamentally altered export flows in the world market of steel tubes.

The EU has maintained its leading position in the world market, ahead of the USA and Japan, due to continuous productivity gains achieved through industry restructuring. Nevertheless, foreign trade has been steadily deteriorating. Despite improved competitiveness, the EU steel tube industry is under the strongest pressure from low priced imports from Central and Eastern Europe which have forced significant reductions of output, capacities and workforce.

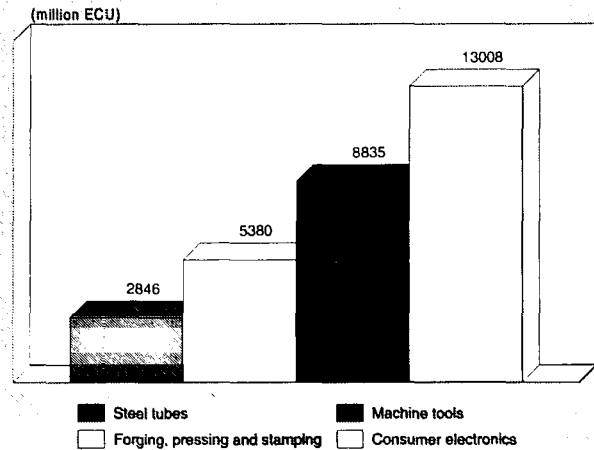
### INDUSTRY PROFILE

#### Description of the sector

Activity of NACE 222 encompasses the manufacture of steel tubes, as well as, steel tube fittings and compressed gas cylinders. This monograph, however, only covers the manufacture of steel tubes. Data is based on production figures compiled from surveys conducted by the national organisations of the producers located in EU Member States. Export and import figures are provided by Eurostat sources.

Steel tubes cover three product categories which differ considerably in their manufacturing processes, raw materials, and investment requirements. These categories are classified as: seamless steel tubes, welded steel tubes of circular cross-section over 406.4 millimetres in outside diameter, welded steel

**Figure 1: Steel tubes**  
Value added in comparison with related industries, 1993



Source: DEBA

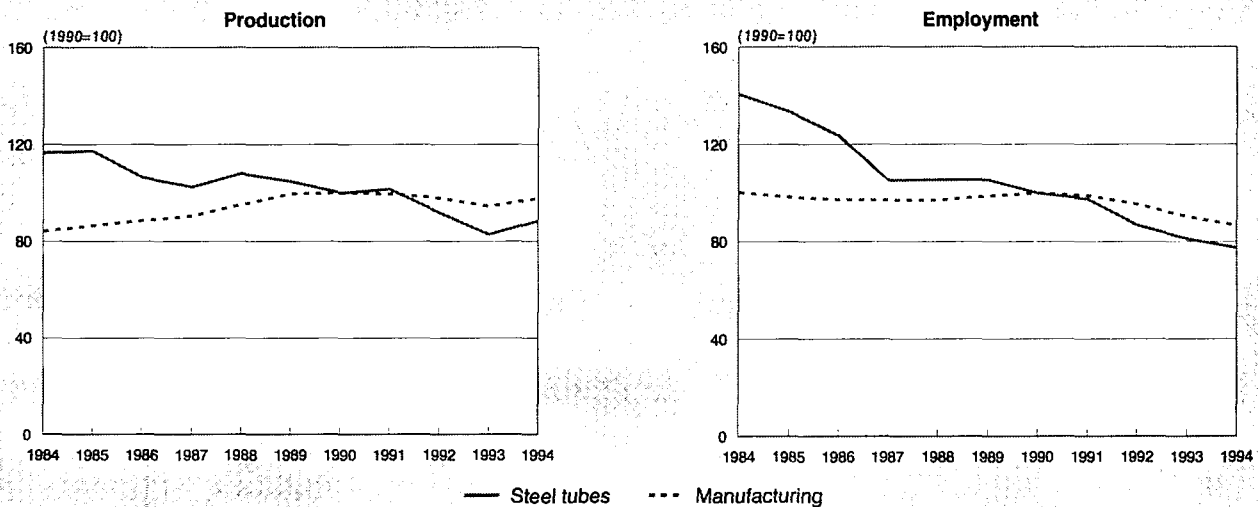
tubes of circular cross-section up to and including 406.4 millimetres in outside diameter and welded steel tubes of non-circular cross-section of any perimeter.

The main consumers are the energy markets (e.g. oil, gas, nuclear, steam generating industries), petrochemical, automotive, mechanical engineering, mechanical services, and construction industries. Economic development in each of the product areas of the steel tube sector varies according to their different end markets. Calculated using a crude steel equivalent, EU steel tube production consumes 16-19 % of ECSC steel output. Steel tubes are manufactured at varying levels in each EU country.

#### Recent trends

After a peak in 1990, a steep downturn in 1993 and a slight recovery in 1994, the long term trend of consumption can

**Figure 2: Steel tubes**  
Production and employment compared to EU total manufacturing industry



1994 are ESTA and Eurostat estimates.  
Source: ESTA, DEBA



**Table 1: Steel tubes**  
**Main indicators**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)
Apparent consumption	8 173	8 406	8 190	8 370	9 674	9 904	10 566	9 811	9 795	8 874	9 400
Production	14 377	14 462	13 132	12 624	13 329	12 908	12 326	12 524	11 311	10 217	10 900
Extra-EU exports	6 948	6 754	5 744	5 103	4 782	4 291	3 165	4 134	3 002	2 556	2 800
Trade balance	6 204	6 056	4 942	4 254	3 655	3 004	1 760	2 713	1 516	1 343	1 500
Employment (thousands)	99.9	94.8	87.8	74.7	74.9	74.8	71.0	69.2	61.7	57.7	55.0

(1) ESTA estimates.  
Source: ESTA, Eurostat

**Table 2: Seamless tubes**  
**Main indicators**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	2 011	2 272	1 896	1 903	2 331	2 417	2 453	2 440	2 210	1 740
Production	4 664	4 773	3 720	3 744	4 062	3 967	3 680	3 758	3 025	2 645
Extra-EU exports	2 898	2 774	2 092	2 170	2 126	2 023	1 685	1 810	1 390	1 248
Trade balance	2 653	2 501	1 824	1 841	1 731	1 550	1 227	1 318	815	905

Source: ESTA, Eurostat

**Table 3: Welded tubes OD > 406.4mm**  
**Main indicators**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	605	668	734	477	598	850	1 101	773	1 144	1 159
Production	3 163	3 449	3 344	2 551	2 297	2 013	1 553	2 021	1 941	1 726
Extra-EU exports	2 634	2 803	2 740	2 096	1 725	1 241	608	1 428	869	661
Trade balance	2 558	2 781	2 610	2 074	1 699	1 163	452	1 248	797	567

Source: ESTA, Eurostat

**Table 4: Welded tubes OD ≤ 406.4mm (1)**  
**Main indicators**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	5 557	5 466	5 560	5 990	6 745	6 637	7 012	6 598	6 441	5 975
Production	6 550	6 240	6 068	6 329	6 970	6 928	7 093	6 745	6 345	5 846
Extra-EU exports	1 416	1 177	912	837	931	1 027	872	896	743	647
Trade balance	993	774	508	339	225	291	81	147	-96	-129

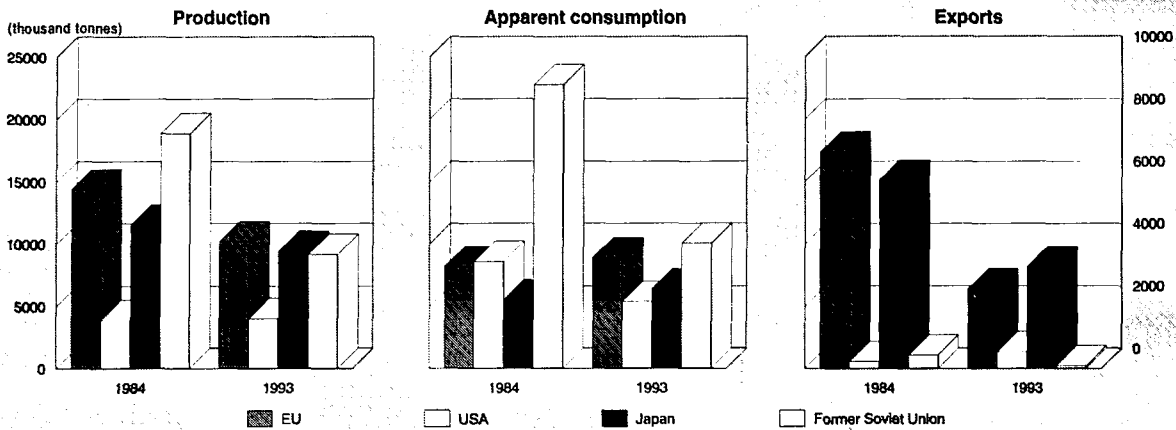
(1) Includes tubes of non-circular cross section.  
Source: ESTA, Eurostat

**Table 5: Steel tubes**  
**Breakdown by major product line, 1993**

(thousand tonnes)	Apparent consumption	Production	Extra-EU exports	Trade balance
Steel tubes	8 874	10 217	2 556	1 343
Seamless tubes	1 740	2 645	1 248	905
Welded tubes OD > 406.4mm	1 159	1 726	661	567
Welded tubes OD ≤ 406.4mm (1)	5 975	5 846	647	-129

(1) Includes tubes of non-circular cross section.  
Source: ESTA, Eurostat

**Figure 3: Steel tubes**  
International comparison of main indicators in volume



Source: ESTA, Eurostat

be seen as developing slowly. However, since 1992, production has been reduced dramatically in some countries as a consequence of lower export possibilities and heavy imports. For 1994, production figures show some upturn. For the medium term, no noticeable growth can be expected.

During 1993, apparent consumption of steel tubes in the EU decreased by 9.4 %, but is expected to rise by 6 % in 1994. Production, reduced in 1992 by 10 %, saw an additional reduction of 10 % in 1993. However, a recovery of 7 % is expected for 1994. Extra-EU exports, after a dramatic decrease of 27.4 % in 1992, experienced a 15 % decrease in 1993, but were expected to increase by 9.5 % in 1994. Extra-EU imports declined in 1993 by 18 % due to weaker consumption, but were estimated to rise by 7 % in 1994.

Data for steel tubes employment shows a 4 000 person decrease in 1993. In total, between 1984 to 1993 employment has experienced a 42 % reduction. Although apparent consumption has increased steadily, or at least remained level, over the past decade, it has mostly been to the advantage of third country competitors. The share of imports from third countries of EU consumption, measured in tonnes, has increased strongly from 9.1 % in 1984 to 13.7 % in 1993. Consequently, trends for employment can only be assessed with pessimism. In 1994 a further 2 700 jobs were to be lost.

Growth in the steel tube sector has clearly lagged behind developments in general manufacturing as a whole. Since 1987, general manufacturing has been characterised by strong growth in production and consumption and a stagnation in extra-EU exports and employment. In contrast, all indicators for the steel tube sector, with the exception of consumption, have shown sharp declines with a temporary recovery in 1994.

#### International comparison

EU production of steel tubes in 1993 accounted for 18.6 % of world production compared to a 1984 production share of 20.6 %. In world ranking, the EU is ahead of Japan and the USA. The former Soviet Union had been at the top of the list for the past several years. In Japan and the EU, steel tube production greatly exceeds domestic consumption which is reflected in their roles as the most significant steel tube exporters.

While the EU, the USA and Japan have suffered setbacks in their shares of world production since the 1980s, the newly industrialised countries (NICs) and developing countries (DCs) have been winners. Consequently, some of these countries, such as Turkey, Mexico, Venezuela, Brazil, Argentina,

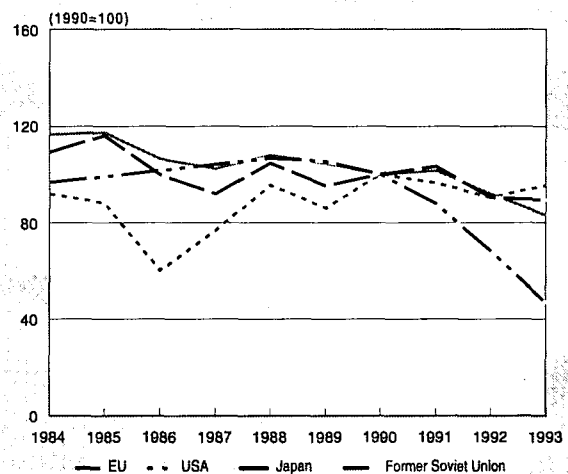
Taiwan, The Republic of Korea and Thailand have continued to expand their production capacity, often supported by heavy state aid. Other winners since 1992 are steel tube producers in the East European countries where, in most cases, raw materials, energy and labour costs are subsidised.

#### Foreign trade

The EU's share of estimated world exports of steel tubes amounts to about 38 %, intra-EU trade included, or roughly 25 %, intra-EU trade excluded. Extra-EU exports of steel tubes have fluctuated since 1985, while extra-EU imports have generally increased in volume, leading to a declining trade balance. However, 1993 was an exception as weak consumption of steel tubes led to a 17 % decline in extra-EU imports.

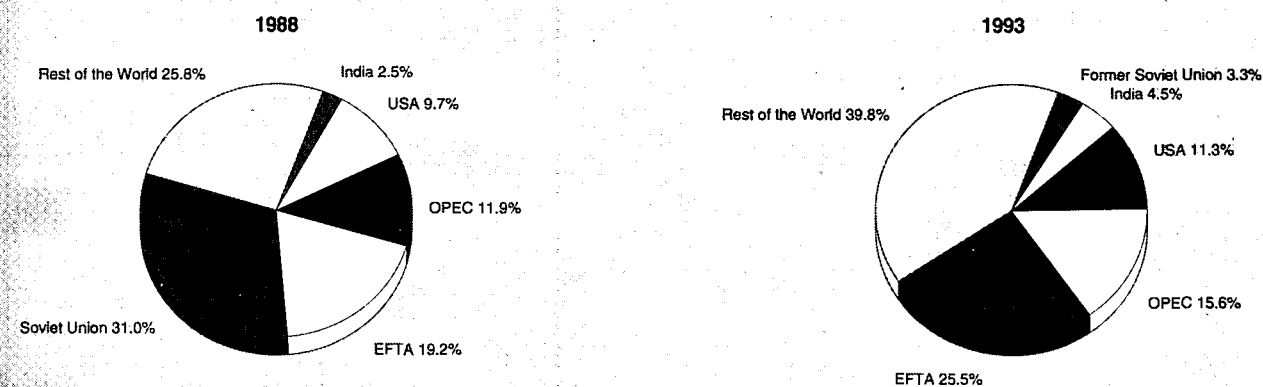
The list of countries receiving EU exports has changed considerably between 1988 and 1993. Exports to EFTA and OPEC countries rose 25 % during this period, while the former Soviet Union, which was a major export market, has reduced its share of EU exports from 31 % to only 3.3 %. EFTA countries remain the dominant suppliers to the EU steel tube market. However, over the last five years, there has been an 8 %

**Figure 4: Steel tubes**  
International comparison of production in volume



Source: ESTA

**Figure 5: Steel tubes  
Destination of EU exports**



Source: Eurostat

decrease in the share of EU imports coming from EFTA countries, while Central and East European countries have more than doubled their exports to the EU. Intra-EU trade is significant, but has shown a decline in 1992 and 1993. In value terms, it amounted to 68 % of total EU imports in 1993.

## MARKET FORCES

### Demand

The most important steel tube consuming sectors are: oil and gas exploration and extraction, transport of oil and gas by pipelines, nuclear and other steam generation industries, mechanical engineering, the automotive industry, structural steel work, the building industry and other metal processing industries. Due to economic developments in these sectors, apparent consumption of steel tubes in the EU rose by 30 % from 1984 to 1990, reaching 10.6 million tonnes. In the following years, however, consumption shrank due to lower investment activity in almost every steel tube consuming sector.

As from 1994, the automotive and mechanical engineering industries have registered growing order volumes, which have led to the expectation of higher consumption figures for steel tubes in 1994 and 1995.

At the same time though, export markets for EU mills have decreased. In 1984, 48.3 % of EU steel tube production was exported to third countries, while in 1993 this share was down to only 25 %. This decrease shows a serious fall in sales opportunities for the EU. The main reason for the reduction in extra-EU exports is the dramatic fall in orders from the former Soviet Union and other East European countries, caused by their lack of purchasing power. Another reason is the short-fall of orders from China as a consequence of their growing self-sufficiency for ordinary steel tubes.

### Supply and competition

Despite continuous labour and production cutbacks, the EU steel tube industry still suffers from world-wide over capacity. The effects on profit margins for commodity steel tubes are

**Table 6: Steel tubes  
Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.92	-2.71	0.92	-9.40
Production	-2.13	-5.68	-3.72	-9.67
Extra-EU exports	-9.19	-12.15	-10.52	-14.86
Extra-EU imports	11.58	-1.45	5.58	-18.38

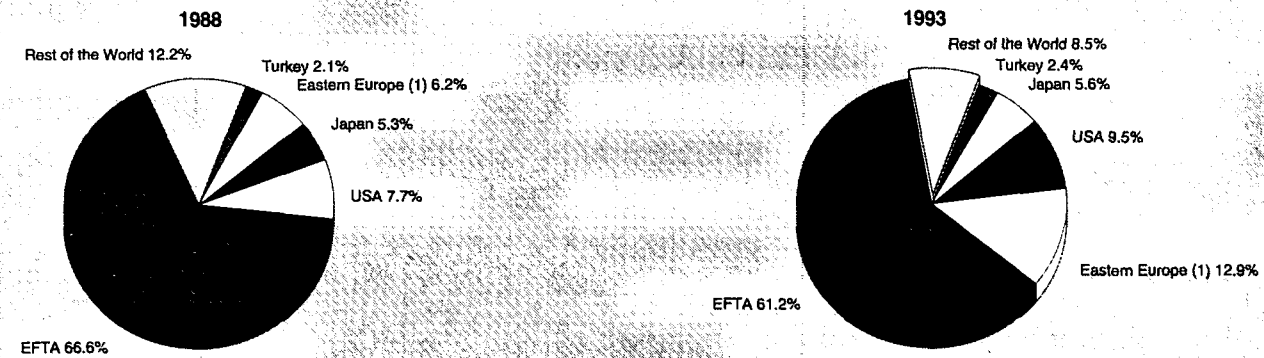
Source: ESTA, Eurostat

**Table 7: Steel tubes  
External trade at current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	4 496	4 788	3 550	2 970	3 293	3 575	2 677	3 092	2 496	2 152
Extra-EU imports	629	665	699	682	900	1 141	1 146	1 116	1 056	874
Trade balance	3 867	4 123	2 851	2 288	2 393	2 434	1 531	1 976	1 440	1 278
Ratio exports/imports	7.15	7.20	5.08	4.35	3.66	3.13	2.34	2.77	2.36	2.46
Intra-EU trade	1 763	1 991	1 916	1 730	2 239	2 700	2 958	3 116	2 833	1 859
Share of total imports (%)	73.7	75.0	73.3	71.7	71.3	70.3	72.1	73.6	72.8	68.0

Source: ESTA, Eurostat

**Figure 6: Steel tubes  
Origin of EU Imports**



Source: Eurostat

considerable; especially in export markets. Given the range of purchase possibilities world-wide and rising imports, customers are in a strong position to dictate price.

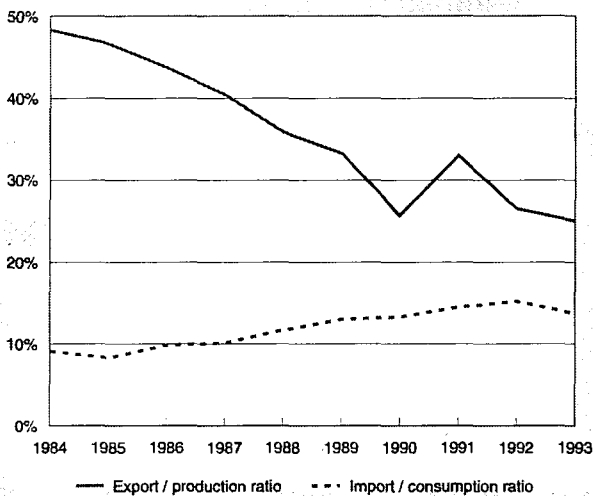
Internal competition within the EU is high. In 1993, intra-EU trade amounted to more than 2.6 million tonnes (with some figures still missing) or roughly 30 % of the consumption of steel tubes. In value terms, intra-EU imports for 1993 totalled 1 859 million ECU, about 31 % of consumption. This is an indication of the fact that there are very few trade barriers in the steel tube sector. Thus, further impacts of the EU single market are expected to be low.

EU competitiveness with respect to third countries, however, is threatened when imported steel tubes are subsidised in their production and/or are produced under non-market economy conditions.

### Production process

Technically, the EU steel tube industry is at the leading edge. Continued investment in research and development ensures high quality steel production and rolling processes. In most

**Figure 7: Steel tubes  
Trade intensities in volume**



Source: ESTA, Eurostat

EU steel tube production facilities, the quality assurance system is certified according to ISO 9001/9002. On-going rationalisation efforts, both in production and labour, have kept costs at a competitive level. In the period from 1984 to 1993, the number of employees in the steel tube industry dropped by 42 %. However, productivity increased by 23 % over the same period.

It should be noted that in many sectors of seamless and welded tubes different product categories are manufactured in the same mill, i.e. tubes of commercial grade, as well as, tubes of highly sophisticated quality. This means that installations need to be filled with a substantial base load of commodity products along with high added value grades to obtain a cost level which is competitive on the world market.

## INDUSTRY STRUCTURE

### Companies

The steel tube industry is a primary steel processing industry with a highly concentrated structure. Five countries, Germany, Italy, France, the United Kingdom and Spain, account for roughly 90 % of total production. In some countries, a single company can account for 50 % or more of national output. In addition to the major integrated steel tube manufacturers (mainly welded tubes), there are a relatively large number of small and medium-sized firms that are independent. Some manufacturers, often small in tonnage terms, operating in niche, high value-added markets, concentrate on the manufacture of special dimensions and grades of tubes according to particular customer specifications. At the end of 1993 there were 285 production units in the EU belonging to an estimated 245 enterprises. Of these, 67 specialise in cold drawing of seamless or welded tubes.

### Strategies

No significant investment has taken place in recent years due to reductions in capacity imposed by the difficulties in the market since 1985. Contrary to the early 1980s, when some investment was directed towards expanding capacity, current investments relate to improvements in productivity and quality.

In the past, companies and countries tended to either manufacture a full range of products or to specialise in niche markets. To strengthen the competitiveness of the industry, consideration is now being given to cross-border mergers and cooperation followed by capacity reductions.

**Table 8: Steel tubes**  
**Trade with Eastern Europe (1)**

	Exports to Eastern Europe				Imports from Eastern Europe				Share of total extra-EU imports (%)			
	1990	1991	1992	1993	1990	1991	1992	1993	1990	1991	1992	1993
In volume (thousand tonnes)	565	444	168	196	210	288	434	294	15.0	20.3	29.2	24.2
In value (million ECU)	430	334	162	175	82	112	161	106	7.2	10.0	15.2	12.1
ECU / tonne	761	752	964	893	390	389	371	361	N/A	N/A	N/A	N/A

(1) Bulgaria, former Czechoslovakia, Hungary, Poland, Romania and the former Soviet Union.  
Source: ESTA, Eurostat

**Table 9: Steel tubes**  
**Labour productivity and unit costs (1)**

(1990=100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Productivity (tonnes/employee)	143.9	152.5	149.6	169.0	178.0	172.6	173.6	181.0	183.3	177.1
Productivity index	82.9	87.9	86.2	97.3	102.5	99.4	100.0	104.2	120.2	116.1
Unit labour costs index (2)	95.8	97.1	109.5	108.6	91.7	90.9	100.0	102.0	104.4	102.8
Total unit costs index (3)	86.2	89.8	91.9	88.6	90.0	97.7	100.0	96.7	95.3	90.5

(1) Estimates are used if country data is not available, especially from 1990 onwards.  
(2) For the whole of NACE 2220; based on labour costs in current prices per person employed.  
(3) For the whole of NACE 2220; based on total costs in current prices per person employed, excluding costs of goods bought for resale.  
Source: ESTA, DEBA

### Impact of the Single Market

As for many sectors, the customs duties for steel tubes were reduced to zero on July 1st 1968. Starting slowly in the sixties, then accelerating, the interpenetration between the EC countries grew from year to year. Exports and imports within the Community reached a share of 40-50% of the market consumption. The free movement of goods within the EU was thus realised at least twenty years before the installation of the "Single market" on January 1st 1993.

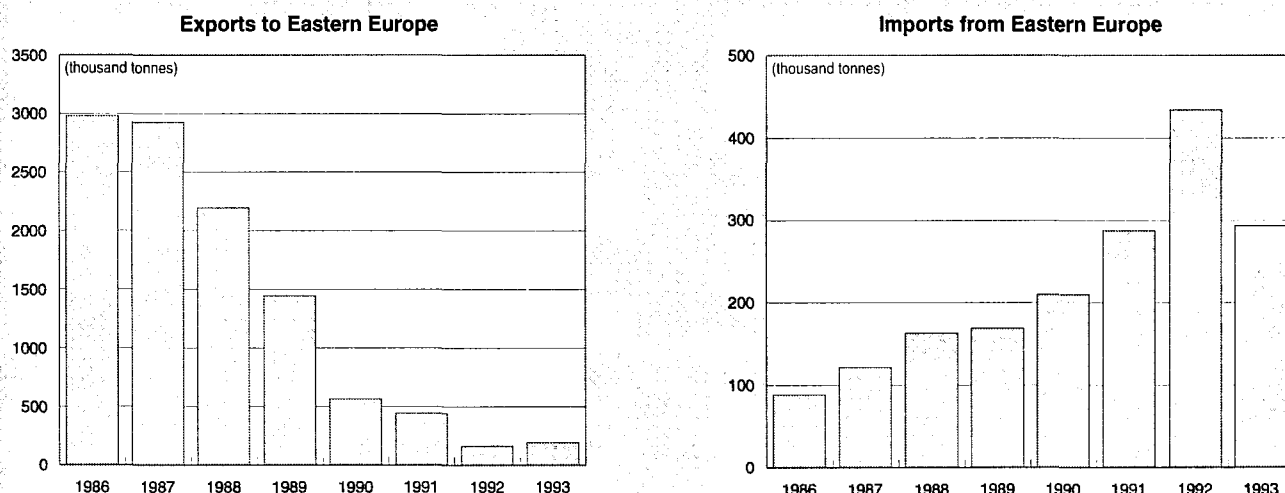
The free movement of goods has by far been the most important aspect of European market integration. The other aspects have had less incidence on the situation of the sector. Some non-

tariff barriers have been abolished. Beside some other positive effects, there was also a negative effect in that the system for gathering data on trade between Member States from businesses (Intrastat) has created a situation of incomplete and late statistics. This makes it difficult to monitor developments in the industry.

### ENVIRONMENT

Costs arising from environmental protection legislation are considerable. To a large extent, costs of classical end-of-the-pipe measures, such as the treatment of emissions from raw material production units, reheating furnaces, noise control,

**Figure 8: Steel tubes**  
**Trade with Eastern Europe (1)**



(1) Bulgaria, former Czechoslovakia, Hungary, Poland, Romania and the former Soviet Union.  
Source: ESTA



**Table 10: Steel tubes**  
**Expected real annual growth rates**

(%)	1994-95	1994-98
Apparent consumption	2.1	0.7
Production	0.0	0.2
Extra-EU exports	-3.6	0.8

Source: ESTA

and the treatment of waste water, can amount to as much as 50 ECU per tonne and average at least 1 % of turnover for EU firms. Waste reduction strategy is implemented more often in refurbishments or modifications of current production processes, procedures and feed stock than it is in the input/output balance. Heat usage and water saving measures, treatment of process liquids, recycling of materials and maximising yields are just a few of the measures used that follow the needs of "best available technology" (BAT). Additional costs, which at present cannot be estimated, arise from the installation of measures to maintain and boost confidence in an environmentally friendly industry. This also prevents site closures for environmental reasons. These measures are in line with the Community Eco Audit Regulation and the Regulation of Free Access to Environmental Information requirements. Steel and steel tube manufacturing enjoy the advantage that during the production process no toxic gases develop and waste material is immediately and completely recycled. Another environmentally sound characteristic of steel is that it can be entirely recycled without polluting the environment.

## REGULATIONS

Trade regulations are a key source of concern for EU steel tube producers. Trade barriers in several countries of the world hamper the penetration of EU exports. The reduction of non-tariff barriers was an important item in the framework of the GATT negotiations.

Harmonisation of EU standards in the sector is well-developed. Internal barriers have practically disappeared and thus do not impede the free circulation of goods among Member States. The EU steel tube market remains open for imports from third countries, provided they enter under fair trade conditions, however, they face strong competition from domestic suppliers and suppliers in other Member States. And, unfair trade practices will be countered by Antidumping and Countervailing procedures.

## OUTLOOK

After a decrease of 9.4 % in EU consumption of steel tubes in 1993, a 6 % recovery is expected in 1994. Production, after the 1992 and 1993 downturns of 10 % each, is estimated to pick up about 7 % in 1994. EU countries which are affected by heavy imports and lack of export opportunities suffer most from production cutbacks, which amounted to as much as to 25 % in 1993. Full recovery of the steel tube industry cannot be expected before mid-1995, brought about by stronger overall economic growth. Exports, however, will continue to decrease.

In the medium term, the development of the EU steel tube industry will be characterised by a number of risks and opportunities. The main risks are a continued increase of imports from Central and East European countries which could lead to further plant closures in the EU. Continued weak demand in the US market and an increase in the export activities of subsidised producers in third countries will also dampen export demand for EU steel tube manufacturers. A new development, however, is the change of export flows into the US market, which are now prevented by actual or threatened trade cases. These tonnages now are diverted to other markets in the world including the EU.

There are promising opportunities for the future, however. Economic recovery in the former Soviet Union and Central and East Europe could emerge more quickly, bringing larger export markets. An improvement in the world economic situation with related growth in demand from the energy industry will increase the order books of the steel tube mills. Finally, fair trade enforcement under confirmed GATT regulations will also support the industry's activity.

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# First processing of steel

## NACE 223

After a period of growth from 1988 up to 1990, the production of the first processing of steel sector decreased. It was of 14 millions tonnes in 1993 against 15.5 million tonnes in 1990, the highest level of the period, but should have reached 14.6 million tonnes in 1994. Extra-EU exports have been increasing from 1988 to 1993 as well as extra-EU imports (except for 1993).

The exports/imports ratio in value has been decreasing from 1988 to 1992, and improved in 1993. The steady increase of imports from Eastern Europe is one of the major factors behind the deterioration of the export/import ratio. As a consequence of these trends and of intensified rationalisation measures, there has been a drop in employment of 10 000 workers during the period 1988 to 1994.

### INDUSTRY PROFILE

#### Description of the sector

Sector 223 of NACE is in fact just a part of first processing of steel. The manufacture of steel tubes (sector 222 of NACE) is also a first processing of steel activity but is considered separately in this publication.

Sector 223 includes the following subsectors:

- NACE 223.1: Cold drawing of steel bars
- NACE 223.2: Cold rolling of steel strip
- NACE 223.3: Cold forming of steel flat products
- NACE 223.4: Cold drawing of steel wire and manufacture of wire products.

The manufacture of cold drawn wire and wire products is the largest activity of the sector with a share of 58.5 % of production volume and 45 % of extra-EU exports in 1993.

#### Manufacturing process

Cold processing of hot rolled raw material is a common feature of the four subsectors: this processing method leads to more accuracy in size and mechanical properties, as well as improvement of the surface condition (except for cold forming) compared to products obtained in the hot mill. The products are mostly manufactured according to the requirements of each individual customer, something which is obviously not possible for the primary steel industry.

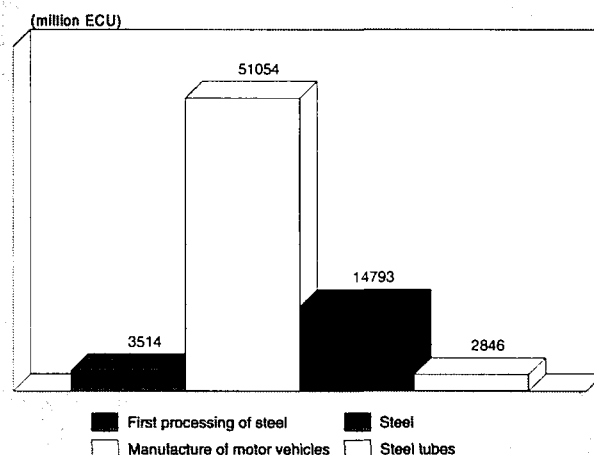
#### Classification in the Combined Nomenclature (C.N.)

Products covered here are classified in chapters 72 and 73 of the "C.N.". Except for cold rolled strip and cold formed wide sections, external trade statistics can be used for the calculation of apparent consumption. The problem for cold rolled strip is that strip produced by the cold rolling industry cannot be classified apart of the cold rolled products obtained by slitting of cold rolled sheet manufactured by the primary steel industry. Concerning cold formed sections, as production figures for wide sections are not available, consumption can only be calculated for long sections. Consequently, apparent consumption is not available for sector 223 as a whole.

#### Period covered

In order to have homogenous figures for external trade statistics, the period selected for the tables and figures begins in 1988, the year of enforcement of the C.N. based on the Harmonized System, which has replaced the previous Common

**Figure 1: First processing of steel**  
Value added in comparison with related industries, 1993



Source: DEBA

Custom's Tariff and Nimexe nomenclatures. Accordingly, the period 1988 to 1994 has been selected for all other statistical information.

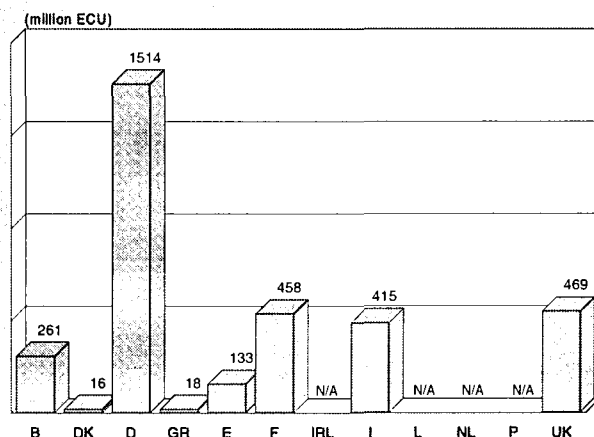
#### Recent trends

In 1993, production in value was 14.7 % lower than in 1989 and 1990. In 1994, the production has increased by 9.8 % (see Table 3).

Production in volume decreased by 2.8 % in 1991, 1.2 % in 1992 and 6.2 % in 1993. For 1994, a 4.5 % growth was estimated. The trade balance has dropped by 20.7 % in 1991, 5.9 % in 1992. In 1993, there has been an increase of 31.5 % due to higher exports and lower imports (see Table 1).

Similarly to the primary steel and steel tube sectors, since 1990 production and employment in the first processing of steel sector have clearly lagged behind the growth in the manufacturing industry as a whole (see Figure 3). Labour productivity has been improving since 1988 except for 1993, while unit labour costs have increased year after year since 1988.

**Figure 2: First processing of steel**  
Value added by Member State, 1993



Source: DEBA

**Table 1: First processing of steel**  
**Main indicators in volume**

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994 (1)
Production	15 164	15 424	15 533	15 096	14 915	13 987	14 620
Extra-EU exports	2 270	2 271	2 187	1 949	2 032	2 231	N/A
Extra-EU imports	1 028	1 139	1 183	1 153	1 283	1 246	N/A
Trade balance	1 242	1 132	1 004	796	749	985	N/A
Employment (thousands)	92.5	90.8	89.2	88.1	85.6	83.5	82.5
Labour productivity (tonnes / worker)	163.9	169.9	174.1	171.4	174.2	167.5	177.2

(1) European Committees' estimates.  
Source: Eurostat, European Committees

**Table 2: First processing of steel**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1988	1989	1990	1991	1992	1993	1994 (2)
Labour productivity index (3)	94.1	97.5	100.0	98.4	100.1	96.2	101.8
Unit labour costs index (4)	92.8	94.9	100.0	108.6	108.5	109.8	N/A
Total unit costs index (5)	92.9	101.5	100.0	98.1	95.7	95.5	N/A
Gross operating rate (%) (6)	9.4	7.2	7.2	5.8	5.3	4.4	7.6

(1) Some country data has been estimated.  
(2) European Committees' estimates.  
(3) Based on index of production / index of employment.  
(4) Based on index of labour costs / index of production.  
(5) Based on index of total costs (excluding costs of goods bought for resale) / index of production.  
(6) Based on (value added - labour costs) / turnover.  
Source: DEBA, European Committees

**Table 3: First processing of steel**  
**External trade in current prices**

(million ECU)	1988	1989	1990	1991	1992	1993	1994
Production	11 925.5	13 925.7	14 006.8	13 063.1	12 956.8	11 943.5	13 116.0
Extra-EU exports	2 250.0	2 573.3	2 331.6	2 079.4	2 032.9	2 231.5	2 523.8
Extra-EU imports	902.3	1 113.0	1 125.9	1 070.4	1 131.1	1 060.3	1 364.3
Trade balance	1 347.7	1 460.3	1 205.7	1 009.0	901.8	1 171.2	1 159.5
Ratio exports/imports	2.5	2.3	2.1	1.9	1.8	2.1	1.8
Intra-EU trade	3 655.6	4 272.8	4 210.8	4 049.7	3 993.0	3 289.4	3 933.3
Share of total imports	80.2	79.3	78.9	79.1	77.9	75.6	75.0

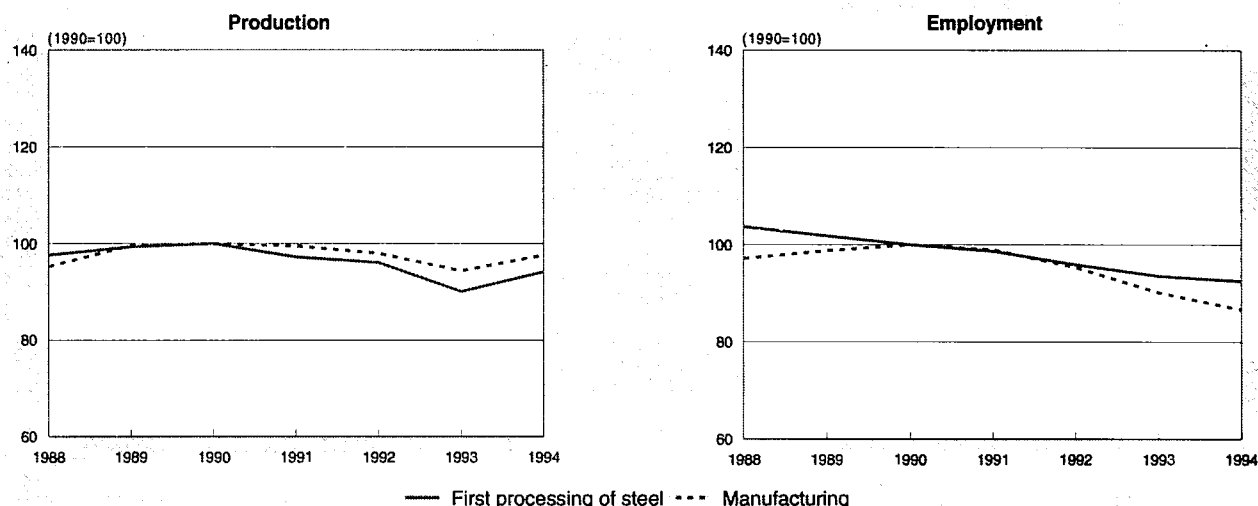
Source: DEBA, Eurostat

**Table 4: First processing of steel**  
**Production specialisation (1)**

(ratio)	1988	1993
Belgique/België	1.59	1.98
Danmark	0.09	0.17
BR Deutschland	0.57	1.23
Hellas	0.36	0.78
España	0.32	0.73
France	0.45	0.72
Ireland	N/A	N/A
Italia	0.48	1.02
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.20	N/A
United Kingdom	0.54	0.96

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

**Figure 3: First processing of steel  
Production and employment compared to EU total manufacturing Industry**



1994 are DEBA and European Committees' estimates.  
Source: DEBA, European Committees

### International comparison

The available statistics of production in current prices (see Figure 4) show a slight difference between 1988 and 1993 for the EU while there were increases of 7.2 % for the USA and of 17.8 % for Japan. In 1994, there were increases of 9.8 % for the EU and 7.5 % for the USA, while for Japan there has been a decrease of 3.5 %.

EU production was 39.7 % that in the USA in 1988, against 33.2 % in 1994. As for Japan, EU production was by 12.6 % lower in 1988, against 15.4 % in 1994.

### Foreign trade

Extra-EU exports have been decreasing from 1989 up to 1992, while they increased by 9.7 % in 1993. Extra-EU imports have been increasing from 1988 up to 1992 (except in 1991). In 1993 they fell by 6.2 % against 1992. The trade balance has been decreasing from 1989 up to 1992 and increased by

12 % in 1993 (see Table 1). Accordingly, the exports/imports ratio has been decreasing until 1992 and has improved in 1993 (see Table 3).

Figure 6 shows slight changes in the destination of extra-EU exports except for the share of the former Soviet Union which has shrunk by 3.5 times over the 1988-93 period. As for extra-EU imports (see Figure 7), the share of Eastern Europe has almost doubled over the period under consideration.

## MARKET FORCES

### Demand

A wide variety of sectors are customers of the first processing of steel industries which are described below. In 1993, most users had to cope with recession. In 1994, there have been signs of recovery in users sectors.

### Supply and competition

In order to improve its competitiveness, during recent years the first processing of steel sector has been forced to cut its workforce. There has been a loss in employment of around 10 000 workers between 1988 and 1994.

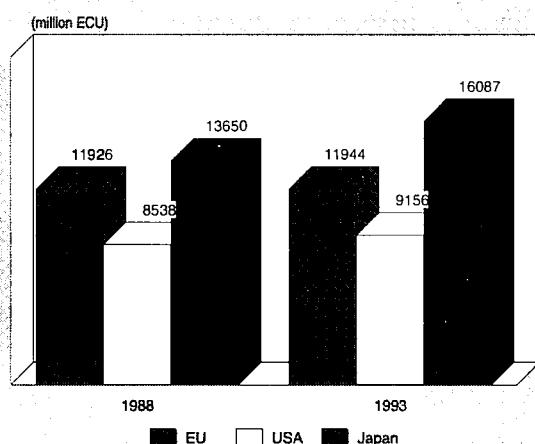
With the slowdown of production, labour productivity has declined in 1993, but it increased by 5.8 % in 1994. The situation of overcapacity is still persistent in most producing countries. Capacity is estimated around 20 million tonnes.

Competition within the EU remained keen in recent years, but intra-EU imports which were of 4.8 million tonnes in 1992, dropped to 4.1 million tonnes in 1993.

Imports from third countries have been increasing since 1988, growing from 1 million tonnes up to 1.3 million tonnes in 1992 corresponding to 0.9 million ECU and 1.1 million ECU respectively. However, extra-EU imports dropped by 2.9 % in volume and 6.2 % in value in 1993. The three new Member States accounted in 1993 for the following quantities of EU-12 imports: 237 thousand tonnes for Austria, 169 thousand tonnes for Sweden, 55 thousand tonnes for Finland.

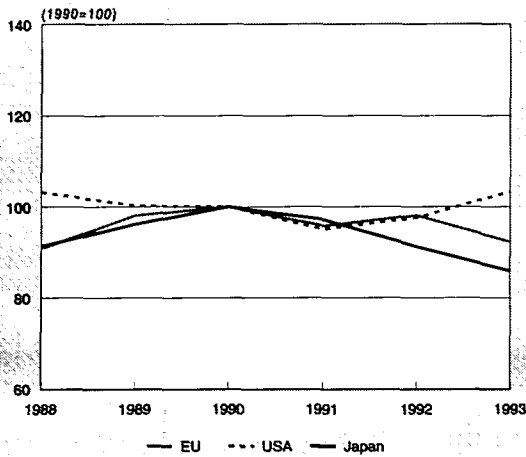
Imports from East Europe were in 1993 86 % higher than in 1988. The quantities have been of 202 thousand tonnes in 1988, against 376 thousand tonnes in 1993. They corresponded to 19.4 % of total extra-EU imports in 1988, 28.7 % in 1992,

**Figure 4: First processing of steel  
International comparison of production in current prices**



Source: DEBA

**Figure 5: First processing of steel**  
International comparison of production in constant prices



Source: DEBA

15.2 % in 1993. The average prices of this group of countries have been very low compared to the average prices of intra-EU imports and of third countries other than East European. In 1993, the Czech Republic was the most important competitor with 180 thousand tonnes, followed by Slovakia with 87 thousand tonnes, Poland with 70 thousand tonnes, Hungary with 22 thousand tonnes. The other main competitors in 1993 were South Africa with 39 thousand tonnes, Japan with 38 thousand tonnes, Russia with 37 thousand tonnes, Slovenia with 26 thousand tonnes, the USA with 25 thousand tonnes, China with 18 thousand tonnes, India with 14 thousand tonnes, South Korea with 13 thousand tonnes.

## INDUSTRY STRUCTURE

### Companies

The number of companies declined from 990 in 1988 to 910 in 1994 due to the closing of redundant installations. The situation at the end of 1994 was the following: Germany 301, Italy 222, France 125 Spain 116, the UK 90, Benelux 45, Denmark 7, Portugal 2, Greece 2. Among the biggest com-

panies, some are integrated to the steel industry, the others are independent and mostly small-size specialised companies.

### Strategies

In contrast to the major firms in the primary steel industry and the steel tube industry, mergers, acquisitions, alliances and cooperation are a less suitable strategy for the medium and small size companies of the first processing of steel sector.

The emphasis will continue to be placed on investments to achieve productivity gains. In addition, the trend towards specialisation will intensify. This applies also with regard to the completion of the Single Market. The introduction of the Single Market has had only relatively minor effects on the sector, given that trade among the various Member States was hardly hindered in the years previously to 1993.

As said above, products exchanged within the EU amounted to 4.1 million tonnes in 1993 which is considerable compared to the total deliveries on the EU market which amounted to 11.7 million tonnes. Due to comparable production techniques in all Member States and harmonisation of Standards published by the National Standardization Organizations, the quality of these products is consistent.

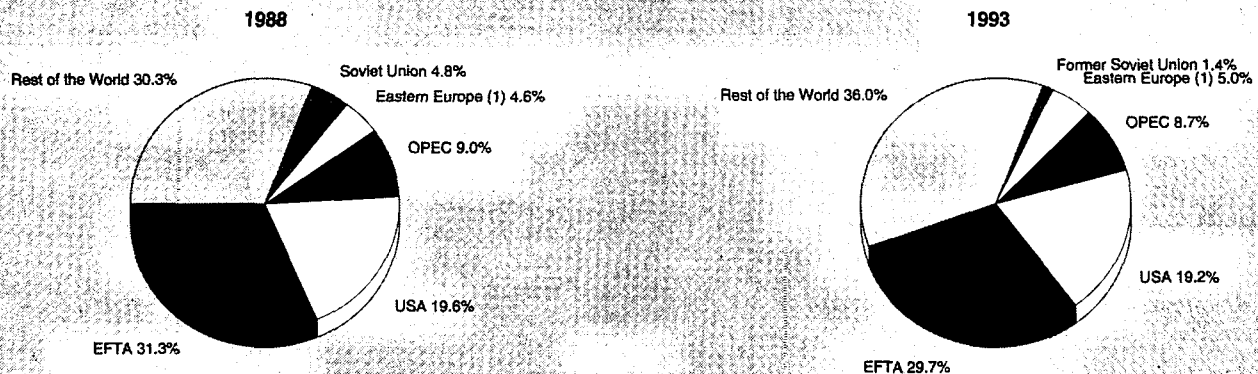
### Impact of the Single Market

As far as circulation of goods is concerned, the Single Market was born on July 1st 1968 with the abolition of custom's duties on trade between the Six Member States which founded the EEC. Since then, internal trade has been growing year after year. The date of January 1st 1993 marked the beginning of a new stage in the development of the Single Market, particularly with the free circulation of goods, services and capital.

Improved circulation of products across the EU and possibly reductions in costs could be achieved through the adoption of European Standards harmonising the technical specifications, or through changes in the organisation of the common commercial policy. In particular, several branches of the Sector consider that the commercial defence instruments may be strengthened. As the internal market becomes reality, there will be a further increase in the number of cross-border ventures in this sector.

One area in which the Internal Market programme may not have had a positive effect is the availability of valuable and up to date statistics making it possible to monitor developments in the sector.

**Figure 6: First processing of steel**  
Destination of EU exports



(1) Bulgaria, Czechoslovakia, Hungary, Poland, Romania.

Source: Eurostat

**Table 5: Cold drawing of steel bars  
Main indicators**

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994 (1)
Apparent consumption	2 456	2 497	2 495	2 206	2 103	1 821	N/A
Production	2 598	2 632	2 611	2 312	2 204	1 980	2 190
Extra-EU exports	282	295	280	241	251	311	N/A
Extra-EU imports	140	160	164	135	150	152	N/A
Trade balance	142	135	116	106	101	159	N/A
Ratio (exports / production)	10.9	11.2	10.7	10.4	11.4	15.7	N/A
Employment (thousands)	9	8.9	8.4	8.2	8.2	8.2	8.2
Labour productivity (tonnes / worker)	288.7	295.7	310.8	282.0	268.8	241.5	267.1

(1) European Committee estimates.

Source: Eurostat, European Committee

The elimination of controls at internal frontiers has axed the Single Administrative Document and made compulsory a new system for gathering data on the Trade between Member States (Intrastat) based on direct monthly return from businesses. The new system is, however, not yet satisfactory. For different reasons, figures published are not complete nor timely. The revision of NACE and the introduction of Prodcod will, however, substantially improve the knowledge on the production and activity of the First Processing of Steel Industries, for the two systems are to cover at least 90% of each sector in the Member States.

### REGIONAL DISTRIBUTION

The majority of the mills is concentrated in the highly industrialised regions: Ruhr district, Northern part of Italy, East and North of France, North East of Spain, West and South Midlands in the United Kingdom.

### ENVIRONMENT

Costs arising from environmental protection are significant in the first processing of steel sector. They are, to a large extent, due to costs incurred in the treatment of smoke emissions from reheating furnaces, treatment of waste water from the pickling installations where they still exist and noise control in the production units.

### REGULATIONS

Trade regulations are a key concern for the EU producers of steel and articles of steel. Up to the end of March 1992, the Voluntary Restraint Agreements (VRA) provided for quotas by group of products for exports to the USA. Since then, trade barriers have hampered the penetration of EU exports into the USA.

Different versions of a draft of "Multilateral Agreement on Steel Liberalization" have been subjected to negotiations between steel producing members of the former GATT, particularly the USA, EU Member States and other partners who were subject to a VRA. A number of meetings have been

held on the matter in Geneva on a multilateral basis or in Washington on a bilateral basis but it has still not been possible to solve the dispute.

### OUTLOOK

Economical recovery in the CIS and East Europe will progressively give the possibility of a development of foreign trade with these countries. In the meantime, imports from East Europe will certainly continue to increase.

As long as there are no clear rules to regulate the exports to the USA, the EU Members States will have all kind of difficulties to sell their products in this country.

Since January 1st 1995, the GATT has been replaced by the World Trade Organisation. This new body will have to implement the final agreement of the Uruguay Round. This should lead to intensification of foreign trade in the world and to higher industrial activity.

On January 1st, 1995 as well, Sweden, Finland and Austria have joined the EU. If the imports into the EU of these three countries were added to intra-EU imports for 1993, the results would have been 4.6 million tonnes corresponding to 3.8 million of ECU against 4.1 million tonnes and 3.3 million ECU for the twelve Member States.

## Cold drawing of steel bars NACE 223.1

### INDUSTRY PROFILE

#### Manufacturing process

Cold drawing concerns the manufacture of steel bars or sections by cold drawing, grinding or peeling of hot rolled steel bars into so-called Bright steel bars, having the form and characteristics required by the users. The finished product has tight tolerances, accurate mechanical properties and a high quality surface. Improved quality surface conditions and closer tolerances can be achieved by additional grinding and pol-

**Table 6: Cold drawing of steel bars  
Production in the EU, USA and Japan**

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994
EU	2 598	2 632	2 611	2 312	2 204	1 980	2 190
USA	1 360	1 335	1 348	1 217	1 323	N/A	N/A
Japan	1 280	1 344	1 394	1 369	1 176	1 086	N/A

Source: IISI

**Table 7: Cold rolling of steel strip**  
**Main indicators**

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994 (1)
Production	3 232	3 283	3 240	3 037	2 914	2 576	2 708
Extra-EU exports	841	807	785	694	755	775	N/A
Extra-EU imports	310	295	321	351	398	396	N/A
Trade balance	531	512	464	343	357	379	N/A
Employment (thousands)	15.9	15.8	15.7	15.3	14.9	14.8	14.7
Labour productivity (tonnes / worker)	203.3	207.8	206.4	198.5	195.6	174.1	184.2

(1) European Committee estimates.

Source: Eurostat, European Committee

ishing. Cold finishing during drawing operations hardens and increases the tensile strength of the steel, while at the same time reducing the ductility, which may require an annealing treatment of the product after drawing. Bright steel bars are mainly of circular, square rectangular or hexagonal section, but all kinds of sections can be produced according to demand. They are delivered in fixed length.

### Products manufactured

The subsector manufactures the following products: non alloy steel bars of free cutting steel and carbon steel bars; stainless steel bars; alloy steel bars of different grades including high speed steel and other tool steel and shapes and sections of different grades of steel. All these products meet the specifications of each individual user.

### Recent trends

Production has decreased by 10.2 % in 1993. Comparing 1993 with 1989, the decrease has been of 24.8 %. An increase of 10.6. % was estimated for 1994. Apparent consumption has decreased similarly to production from 1991 to 1993. Extra-EU exports have decreased since 1989, but increased by 23.9 % in 1993, due to growing demand from the USA, leading to a trade balance increase of 57.4 %.

### International comparison

The statistical yearbook published by the International Iron and Steel Institute (IISI) gives figure showing that besides the EU, the major producing countries of cold finished bars are the USA and Japan. The evolution since 1988 is shown in Table 6.

### Foreign trade

There have been some changes in the destination of extra-EU exports in value. The share of Eastern Europe decreased from 5.7 % to 3.9 %. For the USA, the share in 1993 was of 32.4 % against 26.7 % in 1988.

Extra-EU exports to the USA have been of 86 thousand tonnes in 1988, against 107 thousand tonnes in 1993.

There have also been changes in the origin of extra-EU imports. The share of East Europe has almost doubled with 11.7 % in 1993 against 6 % in 1988.

### MARKET FORCES

#### Demand

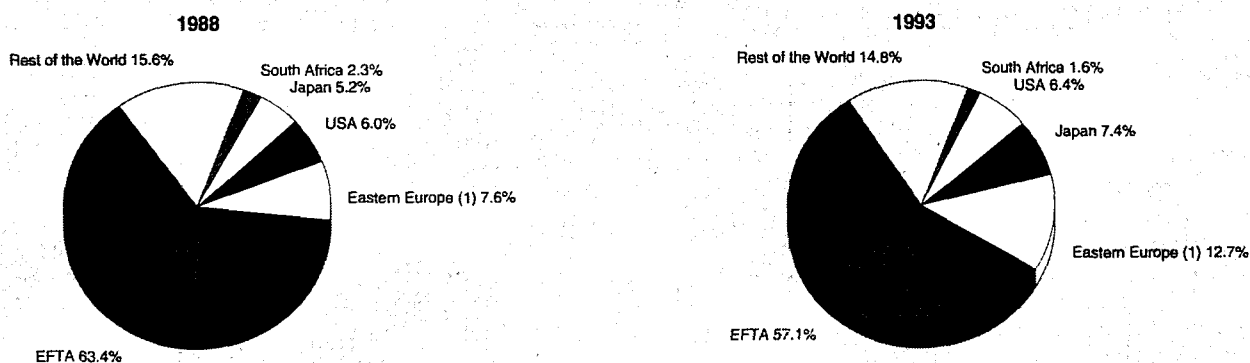
Bright steel bars are used by industries such as manufacture of motor vehicles, machinery, electrical goods and other industries, where a high quality basic material is compulsory.

#### Supply and competition

The loss in employment was of around 800 workers from 1988 to 1994. Labour productivity has decreased since 1990 by 22.3 %. It should have increased by 10.6. % in 1994. Production capacity was around 4 million tonnes in 1993 compared to a production of around 2 million tonnes.

Intra-EU imports amounted to 490 thousand tonnes against 596 thousand tonnes in 1988. After strong increases in 1989 and 1990, extra-EU imports have decreased, albeit at a slow pace.

**Figure 7: First processing of steel**  
**Origin of EU imports**



(1) Bulgaria, Czechoslovakia, Hungary, Poland, Romania.

Source: Eurostat

**Table 8: Cold roll forming or folding of steel (long sections only)**  
Main indicators

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994 (1)
Apparent consumption	1 243	1 301	1 280	1 409	1 436	1 277	N/A
Production	1 206	1 246	1 225	1 343	1 365	1 247	1 340
Extra-EU exports	65	61	64	69	70	79	N/A
Extra-EU imports	102	116	119	135	141	109	N/A
Trade balance	-37	-55	-55	-66	-71	-30	N/A
Employment (thousands)	11.4	11.3	11.2	10.9	10.4	9.8	10.1
Labour productivity (tonnes / worker)	105.8	110.3	109.4	123.2	131.3	127.2	132.7

(1) European Committee estimates.  
Source: Eurostat, European Committee

### Technological progress

There has been steady progress in processes used to manufacture bright steel bars, mainly with the introduction of computers in the production lines, in order to meet the demand of users for even higher quality finished products. The methods used keep gauge, mechanical properties and surface condition under much stricter control.

### INDUSTRY STRUCTURE

#### Companies

The number of companies declined from 162 in 1988 to 141 in 1992. The situation at the end of 1994 was the following: 51 in Germany, 20 in France, 25 in Italy, 26 in Spain, 16 in the United Kingdom, 1 in Denmark, 1 in Portugal, 1 in Belgium.

### ENVIRONMENT

An innovation in this field has been the substitution of pickling by shotblasting in the de-scaling of raw material. This has eliminated problems of discharging acid pickling tank contents into local waterways. This industry has no major problems of acoustic pollution.

## Cold rolling of steel strip NACE 223.2

### INDUSTRY PROFILE

#### Manufacturing process

Cold rolling of steel strip is a process in which pickled flat hot rolled steel products are rolled between polished cylinders. The dimensions of the finished product are of less than 600 mm in width and 0.025 mm up to 12.5 mm in wall thickness.

In the wall thickness range of 0.3 mm up to 3 mm, other flat cold rolled steel products can be obtained by slitting coils of large cold rolled sheet manufactured by the primary steel industry. This operation is done either by the primary steel industry itself or by distributors of steel products.

Rerolling gives a high quality product with consistent dimensional and internal characteristics. The equipment used to roll, anneal, slit, edge and heat treat cold rolled steel strip is highly capable of producing an unique product when compared to large cold rolled sheet mills found in all integrated steel plants throughout the world.

The specialised rolling mills and processing equipment used allow to meet all the different requirements of each individual customer; mainly close tolerances, special forming capabilities

and special finishes (surface edges, coating, for instance) which are not possible for the primary steel industry.

#### Products manufactured

The subsector manufactures the following products: steel strip of a carbon content up to 1.25 %, including rolled or blue strip for packaging; steel strip coated with zinc, tin, lead, copper, nickel or with paint, varnish or plastic, printed on request; clad steel strip; quenchable or quenched steel strip; stainless steel and other alloy steel strip.

#### Recent trends

Production has decreased by 11.6 % in 1993. Comparing 1993 and 1988, there has been a decrease of 20.3 %. An increase of 5.1 % was estimated for 1994. Extra-EU exports have been decreasing from 1988 until 1991. In 1992, there was an increase of 8.8 %, in 1993 of 2.6 %. Nevertheless, the level of 1993 was 7.8 % under 1988. For extra-EU imports, there has been a continuous increase from 1989 up to 1992 while they stagnated at a similar level in 1993.

#### Foreign trade

There have been some changes in the destination of extra-EU exports in value between 1988 and 1993. The share of East Europe grew from 4.5 % to 6 %, while the share of the former Soviet Union fell to 1.3 % from 9.1 %. There was an increase for the USA, 14.7 % against 12.2 % in 1988. China, which was at 6 %, fell to 1.4 %, while Hong Kong which was at 1.8 % reached 4.4 %.

For extra-EU imports, the share of Eastern Europe increased from 2 % to 5.5 %, while the USA grew from 6.8 % to 10.2 %.

### MARKET FORCES

#### Demand

Cold rolled steel strip is used for the manufacturing of automotive parts, hardware, office equipment, fasteners, bearings, chains, tubes and many other products, whenever a high quality basic material is compulsory.

The most important consuming sectors are the manufacture of motor vehicles and other transport equipment including bicycles, which account for more than half of the demand.

#### Supply and competition

The loss in employment was of around 1 200 workers between 1988 and 1994; nevertheless, labour productivity has decreased by 16.2 % between 1988 and 1993. It was expected to increase by 5.8 % in 1994. Capacity was around 4.3 million tonnes compared to a production of 2.6 million tonnes in 1993.

Intra EU imports amounted to 1 535 thousand tonnes in 1988, against 1 501 thousand tonnes in 1993.

Total extra-EU imports increased year after year between 1989 and 1992 but decreased slightly in 1993. Imports from Austria



**Table 9: Cold drawing of steel and manufacture of wire products of steel****Main indicators**

(thousand tonnes)	1988	1989	1990	1991	1992	1993	1994 (1)
Apparent consumption	7 567	7 769	8 029	8 034	8 116	7 744	N/A
Production	8 128	8 263	8 457	8 404	8 432	8 184	8 382
Extra-EU exports	1 031	1 056	1 002	906	901	1 007	N/A
Extra-EU imports	470	562	574	536	585	567	N/A
Trade balance	561	494	428	370	316	440	N/A
Ratio (exports / production)	12.7	12.8	11.8	10.8	10.7	12.3	N/A
Employment (thousands)	56.3	54.9	53.9	53.7	52.1	50.6	49.6
Labour productivity (tonnes / worker)	144.4	150.5	156.9	156.5	161.8	161.7	169.0

*(1) European Committee estimates.**Source: Eurostat, European Committee*

were of 114 thousand tonnes, imports from Sweden 91 thousand tonnes. Imports from the Czech Republic were of 18 thousand tonnes in 1993, 35 thousand tonnes from Slovakia. Other imports in 1993 mainly came from Japan with 18 thousand tonnes and the USA with 17 thousand tonnes.

**Technological progress**

In the 1960s, an important technological innovation was brought on by the multi-cylinder rolling mills and particularly the so-called Sendzimir mill, which allowed rolling of wall thicknesses under 0.20 mm and as low as 0.025 mm. Since then numerous technological innovations have been made, e.g. the introduction of computers in the processing lines which keep gauge, mechanical properties and rolling speed under much stricter control.

**INDUSTRY STRUCTURE****Companies**

The number of companies declined from 164 in 1989 to 155 in 1994: the situation at the end of 1992 was of 64 in Germany, 32 in Italy, 18 in the United Kingdom, 15 in Belgium/Luxembourg, 13 in France, 11 in Spain, 1 in Portugal, 1 in The Netherlands.

**ENVIRONMENT**

Pickling installations have disappeared from the factories in many cases because coils ordered from the steel industry are delivered pickled and protected. In the coating installations, it is necessary to aspirate smokes especially when strip receives a metallic coating. Today, smoke aspiration is also necessary for annealing processes. As for acoustic pollution problems, cold rolling mills are not noisy except when charging the coil in the rolling mill.

**Cold forming of steel flat products NACE 223.3****INDUSTRY PROFILE****Manufacturing process**

Cold forming concerns the manufacture of open sections of steel by progressive forming on a roll mill or folding on a press of hot rolled de-scaled flat products of steel or cold rolled coated flat products of steel. Cold forming is a continuous process which allows the manufacture of big quantities of simple or complex forms. Cold folding is generally used to obtain sections of simple forms in small quantities. Compared to the simple form sections produced on the hot mill, cold formed sections are more accurate in size.

**Products manufactured**

The subsector covers two production areas:

- Long sections: standard sections such as L, C, U, Omega and Z and products for specific uses of complex form according to the requirements of each individual customer;
- Wide sections for building purposes coated with zinc, paint, varnish or plastic, such as sandwich panels, corrugated sheet, profiled sheet and safety barriers.

All these products are mainly of non alloy steel with a content of carbon up to 0.25 % but can also be of stainless or of other alloy steel.

**Recent trends**

Production of long sections decreased by 8.6 % in 1993, and it was estimated to have increased by 7.5 % in 1994. Apparent consumption followed a similar pattern of production. For extra-EU exports, there has been an increase of 12.9 % in 1993, due mainly to increased supply to China. Imports are generally higher than exports in this sector. Imports increased until 1992, while there has been a drop of 22.7 % in 1993 due mainly to lower demand from Eastern Europe.

**Foreign trade**

Extra-EU exports and imports are less important for this subsector than for the other subsectors of first processing of steel. As for exports, the share of Eastern Europe grew from 2.7 % to 7 %. In 1993, the share of China was suddenly of 5.9 %.

As for imports, the share of Eastern Europe, which was of 0.6 % in 1984, reached 13.3 % in 1993.

**MARKET FORCES****Demand**

Cold formed sections are used by sectors such as building, civil engineering and transport equipment, mainly for safety barriers for the highways, sheet piling and manufacture of trucks, railway rolling stock and furniture.

A fact of increasing importance is backward integration by certain users, who at present produce themselves the sections they need. A significant example of this kind of development is provided by the sector specialised in storage equipment.

**Supply and competition**

The loss of employment was of around 1 600 workers from 1988 to 1993. An increase of 300 people may have occurred in 1994. Labour productivity has been improving during the years 1988 to 1992. There has been a decrease of 3.1 % in 1993 but a 4.3 % increase was estimated for 1994.

Intra-EU imports have been of around 200 thousand tonnes for the years 1988 to 1990, but fell to 147 in 1993. Extra-EU imports have been very volatile during recent years: for Eastern Europe they were of 11 thousand tonnes in 1988. They more or less doubled in 1989 and 1990 and were five times higher in 1991 and 1992 with 47 thousand tonnes and 51 thousand tonnes, but fell to 29 thousand tonnes in 1993. Imports from South Africa were of 15 thousand tonnes in 1988 and 1989, they decreased progressively the years after to fall to less than 1 thousand tonnes in 1993.

### Technological progress

One of the main technological innovations has been the automatic machining of forming rolls. The automatic conditioning of products before shipment is also to be mentioned.

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## INDUSTRY STRUCTURE

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### Companies

The number of companies was of 136 at the end of 1994: 28 in Spain, 26 in the United Kingdom, 25 in Germany, 25 in Italy, 20 in France, 5 in The Netherlands, 4 in Denmark, 3 in Belgium/Luxembourg.

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## ENVIRONMENT

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Pickling installations have disappeared from the factories because coils ordered to the steel industry are delivered pickled and protected. Previously used acid waters were rejected from the pickling tanks in the rivers or the lakes. This industry does not produce acoustic pollution, except when charging the coils in the forming mill.

## Cold drawing of steel wire and manufacture of wire products NACE 223.4

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## INDUSTRY PROFILE

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### Manufacturing process

Wire drawing is an operation which consists in cold stretching hot rolled wire rod, through a die, with a form corresponding to the cross-section of the finished product. The mechanical properties of the hot raw material must be appropriate in order to have sufficient ductility to pull it through the die. After this operation, the hardness and tensile strength of the wire becomes higher and may require an annealing after drawing. In some cases a parentage heat treatment is required. The finished products have tight tolerances, accurate mechanical properties and a smooth surface. Their cross-section may be circular, flat with rounded edges, rectangular, hexagonal, triangular, oval, semi-circular etc.

### Products manufactured

The subsector covers two fields of activity:

- Drawn wire: mild steel wire with a carbon content up to 0,25 % and hard steel with a carbon content of over 0,25 % stainless and other alloy steel wire. Non alloy steel wire is delivered uncoated or coated with zinc, copper, tin, nickel, chrome, plastic, varnish or other materials.
- Wire products: strand and ropes, heavy welded mesh, plaited bands; barbed wire, wire fencing, grill, netting; welded link chains, hooks, springs, nails, etc.

### Recent trends

Apparent consumption has been increasing steadily year after year from 1988 up to 1992, but decreased by 4.6 % in 1993. The growth of production was similar until 1992 but the drop

for 1993 was of 2.9 %. An increase of 2.4 % was estimated for 1994.

Extra-EU exports have decreased from 1989 up to 1992. In 1993, they increased by 11.8 % due to shipments to the USA and to Far East countries. Extra-EU imports increased year after year from 1988 up to 1992, while they dropped by 3 % in 1993. As a consequence, the trade balance improved by 39.2 % in 1993 while it had been decreasing since 1988.

### Foreign trade

The main changes in the destination of extra-EU exports in value have been for the USA (21 % in 1993 against 25.3 % in 1988), and for the Far East (10.3 % against 5.1 %).

The main changes in the origin of the extra-EU imports in value have been an increase for Eastern Europe (18.8 % in 1993 against 13 % in 1988), and for Japan (8 % against 4.9 %).

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## MARKET FORCES

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### Demand

Drawn wire and wire products are used by the construction of buildings and civil engineering sectors, the manufacture of motor vehicles, of machinery, of fasteners, screw machine products, chains and springs and furniture sectors, agriculture and telecommunications.

### Supply and competition

The loss in employment was of 5 700 workers from 1988 to 1994. Labour productivity has been improving year after year. It was 12 % higher in 1993 than in 1988. A new increase of 4.5 % was estimated in 1994.

Intra-EU imports dropped to 1 820 thousand tonnes in 1993, against 2 170 in 1992 and 1 864 in 1988.

The main competitors in 1993 were the Czech Republic with 128 thousand tonnes, Slovakia with 52 thousand tonnes, Poland with 48 thousand tonnes, South Africa with 35 thousand tonnes, Switzerland with 29 thousand tonnes.

### Technological progress

What is said about cold drawing (223.1) on the introduction of computer-aided manufacturing techniques in the production lines can be applied to wire drawing.

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## INDUSTRY STRUCTURE

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### Companies

The number of companies declined from 529 in 1988 to 480 in 1994. The situation at the end of 1994 was in Germany 161, in Italy 140, in France 72, in Spain 51, in the United Kingdom 30, in The Netherlands 7, in Belgium/Luxembourg 13, in Greece 2, in Denmark 2, in Portugal 2.

### Strategies

A number of mergers and restructurings have taken place since 1988, especially in and among major steel producing group subsidiaries. Besides these efforts to improve productivity, a tendency to rationalise and specialise production has been spreading among the main European wire-drawing and wire products companies concerned.

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## ENVIRONMENT

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Pickling installations have disappeared from most factories because the hot rolled wire ordered to the steel industry is delivered pickled and protected. In the coating installation, it is necessary to use fume extractors especially when applying metallic coatings.

Written by: Bernard Champin

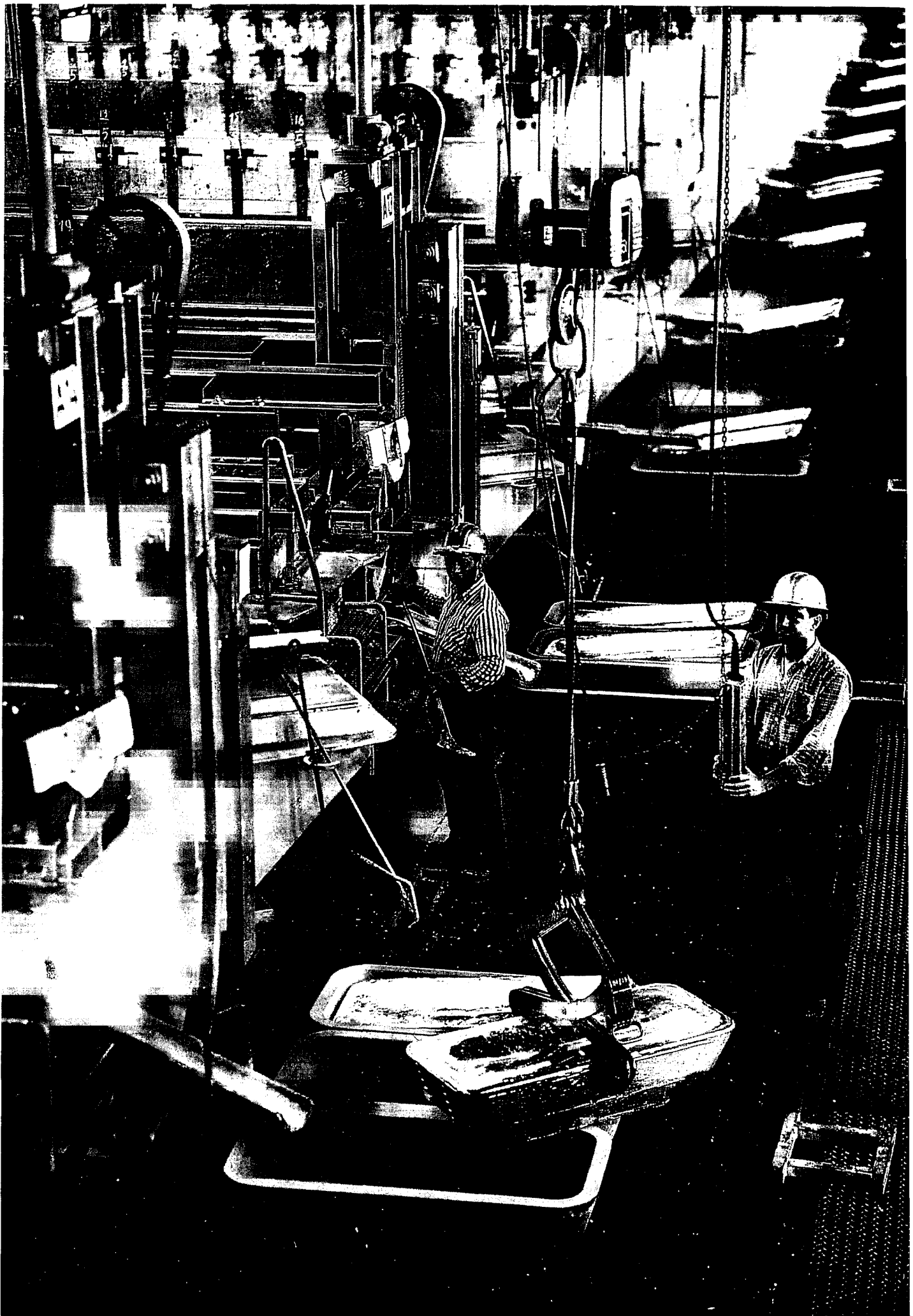
The industry is represented at the EU level by: European Bright Steel Association (EBA). Address: Postfach 30 09 23, D-40409 Düsseldorf; tel: (49 211) 4564 250; fax: (49 211) 43 14 88;

Comité International d'Etude du Laminage à Froid du Feuillard d'Acier (CIELFFA). Address: Rue Paul Cézanne 1, F-75008 Paris; tel: (33 1) 49 53 72 43; fax: (33 1) 49 53 72 44;

Comité International du Profilage à Froid (CIPF) and European Profiles and Panels Producers Federation. Address: Rue Paul Cézanne 1, F-75008 Paris; tel: (33 1) 49 53 72 46; fax (33 1) 49 53 72 44;

Comité Européen de la Tréfilerie (CET). Address: Rue Paul Cézanne 1, F-75008 Paris; tel: (33 1) 49 53 72 71; fax: (33 1) 49 53 72 70.





## Overview NACE 224

The EU non-ferrous metals industry employed just under 300 000 people at some 3 000 industrial units in 1993. Having very few mining resources at its disposal, the EU is responsible for less than 3 % of the mining production of the market economy countries for aluminium, copper, zinc and lead. Nevertheless, in refined metal production the EU is a leader among the market economy countries with 21 % of refined metal output of the four major non-ferrous metals (Al, Cu, Zn and Pb). EU consumption of these same metals is even higher, representing nearly 30 % of market economy countries' demand.

The EU non-ferrous metals industry is a net importer of raw materials: ores, concentrates and other raw materials for refining, and unwrought metals for processing. It also highly dependent on secondary materials (scrap and residue), which constitute the only "domestic" resource of major size in the EU. In purchasing the raw materials which are necessary for its supplies, and, to a lesser extent, in selling its products outside the EU borders, the EU non-ferrous metals industry is very much present on the international market, and is subject to its price fluctuations.

### INDUSTRY PROFILE

#### Description of the sector

The EU non-ferrous metals industry is widely diversified in terms of metals which are produced or processed. These include the major non-ferrous metals aluminium (Al), copper (Cu), zinc (Zn) and lead (Pb) - but also the precious metals gold (Au), silver (Ag), platinum (Pt), palladium (Pd) and rhodium (Rh); and the alloying metals and other minor non-ferrous metals molybdenum, vanadium, tungsten, manganese, cobalt, germanium, cadmium, etc. In view of the fact that the EU is relatively poor in mining resources, its industry is largely dependent on primary raw materials imports, and also finds a significant proportion of its supplies in secondary materials (scrap and residue). It is consequently geared to primary and secondary smelting, and refining metallurgy, and to processing.

The most important consumer markets for the EU non-ferrous metals industry are within the EU itself, but outlets have also been found beyond EU borders. The industry is therefore involved in the international non-ferrous metals market, not only as a purchaser of raw materials, but also as a supplier of metals and processed or speciality products. In both these respects, it is extremely sensitive to the world balance of markets and to their cyclic developments, which are often irregular. The EU non-ferrous metals industry operates in a highly competitive environment and is supported by long years of technological expertise making it the world leader in various segments of its activities.

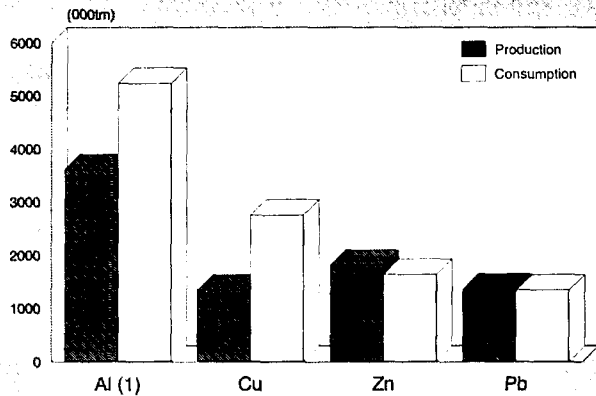
### MARKET FORCES

#### Supply and demand

In terms of volume produced, aluminium, copper, zinc and lead are the dominant metals of the EU non-ferrous metals industry.

In the aluminium sector, EU production hovers between 3.5 and 4 million tonnes of metal per year, which is equivalent

**Figure 1: Refined metals  
Production and consumption, 1993**



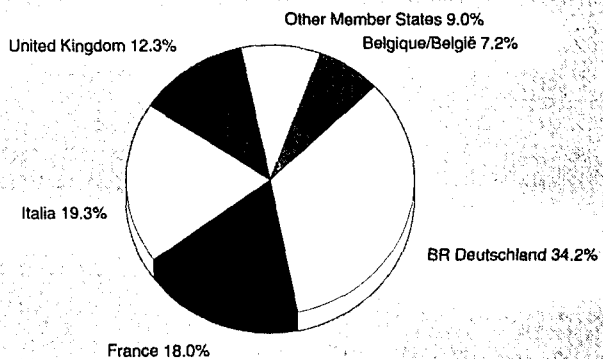
(1) Consumption estimated.  
Source: EAA and OEA (aluminium), World Bureau of Metal Statistics (copper), International Lead and Zinc Study Group (zinc and lead)

to about 65 % of EU demand. This represents only 16 % of world production, however.

The aluminium industry is facing two serious problems: the recent massive increase in exports of metal from the CIS and the ongoing tendency to move production units to geographic zones where energy (an important cost component) is both abundant and inexpensive.

The EU zinc industry produces about 1.8 million tonnes of metal per year. Such an output represents 26 % of world production and slightly exceeds EU market demand. The industry's major problem is unquestionably how to manage the long cycles which affect its market, with a certain degree of inertia in the adjustment of supply to demand.

**Figure 2: Aluminium semis  
Breakdown of production by Member State, 1993**



Source: EAA

**Table 1: Non-ferrous metals  
Imports and exports by Member State, 1993 (1)**

(thousand tonnes)	Aluminium		Copper		Lead		Zinc	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Belgique/België	268	88	133	122	23	60	117	229
Danmark	16	4	e	e	4	e	9	0
BR Deutschland	853	244	496	103	113	71	251	121
Hellas	19	73	68	e	8	4	15	e
España	94	169	39	52	38	3	6	212
France	365	245	443	31	32	67	130	184
Ireland	11	2	1	e	13	e	2	e
Italia	436	34	419	10	70	28	101	25
Nederland	658	430	24	8	34	11	102	126
Portugal	55	3	11	e	19	e	14	9
United Kingdom	294	125	291	21	224	144	125	35

(1) e = negligible amount.

Source: Eurostat - Trade Data (CN codes 7601 - 7403 - 7801 - 7901)

**Table 2: Non-ferrous metals  
Production of primary and secondary unwrought metal**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>Aluminium</b>										
EU	3 160	3 068	3 612	3 693	3 905	4 019	3 924	3 775	3 796	3 611
World	19 781	19 494	19 604	20 894	22 281	22 911	23 074	23 278	23 165	N/A
EU share (%)	16.0	15.7	18.4	17.7	17.5	17.5	17.0	16.2	16.4	N/A
<b>Copper</b>										
EU	921	973	1 136	1 097	1 188	1 222	1 235	1 219	1 242	1 343
World	9 440	9 616	9 829	10 097	10 577	10 807	10 683	10 563	10 854	11 553
EU share (%)	9.8	10.1	11.6	10.9	11.2	11.3	11.6	11.5	11.4	11.6
<b>Lead</b>										
EU	1 235	1 214	1 345	1 374	1 441	1 422	1 389	1 425	1 372	1 355
World	5 139	5 317	5 210	5 411	5 518	5 690	5 419	5 297	5 314	5 382
EU share (%)	24.0	22.8	25.8	25.4	26.1	25.0	25.6	26.9	25.8	25.2
<b>Zinc</b>										
EU	1 348	1 373	1 616	1 667	1 708	1 686	1 699	1 765	1 827	1 811
World	6 298	6 466	6 385	6 608	6 851	6 783	6 685	6 848	6 890	7 105
EU share (%)	21.4	21.2	25.3	25.2	24.9	24.9	25.4	25.8	26.5	25.5

Source: Metallgesellschaft (from 1984 to 1992), ILZSG (for 1993 lead and zinc), EAA and OEA (for 1993 aluminium), World Bureau of Metal Statistics (for 1993 copper)

**Table 3: Non-ferrous metals  
Consumption of primary and secondary unwrought metal**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>Aluminium</b>										
EU	4 323	4 356	4 924	5 136	5 656	5 891	5 965	6 012	6 303	N/A
World	21 020	21 462	22 049	23 185	24 465	24 953	25 378	24 696	25 997	N/A
EU share (%)	20.6	20.3	22.3	22.2	23.1	23.6	23.5	24.3	24.2	N/A
<b>Copper</b>										
EU	2 261	2 227	2 419	2 463	2 525	2 709	2 811	2 841	2 956	2 757
World	10 053	9 885	10 183	10 430	10 660	11 052	10 791	10 646	10 805	N/A
EU share (%)	22.5	22.5	23.8	23.6	23.7	24.5	26.0	26.7	27.4	N/A
<b>Lead</b>										
EU	1 265	1 219	1 393	1 378	1 423	1 478	1 513	1 503	1 454	1 343
World	5 127	5 169	5 274	5 334	5 420	5 600	5 393	5 207	5 150	5 178
EU share (%)	24.7	23.6	26.4	25.8	26.3	26.4	28.1	28.9	28.2	25.9
<b>Zinc</b>										
EU	1 337	1 312	1 477	1 491	1 570	1 585	1 655	1 738	1 711	1 640
World	6 189	6 265	6 438	6 622	6 802	6 706	6 661	6 611	6 472	6 577
EU share (%)	21.6	20.9	22.9	22.5	23.1	23.6	24.8	26.3	26.4	24.9

Source: Metallgesellschaft (from 1984 to 1992), ILZSG (for 1993 lead and zinc), World Bureau of Metal Statistics (for 1993 copper)

## INDUSTRY STRUCTURE

### Companies

The EU non-ferrous metals industry comprises about 3 000 companies, most of which are active in the processing sector. The upstream sectors of primary and secondary smelting and refining metallurgy are more concentrated.

Of the four basic non-ferrous metals - aluminium, zinc, copper and lead - the activities of the primary aluminium industry are most strongly integrated.

In 1993, Germany accounted for 29 % of the total EU refinery output of the four major non-ferrous metals, compared with 16 % accounted for by France. Italy, Spain and the United Kingdom follow closely with 13 % each, while Belgium and the Netherlands trail behind. The breakdown of semis production by country confirms the leading position of Germany with about 33 % of the total EU copper and aluminium semis output, followed by Italy and France.

### Strategies

Recycling is an important feature of the EU non-ferrous metals industry. "Secondary" materials, i.e. recyclable scrap and residue constitute an essential input for many of its metallurgical and processing concerns. Some of the latter's supplies depend entirely on access to secondary materials, although, for most of the producers, recourse to secondary materials goes together with primary raw materials supplies for both economic and technical reasons.

As a result of the scarcity of European mining reserves, the EU non-ferrous metals industry has naturally developed much expertise in the processing of secondary materials. Recycling has therefore traditionally enabled the industry to reduce its dependence on raw materials imports by making use of the "surface" resources generated by the consumption of goods (old scrap) and by the industry itself (new scrap and metallurgical residue). Considerable investments are devoted to recycling, in terms of research, equipment and human resources, to such an extent that recycling is at the root of more than 50 % of total EU production of the four major non-ferrous metals (aluminium, copper, zinc and lead), and accounts for more than 35 % of their consumption in the EU.

### Impact of the Single Market

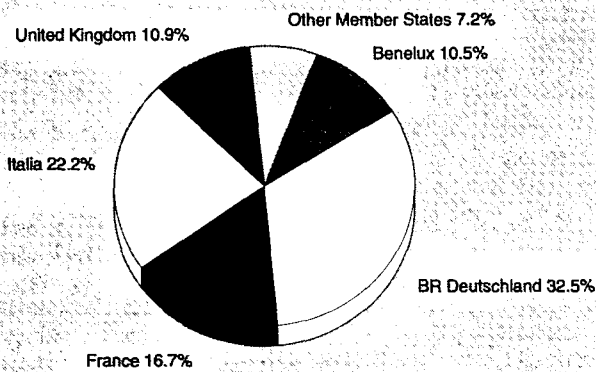
The legislative measures taken as part of the Internal Market programme had a globally positive impact the non-ferrous metals sector. Most relevant to this sector were the measures related to the harmonisation of business conditions across the EU. Differences across Member States in energy prices, taxation and environmental and safety regulations indeed distort competition between producers in different countries, not only in the non-ferrous metals industry but also in most other sectors. These distortions have been reduced, but not yet entirely removed, by convergent EU legislation.

Particularly relevant to the non-ferrous metals industry in view of the completion of the Internal Market are measures aimed at liberalising electricity markets, the harmonisation of VAT rates and the harmonisation of regulations concerning transborder movement of waste. In contrast, the removal of technical barriers to intra-EU trade is not particularly relevant to this sector. The output of the non-ferrous metals sector is largely composed of standardised products, for which there are no non-tariff barriers to trade.

## ENVIRONMENT

More than ever, environmental concerns are impelling the EU non-ferrous metals industry to keep abreast of innovation in the recycling sector. The upgrading and processing of scrap and metallurgical residue are contributing to the protection of the environment, reducing the need for disposal capacities

**Figure 3: Copper semis  
Breakdown of production by Member State, 1993**

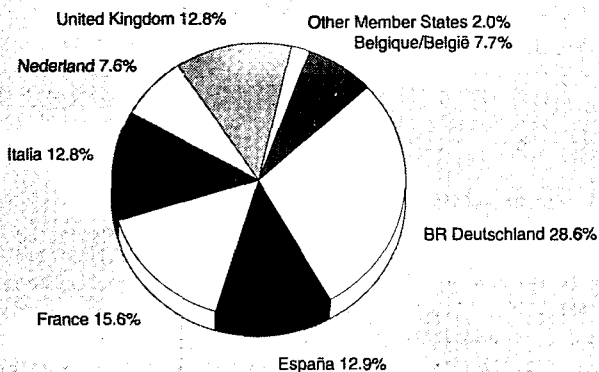


Source: IWCC

In the copper sector, the EU produces about 1.3 million tonnes of metal each year. As the EU is the largest consumer market in the world, this production volume barely reaches about 45 % of its requirements. To lessen its dependence on imported copper raw materials, the EU industry has considerably developed recycling technologies, and is therefore able to secure a significant amount of its supplies from scrap and residue within the EU itself.

Producing about 1.4 million tonnes of metal per year (one quarter of world production), the EU lead industry is able, for the most part, to satisfy the requirements of its domestic market. The industry is experiencing problems due to inherent properties of the metal, the use of which, particularly in "diffuse" applications, is tending to decrease due to constraints connected with the environment. With this in view, the car battery sector is the only consumer industry capable of offsetting the losses of consumption in the other sectors, and increased recycling will further boost the share of secondary lead in the industry's supplies (more than 50 %).

**Figure 4: Refined metals (aluminium, copper, lead, zinc)  
Breakdown of production by Member State, 1993**



Source: World Bureau of Metal Statistics (copper), ILZSG (lead, zinc), EAA and OEA (aluminium)

and dependence on non-renewable natural resources, and allowing considerable energy savings in the extraction and processing of metals (from 60 % for copper to 90 % for aluminium).

EU environmental policy emphasises integrated pollution control. Many of the issues related to the protection of the environment are of direct relevance to the non-ferrous metals industry.

Several draft legislations currently being drawn up by the EU in the field of industrial pollution are based on the concept of "Best Available Techniques". This approach increases the need to analyse in an integrated way the impact of an activity on the whole environment taking into account the whole life-cycle of a product and managing the specific risks accordingly at each individual stage. Legislation on hazardous products is developing in such a way as to take into account the conditions of exposure over and above the intrinsic properties of products, which is a positive trend when it comes to assessing the real impact of heavy metals.

Waste management also raises difficult questions of direct relevance to the non-ferrous metals industry. A clear definition of what is to be understood by waste, as opposed to product or by-product, and a legislation on the management and the control of movements of wastes are critical for the non-ferrous metals sector as non-ferrous scrap and residue are used as feed materials by the sector and are traded extensively on the international market. A competitive recycling industry and considerable energy-saving potential could be affected by limits on this trade.

Additional measures are under discussion concerning waste incineration and landfills. This is another area which could entail a large number of adjustments for the industry. Finally, the new directive on packaging waste will also have implications for the non-ferrous metals industry.

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## OUTLOOK

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During the 1990s, the industry will have to face two major problems. The first is the opening-up of the economies of Central and Eastern Europe and the CIS, which have greatly increased their exports of raw materials; consequently, the full weight of these changes is being borne first and foremost by the EU non-ferrous metals industry, which is closest to the CIS.

The sudden, massive development of exports from former COMECON countries on the international market, particularly on the EU market, is throwing the cyclic adjustments between supply and demand structurally off balance and jeopardising the very survival of companies.

In the case of aluminium for instance, the export level of the CIS has dramatically increased from some 300 000 tonnes per year in 1990 to nearly 2 million tonnes in 1993. In the case of zinc the CIS has become a net exporter whilst it was previously an importer.

These radical changes in trade flows have resulted in an unprecedented piling of stocks on the London Metal Exchange, both for aluminium and zinc, thereby pushing the metal quotations down to historically very low levels.

In the case of non-ferrous metals semis, the countries of Central and Eastern Europe are exporting increasing tonnage at lower than prevailing market prices, fostering a severe downward pressure on the industry's revenues.

In view of these developments, it is vital to make every effort to ensure that the liberalisation of trade develops on a more harmonious basis, which does not disrupt the international markets; this is to be done, among other things, by a greater control of the trade flows, by adapting product quality to international standards, by diversifying outlets and by taking into account the free-market mechanisms in which this trade will henceforth be conducted.

The second major challenge of the non-ferrous metal industry for the 1990s is the mushrooming legislation relating directly or indirectly to environment protection, the development and effects of which ought to be managed not only with a view to maintaining the access to a whole range of raw materials (secondary materials) but also to maintaining future development of the non-ferrous metals uses.

Written by: **Eurométaux**

The industry is represented at the EU level by: **Association Européenne des Métaux (Eurométaux)**. Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax (32 2) 779 0523.



# Aluminium

## NACE 224

The aluminium market is currently facing the emergence of the CIS industry onto the international scene; this is taking the form of massive exports from the former Soviet Union, throwing the cyclic adjustments between supply and demand off balance and causing an unprecedented accumulation of stocks. The European Union has been particularly affected by this phenomenon, being the closest market outlet for CIS producers. However, the industry can count on sound fundamentals to overcome the current difficulties: there is room for structural growth of demand from the major consumer industries (transportation, packaging, construction), and the producers are continuously improving and rationalising their installations with a view to higher productivity and environmentally-sound production process.

### INDUSTRY PROFILE

#### Description of the sector

The aluminium industry is the largest of the non-ferrous metal industries, and is the youngest as well in that aluminium smelting only began about a century ago. Lightness, longevity, resistance to corrosion, electrical and thermal conductivity and reflectivity make aluminium a popular choice in many sectors of the economy. Its aesthetic qualities, alloy possibilities and easy recyclability all add to this appeal.

The aluminium industry encompasses several activity segments, from bauxite mining and alumina production to primary and secondary smelting and metal processing into semi-finished products (bars, profiles, wires, sheets, foils, tubes, pipes,...) or specialty products (powders, special alloys,...).

As far as the major EU metal producers are concerned, those activities are to a large extent integrated, but a number of EU manufacturers are focusing their activity on one particular segment only, such as recycling and secondary smelting or semis fabrication.

#### Recent trends

The EU aluminium industry directly represents a workforce of about 200 000 people and its annual turnover is in the order of 20 billion ECU. Total production of unwrought metal amounted to 3.6 million tonnes in 1993, a 5 % decrease from the 1992 figure. About 42 % of this output is accounted for by secondary production, i.e. the recycling of scrap, which has been constantly growing.

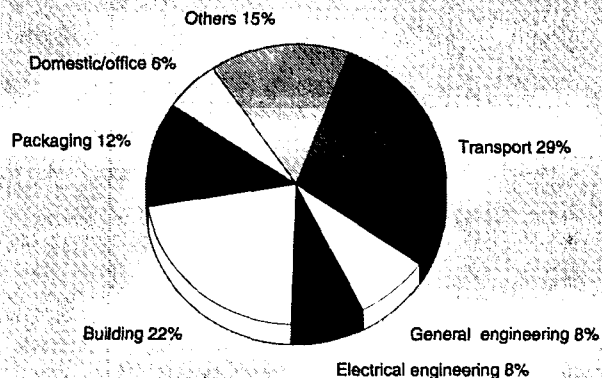
The EU consumer market for aluminium exceeds domestic supply. Posting 5.7 million tonnes in 1992, demand has dropped by about 6 % in 1993 due to the poor economic climate. The market enjoys a rising trend of approximately 2.5 % per year in the long term; there are, however, ups and downs in relation with the business cycle fluctuations.

#### International comparison

In terms of primary metal production, the EU accounted for 14 % of the market economy countries' total production in 1993, ranking third to the USA and Canada. On the other hand, secondary production in the EU is the highest in the world. Hovering at about 1.5 million tonnes in 1993, it represented 42 % of the market economy countries' total.

Regarding the production of semis in 1993, the EU was responsible for approximately one-third of the market economies' output of rolled and drawn products, wires, cables and castings, with a 5.2 million tonnes production.

Figure 1: Refined metals  
Production and consumption, 1993 (1)



(1) Consumption estimated.

Source: EAA and OEA (aluminium), World Bureau of Metal Statistics (copper), International Lead and Zinc Study Group (zinc and lead)

Supply requirements of the EU primary and secondary metal producers are largely met by domestic alumina production and scrap recycling, but the total metal output falls short of the processing industry needs: it meets only 55 % of the EU demand, which is rising, while there has been hardly any net growth of metal production capacity during the past years.

#### Foreign trade

As a result of the deficit in metal production capacity versus semis production capacity, the EU is a regular importer of unwrought aluminium. The EFTA countries traditionally accounted for about 45 to 50 % of EU imports, with Brazil, Africa and Canada making up another 25 % at least. Imports from the CIS, however, have made sharp inroads since 1991, increasing from about 60 000 tonnes per year in the late 1980s to 576 000 tonnes in 1993 and pushing back the share of the traditional major suppliers to 63 % of total imports, or 1.88 million tonnes.

This phenomenon not only affected the import picture regarding the sourcing of the metal, but it also had a major impact on the overall market balance. The sudden and massive aluminium export flow originating from the CIS created a huge surplus which resulted in soaring inventories on the London Metal Exchange (LME) and unprecedented price collapse.

Regarding trade of semi-finished aluminium products, the EU used to be a net exporter for a long time. This trade, however, is highly contingent on currency developments and during the last few years it has been adversely affected by the development of the USD/ECU exchange rate.

### MARKET FORCES

#### Demand

Aluminium is a material with a large range of applications, in the transportation, construction and packaging industries, the electricity sector, household appliances, and the mechanical and agricultural sectors.

Researchers and engineers have been constantly improving the qualities of the material; they have developed new alloys and production processes to open up new areas of application.

**Table 1: Aluminium**  
**Main indicators in volume - semi products**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	2 887	2 960	3 190	3 359	3 730	3 865	4 180	4 205	4 315
Production	3 215	3 271	3 403	3 579	3 890	3 971	4 095	4 172	4 285
Trade balance	328	311	213	220	160	106	-85	-33	-30

Source: European Aluminium Association

The transport sector is by far the largest client sector, accounting for approximately 29 % of total EU aluminium consumption. It is the market segment with the best growth potential, as the strength and stability properties of aluminium alloys, combined with their lightness, make them an attractive material in all transport applications where reduced weight translates into energy consumption savings. In the car industry for instance, 90 % of cylinder heads and 25 % of engine blocks, gear boxes and wheels are made of aluminium castings. Many other components are made of rolled and extruded aluminium products (radiators, roof racks, ABS components, licence plates, ...).

New casting and body-frame techniques should allow further development of the use of aluminium by automobile producers: the metal is already widely used for frame parts in air, road and rail transportation as well as in commercial and cruise ships.

Construction is the second largest aluminium consumer sector, making up about 22 % of EU total demand for aluminium.

Aluminium products such as profiles, claddings, window and door frames, staircases, roof panels, greenhouse frames, smoke and fire protection systems, etc., find markets not only in new buildings but also in the renovation of old ones. They are selected for a number of qualities, such as resistance to corrosion, lightness, easy machinability and installation, low maintenance and repair costs, good formability and shaping along modern design requirements.

The third most important client sector for aluminium is packaging which accounts for an estimated 12 % share in EU aluminium demand. Packaging applications are numerous, not only in relation to foodstuffs and household products, but also for pharmaceuticals and cosmetics. Aluminium has the necessary properties to protect and preserve these goods and

to ensure their safe transportation and distribution as well as their convenient use.

Further progress can be expected in the use of aluminium in this sector as technical developments will further improve thin strip quality, down-gauging, lacquering and coating.

### Supply and competition

The world aluminium market has deteriorated considerably since 1991, following three years of near balance between supply and demand.

The imports from the CIS are playing a determining role under these circumstances. Until 1990, trade between the market economy and socialist countries resulted in net imports from the latter, which hovered around 300 000 tonnes per year. However, from 1991 onwards, the collapse of the Soviet system fundamentally changed the picture: the loss of the COMECON outlets, the sudden drop of domestic demand for military applications and a surge in the need for hard currency have propelled the former Soviet Union aluminium industry out onto the international market. Exports of the CIS increased by more than 100 % in 1991, and by a further 35 % in 1992. In 1993 exports further increased to reach an estimated 1.8 million tonnes. As a result, primary aluminium inventories on the LME have jumped from a mere 300 000 tonnes at the end of 1990 to five times as much at the end of 1992, and overstepped the 2.5 million tonnes mark by early 1994.

The EU market was the first to be hit, being situated nearest to the former Soviet Union. It is estimated that three-quarters of CIS exports have been directed to the EU in the first place.

The resulting price collapse on the LME has seriously affected the profitability of the aluminium producers in the market economy countries: in Europe, price levels dropped by more than 20 %.

**Table 2: Aluminium**  
**Breakdown of EU production, 1992-93**

(thousand tonnes)	Bauxite		Alumina		Primary aluminium		Aluminium semis		Secondary aluminium	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
EU	2 297	N/A	5 103	N/A	2 173	2 109	N/A	N/A	1 638	N/A
Belgique/België, Luxembourg	0	N/A	0	N/A	0	0	297	269	0	0
Danmark (1)	0	N/A	0	N/A	0	0	20	20	14	N/A
BR Deutschland	0	N/A	1 120	N/A	603	552	1 445	1 339	536	408
Hellas	2 200	N/A	627	N/A	153	148	137	130	0	0
Ireland	0	N/A	1 007	N/A	0	0	N/A	N/A	N/A	N/A
España	0	N/A	959	N/A	359	356	N/A	N/A	97	100
France	0	N/A	508	N/A	418	426	732	673	236	222
Italia	97	N/A	762	N/A	161	156	743	721	353	346
Nederland	0	N/A	0	N/A	235	232	157	N/A	150	150
Portugal	0	N/A	0	N/A	0	0	N/A	N/A	N/A	N/A
United Kingdom	0	N/A	120	N/A	244	239	483	460	252	274

(1) Aluminium semis estimated.

Source: European Aluminium Association

**Table 3: Primary aluminium  
World refined production by country, 1993**

(thousand tonnes)	
EU (1)	2 109
BR Deutschland	552
Hellas	148
España	356
France	426
Italia	156
Nederland	232
United Kingdom	239
USA	3 695
Canada	2 310
Australia	1 385
Brazil	1 170
Norway	887
Venezuela	590
India	466

(1) Belgium, Denmark, Ireland, Luxembourg and Portugal do not produce primary aluminium.

Source: European Aluminium Association

In these circumstances in February 1993, the EU primary aluminium producers have lodged a request for safeguard measures with a view to curbing the CIS exports to the EU market. As a result, in August 1994 the European Commission imposed an import quota for a four-month period. This measure was subsequently extended up to the end of February 1994.

The "aluminium safeguard" measure had the effect of relieving the immediate pressure of CIS exports to the European market and has led to a multilateral dialogue with the major CIS exporter, i.e. the Russian Federation. In this dialogue, the governments of six nations took on, for the first time, the urgent and fundamental problem of the entry of a state-run industry of the former Soviet Union into the international market economy.

## INDUSTRY STRUCTURE

### Companies

In 1993, 22 primary aluminium smelters were operating in the EU but the number of producer companies is, in fact,

**Table 4: Aluminium semis  
EU exports and imports, 1993**

(thousand tonnes)	Exports	Imports
Belgique/België	289	157
Danmark	N/A	N/A
BR Deutschland	640	490
Hellas	76	30
España	295	81
France	409	340
Ireland	9	42
Italia	248	278
Nederland	158	171
Portugal	6	23
United Kingdom	242	330

Source: Eurostat - External Trade Data (CN codes 7604 to 7608)

much smaller: the major ones are Aluminium Pechiney (F), VAW aluminium (D), Inespal (E), Alumix (I), Hoogovens (NL) and British Alcan (UK). Some of these companies operate plants in different EU countries or have subsidiaries or branches in other parts of the world.

The number of companies involved in aluminium processing is much larger, although there is a fairly good integration of the rolling activity into the smelting. The structure of the extrusion industry is, on the contrary, much less integrated, with about 170 production sites scattered on the EU territory.

## ENVIRONMENT

Aluminium has properties which make it increasingly competitive in an ecology-conscious world. As previously mentioned, its light weight is particularly effective in increasing energy savings in transportation applications. The high recyclability of aluminium is an additional important competitive advantage, particularly in packaging. Currently, 45 % of total EU aluminium output on average arises from scrap recovery. This proportion varies widely among Member States, however.

Aluminium projects for packaging will be affected by the planned "Directive on Packaging and Packaging Waste" which aims at reducing the amount of waste, and sets targets for recycling used packaging materials. In cooperation with other industries which are affected by this legislation, the aluminium

**Table 5: Aluminium  
Primary aluminium producers, 1993**

Country	Company	Locations	Theoretical annual capacity (tonnes)
BR Deutschland	VAW aluminium AG	Norf, Töging, Stade	370 000
	Hoogovens Aluminium GmbH	Voerde	78 000
	Leichtmetall-Gesellschaft mbH	Essen	136 000
	Hamburger Aluminium-Werk GmbH	Hamburg	120 000
Hellas	Aluminium de Grèce	Distomon	150 000
España	INESPAL	Aviles, La Coruna	162 000
	Aluminio Español S.A.	San Ciprian	194 000
France	Aluminium Pechiney	Auzat, St Jean de Maurienne,	459 000
		Lannemezan, Venthon, Dunkerque	
		Fusina, Porto Vesme	170 000
Italia	Alumix		
Nederland	Aluminium-Delfzijl	Delfzijl	98 000
	Pechiney Nederland N.V.	Vlissingen	175 000
United Kingdom	British Alcan Aluminium plc.	Kinlochleven, Lochaber,	
		Lynemouth	114 000
	Anglesey Aluminium plc.	Holyhead	127 000

Source: European Aluminium Association



industry is prepared to play a leading role in minimising the impact of packaging on the environment, and is working together with public authorities to reduce the quantity of packaging waste going to landfills. At the same time, the industry emphasises the contribution of packaging to product protection and the safe transportation and distribution of goods.

Aluminium as a mineral is available in almost unlimited quantities: 7 % of the earth's crust is made of aluminium. The mining of aluminium-bearing ores, i.e. bauxite, can have negative effects on the ecological system, but reclamation of mined land is a top priority for the industry experiments and continuous efforts have yielded positive results in this area.

The reduction process for producing the metal consumes electricity and gives rise to emissions. The worldwide aluminium industry reduced its electricity consumption from 17 kWh per kg produced in 1980 to less than 16 kWh at the beginning of the 1990's. Major emissions were reduced by a factor of four or more during the same period, with the EU producers complying with stringent emission constraints.

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## OUTLOOK

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Primary aluminium consumption in the EU is expected to grow at an average annual rate of 2 to 3 % during the 1990s. Total aluminium demand, i.e. including secondary aluminium, should grow at a slightly higher pace as a result of the development of secondary uses, especially in the transportation and packaging sectors.

The packaging industry is expected to make considerable progress: the canning sector is far from maturity, and will give rise to considerable demand.

In the transportation industry the growth of aluminium demand is expected to arise chiefly from the automobile sector, where aluminium can further contribute to the lightness of cars, not only in castings, but also in wiring and body frames.

Increases in aluminium consumption in the construction industry is a function of the recovery of that client sector.

Written by: Eurométaux

The industry is represented at the EU level by: Association Européenne des Métaux (Eurométaux). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

# Copper

## NACE 224

The EU possesses few copper mine resources, but its copper metallurgical activities are highly significant. Its refining and semi manufacturing capabilities have developed in line with the requirements of its large consumption, using imported primary raw materials and domestic as well as imported scrap. EU copper demand follows the slow growth pattern of a mature market. Recycling is brought to a high level as, in many of its applications, copper can be reprocessed without loss of its intrinsic properties.

### INDUSTRY PROFILE

#### Description of the sector

The core of the EU copper industry is in refining and semi-manufacturing, in comparison with which the EU mining capabilities are negligible. Since the start-up of mining at Neves Corvo in 1989, Portugal has become the only EU country with a sizeable copper mine production (150 000 tonnes of copper in 1993). At present, with about 154 000 tonnes of copper extracted from domestic ores in 1993, the EU accounts for no more than 2 % of total market economy countries' copper mine output.

Annual refined copper production in the EU is in excess of 1.3 million tonnes. The largest facilities are located in Germany, Belgium and Spain. Refinery output essentially arises from electrolytic processes, in the form of cathodes, that are often melted and cast on the premises into "refinery shapes", i.e. billets, cakes. Some refineries also produce wire rod at the refinery location or elsewhere. About 60 % of the feed supplies to the EU copper refineries are purchased on the international market in the form of copper blister, anodes or scrap. The remaining 40 % come from the refiners' smelting operations whose feed consists of domestic and imported copper concentrates as well as copper bearing residue or scrap.

The products of the refineries are the major feed material for the copper semis manufacturers. The EU copper semis output exceeded 4.0 million tonnes in 1993. Owing to the recession this was 6 % below the record output of 1992. Germany, Italy and France accounted for about 71 % of EU output, with the Benelux countries, the United Kingdom and Spain making up most of the balance. The range of products supplied by the semis manufacturers is very wide. They consist primarily of rods, profiles, wires, sheets, strips, tubes, etc. with applications in such diverse sectors as electrical engineering, automobiles, construction, machinery, shipbuilding, aircraft, precision instruments, watches and clocks.

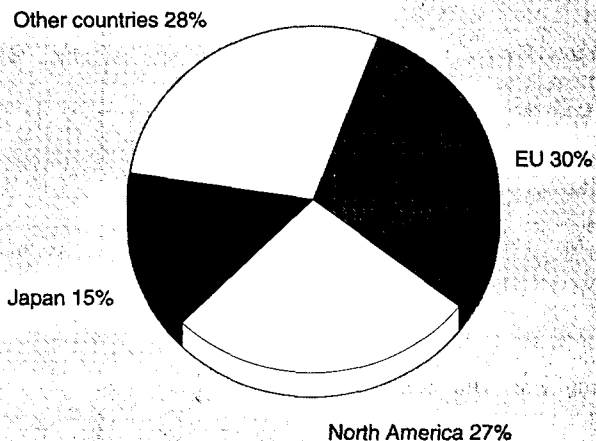
With an output which is three and half times that of EU refinery output, the EU copper semis manufacturers must turn to the international market to secure adequate volumes of supplies, together with the required alloying metals (zinc, tin and nickel for the most part).

The EU semis production is in excess of demand, and the EU copper semis manufacturing industry is a net exporter by about 300 000 tonnes per year.

#### International comparison

Nearly 30 % of the market economy countries 9.3 million tonnes demand for refined copper arises from the EU market. The EU consumed 2.8 million tonnes of copper, more than both North American consumption of 2.7 million tonnes and Japan's 1.4 million tonnes. Germany, France, Italy, Belgium and the United Kingdom are each among the top ten consumers

Figure 1: Refined copper  
Market economy countries consumption, 1993



Source: World Bureau of Metal Statistics, August 1994

together with the United States, Japan, Taiwan, South Korea and Canada.

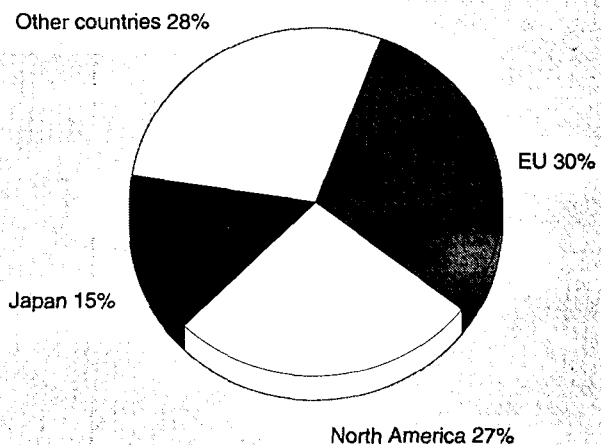
In terms of production, the EU refiners account for about 15 % of the market economy countries' output. The EU's 1.3 million tonnes produced per year is slightly ahead of Japanese and Chilean production, each of around 1.2 million tonnes, but behind North American production (3.0 million tonnes). In the coming years, however, EU production will most probably lose its second place ranking to Chile, whose production is rising. For copper semis production, the EU countries hold by far a dominant position at world level, accounting for 38 % of the market economy countries' estimated 10.6 million tonnes output in 1993; the United States and Japan contribute 28 % and 20 % respectively.

### MARKET FORCES

#### Demand

Though lacking copper primary resources, the EU has a strong copper industry, being the largest consumer market among

Figure 2: Refined copper  
Market economy countries production, 1993



Source: World Bureau of Metal Statistics, August 1994

**Table 1: Refined copper**  
**Main indicators in volume**

(thousand tonnes)	1988	1989	1990	1991	1992	1993
Consumption	2 525	2 709	2 804	2 837	2 941	2 757
Production	1 226	1 222	1 235	1 219	1 252	1 343
Trade balance	-1 317	-1 454	-1 689	-1 728	-1 701	-1 589

Source: World Bureau of Metal Statistics, August 1994 and Eurostat External Trade Data (CN code 7403)

**Table 2: Copper semis**  
**Main indicators in volume (1)**

(thousand tonnes)	1988	1989	1990	1991	1992	1993
Consumption	3 236	3 441	3 563	3 680	3 813	3 440
Production	3 800	4 079	4 142	4 217	4 323	4 083
Trade balance	267	273	242	227	220	299

(1) Excluding Denmark and Ireland.

Source: International Wrought Copper Council, London - Eurostat External Trade Data (CN codes 7407 to 7412)

market economy countries. Demand for copper mainly comes from the electrical and electronics industries, which absorb about 50 % of total EU consumption. These industries use copper primarily as a conductor material to carry electricity, in the form of wires, profiles and rods made of unalloyed copper. The construction sector is the second largest consumer: excluding building wire, it accounts for approximately 25 % of total EU copper demand. A wide variety of semi finished products, of both unalloyed and alloyed copper, is used in plumbing, roofing, decoration, etc. The remaining 25 % of demand arises mostly from industrial machinery and equipment, transportation equipment, and consumer products.

Copper's excellent thermal and electrical conductivity, corrosion resistance and malleability make it an ideal and safe choice for these applications.

Copper applications are well developed and the growth pattern of copper consumption closely follows the cycle of overall industrial activity at large. Copper demand on the EU market as a whole is growing slightly, as in most industrialised areas

in the world. Trends differ from country to country, however. Reconstruction in the east German Länder is contributing to produce higher than average copper demand.

### Supply and competition

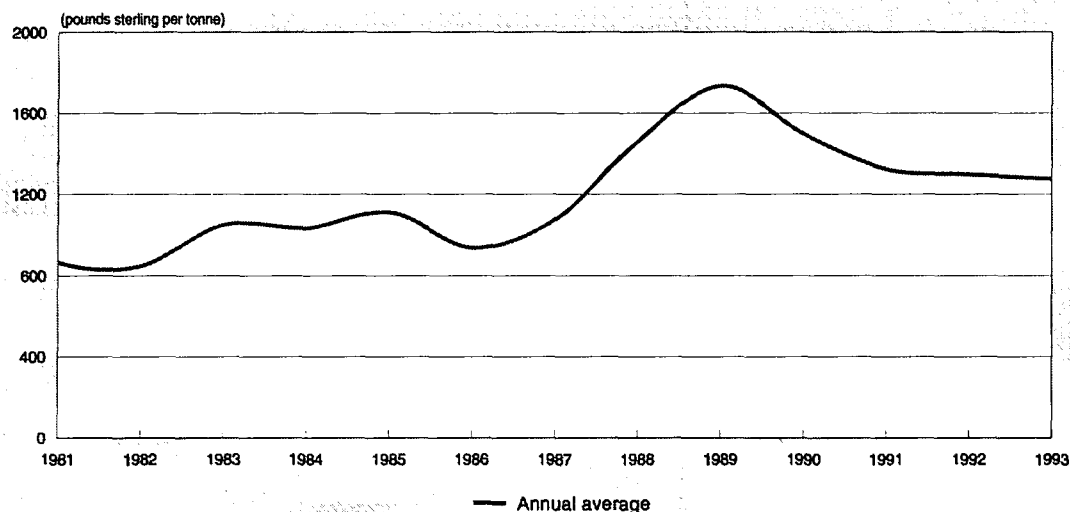
EU copper refining activity has been able to grow primarily by securing raw materials on the international market and making use of the domestic "surface mine", consisting of copper scrap and residue generated by consumers and processors, as well as by demolition and obsolescence. Access to primary supplies has become increasingly difficult over the past few years, as copper mining countries have developed their own refining facilities close to their mines, thereby reducing raw materials availability on the international market. Furthermore, competition by rapidly industrialising countries for copper raw materials has increased as these countries develop domestic refining capacity to satisfy the requirements of their consumer markets.

**Table 3: Refined copper**  
**International comparison of consumption**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Share 1993 (%)
Market economy countries	7 668	7 362	7 674	8 012	8 211	8 636	8 761	8 972	9 061	9 304	100.0
EU	2 394	2 358	2 419	2 457	2 525	2 709	2 804	2 837	2 941	2 757	29.6
Belgique/België	299	310	303	292	318	376	390	372	372	320	3.4
BR Deutschland	792	754	771	800	798	854	897	998	1 032	899	9.7
España	114	116	130	131	135	146	146	156	153	162	1.7
France	412	398	401	399	409	459	478	481	488	474	5.1
Italia	348	362	394	420	445	458	475	471	502	487	5.2
Portugal	19	16	18	26	28	22	25	26	21	10	0.1
United Kingdom	353	347	340	328	328	325	317	269	308	325	3.5
USA	2 133	1 976	2 100	2 127	2 206	2 204	2 150	2 058	2 176	2 368	25.5
Canada	231	223	226	232	236	219	185	185	176	204	2.2
Japan	1 368	1 226	1 211	1 277	1 331	1 447	1 577	1 613	1 411	1 384	14.9
Taiwan	137	92	156	208	215	315	265	399	416	477	5.1
South Korea	188	207	262	259	266	252	324	343	354	400	4.3

Source: World Bureau of Metal Statistics, August 1994

**Figure 3: Refined copper  
LME quotations (settlement-grade A)**



Source: World Bureau of Metal Statistics, August 1994

Copper refiners in the EU face heavy international competition for their raw material purchases, especially from refiners in certain markets, mainly in the Far East, which benefit from protective measures. Furthermore, the trade in secondary materials is increasingly being restricted by environmental regulations such as the Basle Convention. These regulations are now starting to make a real impact on certain areas of the international copper scrap trade, with shipments of material held up pending the granting of relevant licences and other documentation. The major problems relate to:

- the notification and follow-up documents which have to be used;
- the financial guarantees which the Member States have a right to claim in order to cover the risks involved in these movements;
- the absence of bilateral agreements which are necessary in order to promote trade with a large number of non OECD countries.

All this has a negative influence on an intensive recycling industry like the EU copper industry with well established recycling circuits. According to industry sources, there is in fact the possibility that these rules actually discourage recycling rather than promote it.

The potential for expansion of copper refinery capacities in the EU is limited due to the difficulties of access to feed supplies as well as the heavy investment requirements and operational costs arising from environmental protection measures, which are far above the average world standard. Nevertheless, following the acquisition of Rio Tinto Minera in Spain by a major mining company, Freeport, with a world class copper mine in Indonesia, an expansion of the Spanish smelter and refinery is taking place. Besides, refinery modernisations have taken place at Norddeutsche Affinerie and at Hüttenwerke Kayser (D) and the Union Minière (B) refinery at Olen is currently being modernised. All are making use of the latest tankhouse technology.

**Table 4: Refined copper  
International comparison of production**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Share 1993 (%)
Market economy countries	7 186	7 310	7 434	7 631	7 974	8 317	8 469	8 524	8 905	9 064	100.0
EU	1 165	1 216	1 229	1 192	1 226	1 222	1 235	1 219	1 252	1 343	14.8
Belgique/België	396	413	414	408	393	329	332	298	316	336	3.7
BR Deutschland	379	414	422	400	426	475	476	522	582	632	7.0
España	156	152	155	151	159	166	171	190	179	179	2.0
France	N/A	44	42	40	44	49	52	56	57	59	0.7
Italia	N/A	64	65	65	75	83	83	83	76	90	1.0
Portugal	5	5	5	5	5	0	0	0	0	0	0.0
United Kingdom	N/A	125	126	122	124	119	122	70	42	47	0.5
USA	1 490	1 435	1 480	1 542	1 853	1 954	2 017	1 995	2 144	2 253	24.9
Canada	504	500	493	491	529	515	516	538	539	562	6.2
Japan	935	936	943	980	955	990	1 008	1 076	1 161	1 189	13.1
Chile	880	884	942	970	1 013	1 071	1 192	1 228	1 242	1 268	14.0
Peru	219	227	226	225	175	224	182	244	251	262	2.9
Zaire	225	227	218	210	203	204	173	140	57	40	0.4
Zambia	522	510	487	509	448	470	479	424	472	425	4.7
Australia	197	194	185	208	223	255	274	279	303	309	3.4

Source: World Bureau of Metal Statistics, August 1994

**Table 5: Copper semis**  
**Main indicators by product line, 1993**

(thousand tonnes)	Production	Net exports
Unalloyed copper, total	2 773.4	191.8
Wire	1 992.0	164.9
Rods, profiles	46.7	21.2
Rolled material	301.2	11.8
Tubes	433.5	-6.1
Copper alloys, total	1 301.8	95.2
Wire	63.7	3.7
Rods, profiles	783.6	15.1
Rolled material	345.2	57.4
Tubes	109.3	19.0
Total	4 075.2	287.0

Source: International Wrought Copper Council, London; Eurostat\*

Nevertheless, the structural shortage of EU refined copper output versus the manufacturing industry's consumption needs is expected to continue and the EU will remain a large net importer of refined copper. EU copper semis output, on the other hand, is large enough to adequately supply the EU consumer market towards which it is primarily geared. Excess capacity should enable the EU to remain a net exporter.

### Prices

The London Metal Exchange (LME) quotations for Grade A copper cathode generally govern the pricing of copper transactions made by the industry. The evolution of the LME copper prices generally reflects the market balance at world level, although the influence of large investment funds is increasingly felt in the market.

## INDUSTRY STRUCTURE

### Companies

There are ten major refineries in the EU and it is estimated that the copper refining industry employed more than 5 000 people in 1993. Two companies have facilities of over 250 000 tonnes of refined copper per year capacity. Union Minière (B) and Norddeutsche Affinerie (D). Two others, Hüttenwerke Kayser (D) and Rio Tinto Minera (E), produce more than 100 000 tonnes per year each. Production capacity at the other facilities in Spain, Italy, the United Kingdom, France and Belgium, ranges between 35 000 and 100 000 tonnes of copper per year.

**Table 6: Copper**  
**EU copper refineries, 1993**

Country	Company	Location	Theoretical annual capacity (tonnes)	Employment
Belgique/België	Union Minière	Olen	330 000	800
	Metallo-Chimique	Beerse	38 000	240
BR Deutschland	Norddeutsche Affinerie	Hamburg	350 000	2 000
	Hüttenwerke Kayser	Lünen	122 000	700
	MKM Mansfelder Kupfer und Messing	Hettstedt	55 000	230
España	ELMET	Bilbao-Berango	38 000	125
	Rio Tinto Minera	Huelva	150 000	600
France	Cie Générale du Palais	Le Palais	45 000	270
Italia	ENIRISORSE	Porto Marghera	60 000	200
United Kingdom	IMI Refiners	James Bridge	46 000	380

Source: International Wrought Copper Council, London, and industry statistics

Upstream integration into smelting operations, processing concentrates or low grade scrap varies from one refinery to another. Some are fully or partially integrated whilst others have no smelting facility at all. One company only has a smelting capacity which significantly exceeds its refining capacity (Metallo Chimique in Belgium). At EU level, there is a deficit in copper smelting capacity.

There are many more companies in the copper semis manufacturing industry, where about 100 companies are involved throughout the EU, employing some 75 000 people. However the industry is dominated by three large groupings, Europa Metall (I) with manufacturing subsidiaries in France, Germany and Spain, Outokumpu (SF), with manufacturing facilities in Finland, Sweden, and Spain, and Boliden (S) with plants in Sweden, Netherlands, Belgium and the UK. Other major independent companies include Carlo Gnutti (I), Wieland Werke (D) and IMI (UK). The industry suffers from overcapacity, making it very vulnerable to cyclical movements in demand.

## ENVIRONMENT

Recycling constitutes an important component of the raw material supplies of the copper refining and manufacturing facilities. Copper can be recovered from many of its applications and returned to the production process without loss of quality in recycling. Having very limited access to domestic primary sources of copper, the EU industry has traditionally given much attention to so-called "surface mine", relying to a large extent on scrap feed to reduce the large deficit of its copper raw materials trade balance. Altogether, secondary raw materials account for about 40 % of EU's use of copper, either by refineries as part of their feed and then by fabricators in the form of refined copper or by fabricators directly. In some cases, such as brass rods, the product is made entirely from recycled copper and brass, with only a small input of primary zinc.

The EU copper industry has developed advanced technologies and made considerable investments so as to be able to process a wide range of copper scrap, including complex, low-grade residues, and to comply at the same time with increasingly stringent environmental regulations.

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# Zinc

## NACE 224

The EU zinc industry holds a top ranking position at world level not only in terms of production, but also in terms of know-how and consumer market basis. It is currently confronted with the effects of serious market imbalance created by both the lasting slump in demand and the sudden inversion of net trade with the Central and Eastern Europe countries, the CIS and China. As a result, the LME inventories have surged to unprecedented levels and prices have collapsed.

### INDUSTRY PROFILE

#### Description of the sector

Zinc is the third most used non-ferrous metal, behind aluminium and copper. Primary zinc production results from the processing of zinc ores into zinc concentrates of approximately 60 % zinc content which are then smelted and refined into zinc metal. Zinc production may also arise from secondary source materials such as metallurgical residue, ash from galvanising, new and old scrap. Zinc production from secondary sources accounts for 6 % to 7 % of refined zinc output in the market economy countries.

Zinc is supplied to the market in various qualities and shapes: metal ingots of various grades (the highest quality is SHG i.e. Special High Grade which rates 99.995 % Zn, whilst the poorest is only about 98 % pure); extrusion products such as bars, rods and wires; rolling products such as sheets and strips; casting alloys; powders and chemical compounds, such as oxides.

End-uses include a wide range of applications, the most important one in terms of volume being steel protection against rust through galvanising for the automotive, appliance and building industries. Zinc alloys (brass, bronze, die casting alloys, etc.) and zinc semis are respectively the second and third major consumption areas with applications in the building, appliance and car industries.

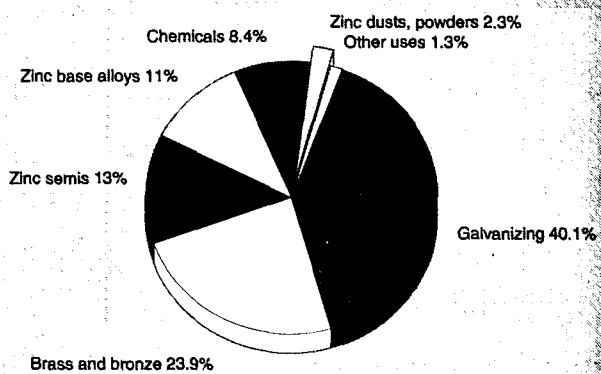
In 1993, the EU mine output dropped significantly to 397 000 tonnes of zinc contained in concentrates as a result of the exhaustion of reserves and lower ore grades at some mining operations. Metal production stayed above the 1.8 million tonnes mark which it had overstepped in 1992, while consumption of refined zinc stepped back to 1 640 000 tonnes, accounting for 30 % of the demand for zinc in the market economy countries.

#### International comparison

As shown in Table 1, the EU production of zinc concentrates is still significant at international levels, although it has been decreasing since the late 1980s, ranking in fifth position behind Canada, Australia, Peru and the USA.

Mine output in the EU is essentially accounted for by Ireland and Spain. In the other countries, mining is gradually being phased out as mine reserves are exhausting and operations are becoming uneconomic due to the high cost of labour and environmental protection, and the relatively low grade of ores. Considering these factors, combined with the persisting low prices for metal, zinc mining in the EU is bound to further decline in the coming years. While EU concentrates used to meet more than 45 % of the EU refinery requirements 10 years ago, they now account for less than one fourth of these. The deficit is filled in by increased imports, as mine production capacity is currently increasing in North America, Australia and some South American countries.

Figure 1: Zinc  
Breakdown of EU consumption by uses, 1993



Source: International Lead and Zinc Study Group, September 1994

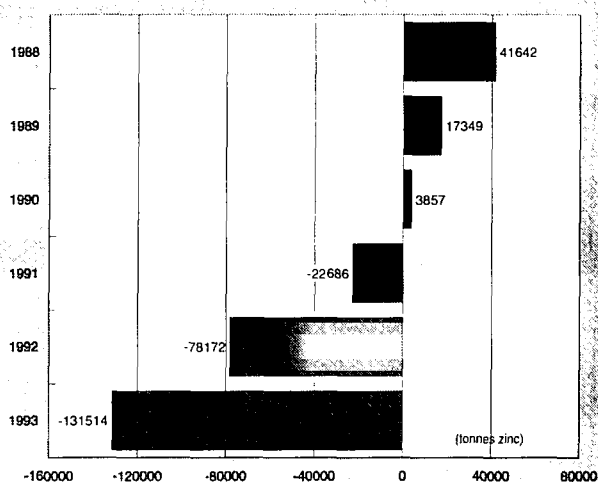
In terms of refined zinc production, the EU definitely stands as the world leader, way ahead of Japan and Canada which rank on the second and third position respectively. In 1993, the EU output was recorded at 1 811 000 tonnes of metal, accounting for 33 % of the market economy countries total of 5 473 000 tonnes.

The EU is also the major consumer area of zinc among the market economy countries. The 1 640 000 tonnes zinc consumed in 1993 was 44 % above the second largest consumer market, i.e. the USA market, and 128 % above Japan.

#### Foreign trade

Zinc metal is a widely traded commodity as shown in Tables 4 and 5. Trade patterns have undergone a major change, however, with the opening of Eastern Europe. In the past, the countries of Central and Eastern Europe (CEEC) and the former Soviet Union were net importers of about 75 000 tonnes of zinc per year from the West. With the dismantling of the COMECON and the collapse of the State monopolies, the

Figure 2: Zinc  
EU net trade with former USSR and COMECON



Source: Eurostat - External trade data (CN code 7901)

**Table 1: Zinc**  
**Production of zinc concentrates**

(thousand tonnes of zinc content)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	727	726	670	706	702	672	629	604	501	397
Danmark	73	70	62	66	77	71	48	0	N/A	N/A
BR Deutschland (1)	113	118	104	99	75	64	59	54	14	N/A
Hellas	23	21	23	21	21	25	27	30	26	22
España	229	234	227	273	278	266	257	265	208	158
France	36	41	40	31	31	27	24	27	17	14
Ireland	206	192	182	177	177	169	166	188	194	194
Italia	42	45	26	33	38	44	42	37	31	7
Portugal	0	0	0	0	0	0	N/A	2	11	2
United Kingdom	5	5	6	6	5	6	6	1	N/A	N/A
Canada	1 207	1 172	1 291	1 482	1 347	1 216	1 203	1 157	1 325	1 007
USA	277	252	221	233	256	288	543	547	552	517
Peru	555	583	598	612	485	598	598	638	602	665
Australia	653	713	665	738	739	811	884	1 048	1 013	1 007
Market economy countries (1)	5 095	5 148	5 066	5 316	5 052	5 094	5 396	5 587	5 669	5 156

(1) Data from 1991 onwards including former East Germany from 1991.  
Source: International Lead and Zinc Study Group, August 1994 Bulletin

trade flows which traditionally existed between those countries were knocked down. Also the rouble clearing system broke up, this phenomenon being accelerated by the rouble devaluation. Simultaneously, major production outlets in defence applications vanished, and as the conversion of the industry from defence to consumer products is a slow process, metal demand has dropped dramatically.

Due to these developments and the urgent need of these countries for "hard currencies", domestic production has been diverted from home markets: it is estimated that about 260 000 tonnes of refined zinc were exported from the CEEC and the CIS during 1993. Since the traditional 75 000 tonnes per year net export flow from the West to these countries dried up in fact at the beginning of the 1990s, it can be estimated that a supply of approximately 335 000 tonnes has been thrown on the Western market in 1993, with Europe bearing the brunt of it.

The EU zinc industry used to export significant tonnage of zinc on a regular basis to the former Soviet Union and, to a

lesser extent Czechoslovakia, while imports from the COMECON remained negligible.

By the beginning of the 1990's however, a drastic change occurred in these trade flows: EU exports rapidly decreased from more than 46 000 tonnes in 1988 to a mere 6 000 tonnes in 1991, and imports from the CIS and the countries of Eastern and Central Europe mushroomed from about 1 000 tonnes in 1989-1990 to nearly 27 000 tonnes in 1991 and almost five times as much in 1993. Figure 2 shows this development: the net trade surplus of the late 1980s has turned into a major deficit in 1993. Within four years, not only did the EU zinc industry lose a market outlet which it had ensured thanks to the superior quality of its product, but it also had to incur fierce inroads on its domestic market by lesser quality low price imported zinc products.

The move of the CIS and former COMECON zinc industry towards foreign markets, has destabilised the balance of the zinc market. This has a direct impact on the supply/demand balance and resulting market prices; but, more perniciously,

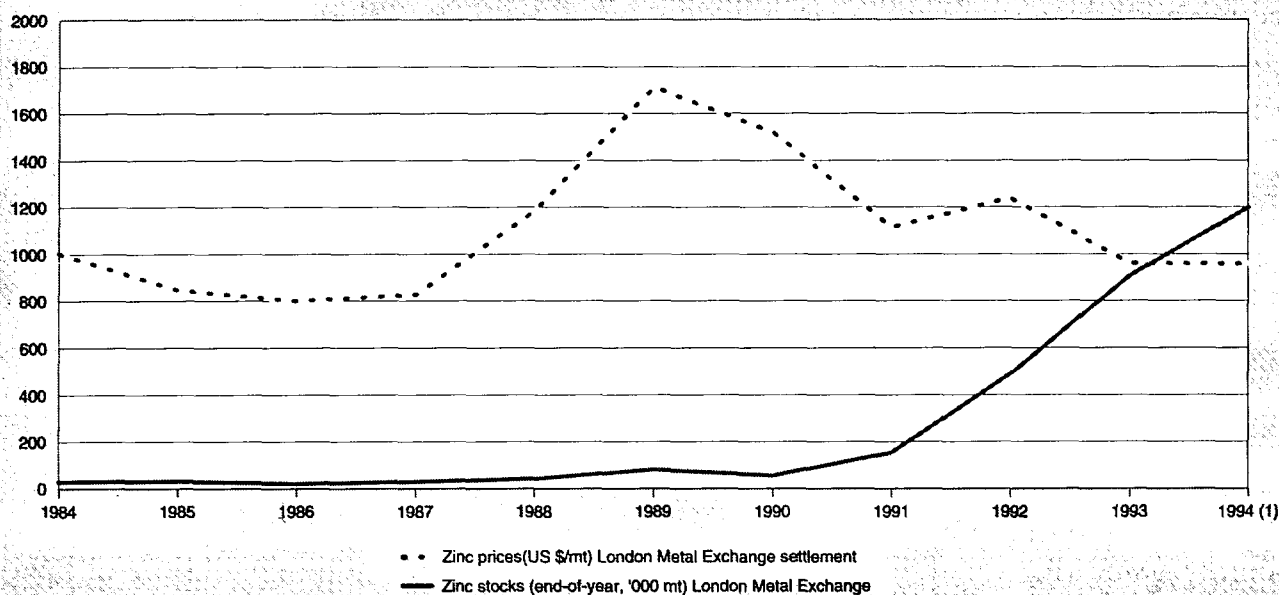
**Table 2: Zinc**  
**Production of refined zinc (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	1 567	1 694	1 619	1 677	1 719	1 695	1 703	1 777	1 829	1 811
Belgique/België	271	271	269	284	298	285	290	298	217	209
BR Deutschland (2)	356	367	371	380	356	353	338	346	383	381
España	212	216	202	224	256	257	257	274	368	342
France	259	247	257	249	274	266	264	299	304	310
Italia	167	310	230	247	242	246	248	256	253	254
Nederland	210	203	198	206	210	203	207	201	205	206
Portugal	6	6	6	6	6	5	6	2	2	4
United Kingdom	86	74	86	81	77	80	93	101	97	105
Canada	683	692	571	610	703	670	592	661	672	662
USA	331	334	316	344	330	358	358	376	400	399
Japan	754	740	708	666	678	665	687	731	729	696
Australia	306	293	308	312	302	294	303	326	332	317
Market economy countries (2)	4 592	4 996	4 854	5 058	5 240	5 215	5 206	5 405	5 449	5 473

(1) Total production by smelters and refineries of zinc in marketable form or used directly for alloying including production on toll in the reporting country, regardless of the type of source material. Remelted zinc and zinc dust are excluded.

(2) Data from 1991 onwards including former East Germany from 1991.  
Source: International Lead and Zinc Study Group - August 1994 Bulletin

**Figure 3: Zinc**  
**LME zinc prices and stocks**



(1) 6 month average price / end-of-June stock.

Source: International Lead and Zinc Study Group, August 1994 Bulletin

it also pulls the market value of zinc down as zinc from the CIS and former COMECON countries is offered at very low discount prices.

### Prices

Zinc is quoted on the London Metal Exchange (LME) where demand and supply regulate the price. As production remained slightly below consumption in 1990 and 1991, the price drop linked to business cycle factors was stopped in 1992 and prices increased during the first months of the year until the rising of stocks forced them to drop back.

The stagnation of consumption worldwide, the increasing exports from the former COMECON countries and the CIS and the unexpected surge in exports from China did in fact create a significant surplus which has been heavily depressing price levels since October 1992. On 29 September 1993, zinc was quoted on the LME at 859 USD per tonne, which is the lowest level since 1987 in real terms, and at the end of the year, the LME inventories were piling up at 907 000 tonnes, an unprecedented high level.

**Table 3: Zinc**  
**Consumption of refined zinc (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	1 450	1 424	1 475	1 500	1 594	1 594	1 671	1 751	1 711	1 640
Belgique/België	156	169	172	163	175	174	185	200	189	210
Danmark	10	12	15	10	12	11	13	13	16	14
BR Deutschland (2)	425	410	434	455	450	453	484	540	532	470
Hellas	12	15	15	14	14	17	20	16	12	12
España	101	103	100	109	127	116	125	129	112	119
France	282	247	260	253	290	279	284	289	258	218
Ireland	1	1	1	1	2	2	1	2	1	2
Italia	210	218	232	245	254	262	275	283	300	295
Nederland	60	51	54	50	67	75	76	82	87	90
Portugal	11	9	10	12	10	11	15	13	14	14
United Kingdom	182	189	182	188	193	194	193	184	190	196
Canada	146	156	154	158	159	148	122	121	126	134
USA	980	962	998	1 052	1 089	1 059	992	931	1 057	1 142
Japan	774	780	753	729	774	769	814	845	784	719
Australia	97	107	99	94	108	111	114	113	119	132
Market economy countries (2)	4 704	4 737	4 885	5 044	5 267	5 199	5 199	5 388	5 399	5 494

(1) Total consumption of refined zinc for the production of zinc alloys, regardless of the type of source material from which produced. Remelted zinc and zinc dust are excluded.

(2) Data from 1991 onwards including former East Germany from 1991.

Source: International Lead and Zinc Study Group - August 1994 Bulletin



**Table 4: Zinc  
Imports of refined zinc (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	526	504	475	491	556	573	598	642	795	N/A
Belgique/België	46	47	45	38	35	30	25	39	142	106
Danmark	11	12	12	10	12	12	11	14	16	N/A
BR Deutschland (2)	161	152	159	156	179	186	222	270	283	234
Hellas	15	15	17	15	16	17	13	11	10	14
France	65	62	64	70	87	84	89	82	98	92
Italia	91	63	55	64	53	76	77	71	82	89
Nederland	15	14	17	19	36	36	26	25	29	N/A
Portugal	6	8	4	5	5	6	11	10	12	10
United Kingdom	116	131	102	114	133	126	124	120	123	117
USA	639	611	665	706	749	712	632	549	645	720
Japan	57	65	93	105	113	133	141	142	106	84
Taiwan	40	39	56	65	64	57	72	126	129	171

(1) World imports of unalloyed unwrought zinc.

(2) Data from 1991 onwards including former East Germany from 1991.

Source: International Lead and Zinc Study Group, August 1994 Bulletin; Eurostat (CN codes 790111 & 790112)

## INDUSTRY STRUCTURE

### Companies

Table 6 identifies the EU top zinc metal refiners with reference to their 1993 production capacity.

The major EU refiners have a diversified product list as they process part of their unwrought zinc output into value added products such as rolling products (sheets and strips of various dimensions), casting alloys or specialty products such as galvanising anodes, powders and callots for the battery industry, wires for the surface treatment of steel, dust, oxide. In the case of Union Minière (B) and Metallgesellschaft (D), value added products account for 50 % or more of output value and volume. The most diversified product list is Union Minière's.

Backward integration at mine level is limited and none of the EU refiners can rely significantly on its own mines' concentrate supplies, if any. A significant share of zinc mine production in the EU is not dedicated to any particular refinery. In Ireland for instance, Tara Mines has no integrated refinery and sells its concentrates on the market, and the current major mining projects or developments, in Ireland and Spain, are not geared to the exclusive supply of any EU zinc refinery.

## ENVIRONMENT

According to the European Zinc Institute (E.Z.I.), the market economy countries consume about 2 million tonnes of zinc from secondary sources either as refined metal or remelted zinc or through direct use of scrap at the fabricating stage. Estimates based on historical consumption and product life cycles indicate that the recovery rate of 80 % has been reached. The recyclability of zinc is far advanced, not only as zinc metal but also in several different forms.

Primary and secondary facilities in the EU operate under strict emission control and limit values with respect to air and water. The technology currently implemented is state of the art in this respect, making the EU production units the most environmentally friendly in the world.

## OUTLOOK

The oversupply of zinc metal, due to reduced consumption and increased exports from former COMECON countries and China, has resulted in extremely low prices which do not cover production costs for most mines and smelters, especially in the EU.

**Table 5: Zinc  
Exports of refined zinc (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	675	659	597	655	703	686	631	618	825	790
Belgique/België	168	157	137	160	155	158	132	126	150	146
BR Deutschland (2)	98	94	78	79	99	93	72	74	117	106
España	106	127	94	106	146	148	137	146	220	205
France	93	69	66	71	66	71	74	81	147	182
Italia	42	44	46	58	50	45	51	35	34	16
Nederland	160	160	165	177	180	162	157	140	144	116
United Kingdom	8	8	11	4	7	9	8	16	13	19
Canada	530	556	427	441	528	495	450	521	510	493
Australia	221	215	217	241	207	203	244	253	259	259
Finland	123	137	128	134	128	134	135	149	139	137

(1) World exports of unalloyed unwrought zinc.

(2) Data from 1991 onwards including former East Germany from 1991.

Source: International Lead and Zinc Study Group, August 1994 Bulletin; Eurostat (CN codes 790111 & 790112)

**Table 6: Zinc  
Top EU producers in terms of annual capacity, 1993**

Country	Company	Location	Process (1)	Theoretical annual capacity (tonnes)	Employment
Belgique/België BR Deutschland	Union Minière	Balen-Wezel	E	200 000	725
	Ruhr-Zink GmbH	Datteln	E	200 000	519
	M.I.M. Hüttenwerke Duisburg GmbH	Duisburg-Wanheim	ISF-RT	100 000	580
	Metaleurop Weser Zink GmbH	Nordenham	E	130 000	440
	Harz Zink GmbH	Harlingerode	CV	30 000	59
España	Asturiana de Zinc S.A.	San Juan de Nieva	E	320 000	896
	Española del Zinc S.A.	Cartagena	E	60 000	298
France	Union Minière France	Auby	E	220 000	700
	Metaleurop S.A.	Noyelles Godault	ISF-RT	100 000	485
Italia	ENIRISORSE	Porto Vesme (Sardegna)	ISF-RT	75 000	751
		Porto Vesme (Sardegna)	E	80 000	
	Pertusola Sud S.p.A.	Crotone (Calabria)	E	100 000	637
Nederland	Budelco B.V. (Pasminco + Billiton)	Budel-Dorplein	E	215 000	600
United Kingdom	Britannia Zinc (MIM Holdings)	Avonmouth	SF-RT	114 000	531

(1) E = Electrolytic plant ISF = Imperial smelting furnace; CV = Vertical retorts; RT = Fire refining.  
Source: Industry statistics

The integration of the former USSR and COMECON countries in the international zinc market appears to be the major determining factor for the future. This might lead to some fundamental restructuring of the industry worldwide, but the EU is more specifically affected as its geographic position makes it the closest target for the newcomers' exports. Meanwhile, the resumption of consumption might bring some relief in absorbing the current market surplus, although the latter has developed to unprecedented levels, and zinc being a mature metal demand, growth rates are not expected to be high.

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# Lead

## NACE 224

The EU possesses few lead mine resources, but its lead metallurgical activities are powerful and competitive. During the last 10 years, EU consumption and production have experienced only modest growth, resulting in a decrease in the EU's world market share. Considerable restructuring has been taking place in the lead refining industry and in its major client industry, particularly the battery sector. Restructuring will require the build up of new relationships between suppliers and consumers. Secondary smelting is an increasingly important source of lead, particularly as environmental regulations become more stringent.

### INDUSTRY PROFILE

#### Description of the sector

Lead is the most abundant heavy metal in the earth's crust. It is normally found in mixed ores where it is associated with zinc and small amounts of silver and copper. Lead's softness, low melting point, chemical reactivity and resistance to corrosion give it great functional value, both in its pure form and in alloys or compounds. Mine production of lead has decreased slightly, as a result of the growing importance of recycling. Refined lead is derived from two sources: primary material in the form of lead ores and concentrates, and secondary material in the form of scrap and residue. Primary production requires the smelting of lead-bearing ores to produce refined lead bullion.

Secondary production may also require refining facilities if the secondary raw materials contain unwanted compounds. As a result of environmental and other regulations aimed at recycling of lead-bearing scrap, the secondary refining industry

now supplies more than 50 % of the lead consumed in market economy countries. As lead acid accumulators in cars are the main source of scrap for secondary refining, this proportion will increase as the world car population increases.

Primary refining is linked to the economics of mining lead-zinc orebodies. The bulk of lead mine production comes predominantly from operations in which zinc, and silver to a lesser extent, are the principal profit makers; less than a third comes from actual lead ore mining operations in which lead is the principal metal recovered.

The most important consumer of lead is the battery industry. Other uses for lead include: petrol additives (tetraethyl lead), paint, shot, glass, ceramics and plastics.

#### Recent trends

Consumption of lead rose significantly world-wide in the 1980s. From 1982 to 1992, consumption in EU Member States rose by some 13 % at an average annual rate of 1 %. In 1993, however, consumption of refined lead in the EU fell sharply to almost the same level as in 1985, at 1 347 000 tonnes.

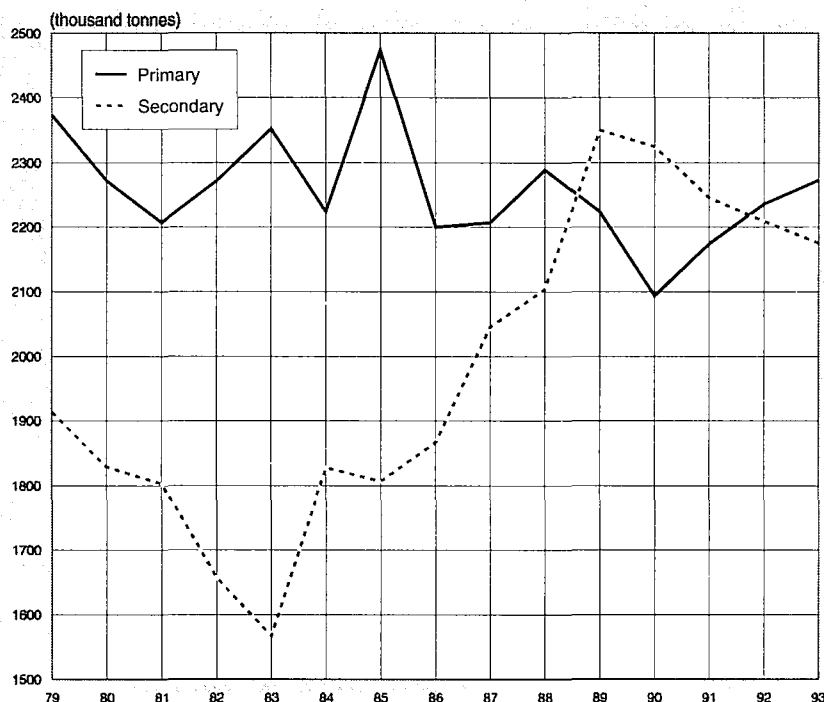
The EU is not a major mining region. In 1993, only 104 700 tonnes of lead were mined in the EU, a fall of 19 000 tonnes from 1992. Metal production, however, is much higher and amounted to 1 355 000 tonnes in 1993, of which 50 % was from secondary feed materials. The industry is responding effectively to potential ecological problems by recovering ever increasing amounts of lead, resulting in a steady decline of primary production.

### MARKET FORCES

#### Demand

Consumption of lead generally follows business cycles, increasing during periods of high economic activity and falling during periods of recession. So it was in the EU from 1991

**Figure 1: Lead**  
**Production of primary and secondary lead in the market economy countries**



Source: World Bureau of Metal Statistics

**Table 1: Refined lead  
Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	1399	1 342	1 386	1 377	1 416	1 474	1 514	1 503	1 453	1 347
Production	1384	1 370	1 339	1 374	1 453	1 422	1 389	1 423	1 372	1 355

Source: World Bureau of Metal Statistics

to 1993 with the result that the average annual growth rate recorded over the 1980s dropped from 1.5 % to 1 % per year.

Regional trends in consumption are variable. For example, the share of EU consumption relative to consumption in market economy countries has fallen in recent years. The same is true for the USA. In contrast, most other areas of the world have increased their share in world consumption. Apart from the major influence of business cycles, consumption trends are largely driven by regulatory control on lead products (e.g. gasoline additives) and the cost and availability of substitutes.

Demand from the battery industry will continue to underpin consumption, largely as a result of rising demand for lead acid batteries for the automobile industry. Between 1979 and 1991, lead consumption in the battery industry increased by almost 43 %, at an average annual rate of 3.25 %. The vast majority of storage batteries are used in starting, lighting and ignition (SLI) applications in motor vehicles. Demand for such batteries depends on the number of vehicles built and, more importantly, on the number of batteries required to replace exhausted units. Demand has also increased for other types of batteries, such as those used in load levelling/peak sharing applications, as well as in electric-powered vehicles and standby power applications.

Environmental constraints and competition from other metals or materials have resulted in a stagnation or decline of lead demand in most of its other end-uses. Consumption of rolled and extruded products, shots, pigments and other compounds rose marginally, but contributed little to overall growth. In applications such as cable sheathing, alloys and gasoline additives, consumption has declined markedly: between 1979 and 1993 consumption in these three sectors fell by nearly 58 %. By the end of 1993, they accounted for only 8 % of the total, compared with 22 % in 1979.

In the case of cable sheathing and alloys, lead has suffered from substitution by other materials and the introduction of new technologies. Increasing awareness about the impact of polluting emissions on the environment is the main reason for the drop in lead consumption in gasoline additives. Over the period 1980 to 1993, consumption of lead for this end-use

fell by more than three-quarters, and it only remains of significance in the United Kingdom, which consumed 72 % of the total recorded in 1993.

#### Supply and competition

The market for primary lead and lead products is international in scope. Large consumer markets such as the EU are significant importers of lead concentrates and bullion. North America and Australia are large exporters of the same, after meeting their own market requirements. The market for secondary refined lead is more regional as secondary refining is predominantly carried out in the country where the scrap arisings occur and production is supplied directly to the neighbouring market. With the growing importance of secondary refining, from an environmental standpoint, the majors in Europe have a vested interest to be active in both primary and secondary refining. These companies are best placed to finance the investment that will be required to conform with increasing environmental legislation.

With the collapse of COMECON and the former Soviet Union in the early 1990's, increasing tonnage of refined metal of good to mediocre quality is being exported from these countries, disturbing the prevailing trade patterns in the Western European market, which it is the closest outlet to the now liberalised Eastern producers. The flow of Eastern material has enhanced the downward pressure on prices, which were already suffering from the slump in demand, and pushed metal stocks on the London Metal Exchange (LME) to sky-high levels. Competition from Eastern Europe is all the more damaging to the EU industry in that material prices do not take into account any comparable costs with respect to environmental protection, transport, or salaries, while EU producers bear the full brunt of heavy investment in R&D and for implementation of anti-pollution measures and environment-friendly technologies. At current price levels, the future of the industry is at stake and even secondary refining, though directly beneficial to the environment, is seriously threatened for no longer being economically viable.

**Table 2: Refined lead  
Consumption of refined lead in major countries by end-use**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Batteries	2 081	2 131	2 164	2 303	2 394	2 492	2 541	2 558	2 566	2 662
Cable sheathing	207	207	195	194	183	196	182	170	153	144
Rolled and extruded products	302	280	289	282	312	312	310	285	273	265
Shot/ammunition	107	102	92	96	94	99	101	109	113	115
Alloys	158	155	143	151	147	142	134	134	139	138
Pigments and other compounds	503	524	500	528	527	557	517	543	531	489
Gasoline additives	166	136	110	108	103	98	87	74	58	54
Other	151	157	154	165	165	149	150	156	148	152
Total	3 675	3 692	3 647	3 827	3 925	4 045	4 022	4 028	3 980	4 019

Source: ILZSG (covers over 90% of Western World consumption)



## INDUSTRY STRUCTURE

### Companies

Within Western Europe there are ten primary smelters/refiners, ranging in size from 75 000 tonnes per year to 200 000 tonnes per year. The primary refineries are mostly multinational and spread throughout the United Kingdom, Sweden, France, Germany, Belgium, Spain, Austria, Yugoslavia and Italy. All plants, with the exception of Britannia Refined Metals (UK), smelt lead or lead/zinc concentrates before refining lead bullion. Britannia Refined Metals refines only crude lead bullion imported from its parent company MIM in Australia.

The secondary industry is characterised by a large number of smaller refineries, many of which are independent. There are approximately thirty secondary smelters/refiners in Western Europe producing from 5 000 to 65 000 tonnes per year. They recycle and refine scrap generated in their local area. The number of these refineries is decreasing as the large multinational companies, and the major battery manufacturing groups as well, acquire the smaller secondary facilities or set up their own new recycling operations.

The largest primary smelters/refineries in the EU include: Britannia Refined Metals (UK); Metaleurop (F and D); Metallgesellschaft (D); Union Minière's Business Unit Hoboken (B); and, Enrisorse (I). With the exception of Union Minière's Business Unit Hoboken, all of these primary refiners are involved in secondary recycling/refining as well.

### Strategies

During the last three years there has been considerable restructuring within the lead refining industry and its major outlet, the battery industry. The effects of restructuring can be noted within the battery industry, with the emergence in Europe of five major battery groups. These groups have become very powerful in their bargaining capabilities and some are competing with lead refiners by integrating their battery manufacturing facilities into lead recycling/refining opera-

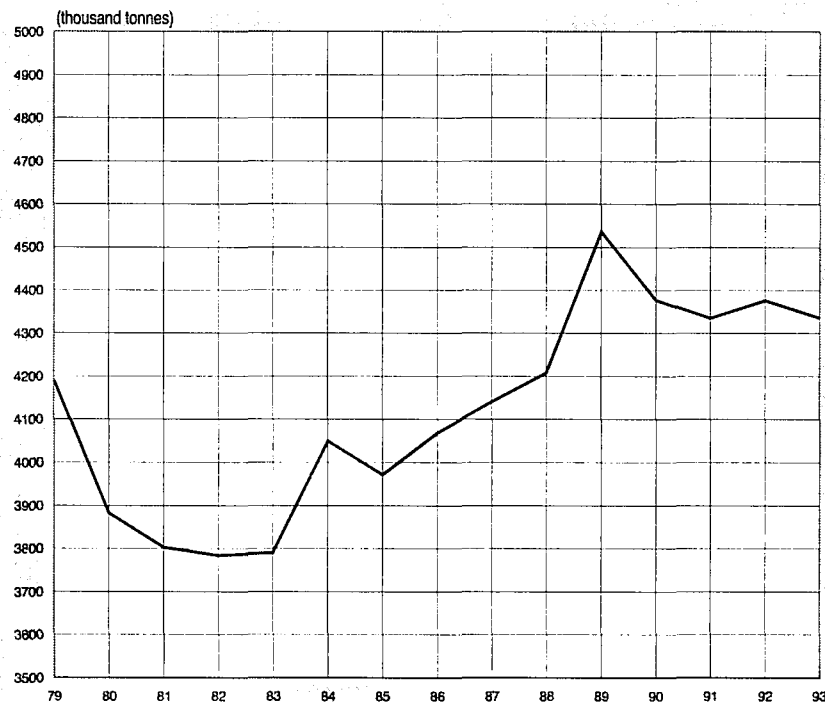
tions. They process their own scrap collected from their own collecting networks for spent batteries, which are returned through their distributor networks.

In the future, secondary refiners will have to work more closely with major battery companies in order to maximise the recycling rate of battery scrap and to comply with national legislation implementing the EU Battery Regulation. Government approved collection schemes will be set up hopefully in close collaboration between the refiners and the battery manufacturers. Such schemes should be harmonised throughout the EU to allow fair competition on supply of lead and lead alloys between EU Member States and other European countries with similar schemes.

Environmental legislation will also require investment to reduce lead in air emissions. In recent years, several new technologies have been developed and implemented which offer more efficient, environmentally acceptable methods of smelting lead concentrates. These new technologies should rapidly gain ground because of their ability, in most cases, to handle secondary feed material. They integrate smelting and refining operations, offering many advantages such as economies of scale, synergy of the smelting and refining processes, concentration of lead production in fewer areas, closure of environmentally unacceptable plants, and lower lead emission levels.

It seems certain that new pyrometallurgical technologies will further increase their share of total lead smelting capacities over the next decade at the expense of the conventional blast furnace. Ultimately, looking further ahead, hydrometallurgical processes will probably make their way through also. In fact, there are already signs of such development in the treatment of battery paste. Undoubtedly, the number of operational refining sites will decrease in Europe. Consolidation and rationalisation are bound to take place as companies are confronted with facts and figures relating to possible return on investments.

**Figure 2: Lead**  
**Consumption of refined lead in the market economy countries**



Source: World Bureau of Metal Statistics



## ENVIRONMENT

As lead is a toxic metal, it ranks high among environmental concerns. The metal has relatively little impact on ecosystems though and there has been much debate about the levels of lead which can actually cause harm. General policy is normally to restrict emissions to the lowest practicable levels given the state of technology. Recycling is normally conducted whenever appropriate and economic. Most control measures are concerned principally with human exposure (humans are most affected by lead exposure); although there are certain instances in which animals can be exposed to environmental lead.

Lead is increasingly recyclable in its major applications. Batteries, which created 49 % of lead consumption in Europe in 1990, are recycled with more than 90 % efficiency. Indications are that this efficiency rate should further improve in the future. Among other uses, tetraethyl lead (petrol additives), pigments and shots have declined dramatically or disappeared completely over recent years. This is partly a result of environmental legislation (e.g. tetraethyl lead), partly a result of voluntary reductions by industry (e.g. lead shots for fishing weights) and partly a result of substitution (pigments). As far as other uses are concerned, lead is mostly used in products from which it cannot be easily extracted, such as glass, ceramics, and plastics. In these cases, however, there is minimal risk for ecological impact. The net result is that uses of lead which really affect the environment are steadily disappearing.

During production and processing of lead there are inevitably occasions for emissions. These are kept to a minimum through the use of pollution control technologies and strict compliance to legal limit values on the amounts which are allowed to escape. Airborne emissions are controlled through efficient filtration systems and the implementation of design and management systems which prevent uncontrolled losses to the environment. Aqueous effluents are treated before discharge to ensure their compliance with limits imposed by water authorities. Finally, solid residues may not be disposed of indiscriminately. Depending on their lead content or their ability to dissolve into the environment, residues are designated as safe or hazardous and disposed of in authorised landfills.

## REGULATIONS

Regulations affecting lead fall into three main categories: occupational exposure, emissions from plants and controls on products. Occupational exposure is addressed under EU Directive 82/605/EEC of July 28, 1992 on the protection of workers from risks related to exposure to metallic lead and its ionic compounds at work. This directive sets allowances on the level of lead in the air in the workplace and on certain biological indicators which reflect the level of exposure of individual workers. The limit values are complemented by rules on the protection of the workforce providing for the use of protective clothing, respirators, washing facilities or specifying rules on eating, drinking, smoking, etc.

Emissions from lead works are normally controlled by national regulations relating to air or water. There are no universal European limits in these areas. However, lead in the general atmosphere is limited under Directive 82/844/EEC of December 3, 1982 which sets a limit for levels of lead in the air throughout the EU. Levels of lead are also controlled in a number of directives relating to water, depending on its type and use; e.g., water intended for human consumption, water for bathing, fishing waters, etc.

Regarding products, regulations do apply to a number of non-recoverable uses of lead. The use of lead in petrol, for instance, is controlled under Council Directive 85/210/EEC of March 20, 1985. Several Member States have their own regulations which impose tighter limits or which require the availability

of unleaded petrol for vehicles introduced to the market after a certain date. Another area in which legislation is applied is the use of lead in paints, which has been restricted under various national legislation for many years. Recently, lead carbonates and lead sulphates have also been controlled under EU Directive 89/667/EEC of December 21, 1989. This directive prohibits the sale of lead pigmented paints and prohibits their use in domestic buildings.

## OUTLOOK

During the past year the price of lead has improved. This has been brought about by shortages of clean concentrates and scrap batteries, coupled with a gradual emergence from recession. While LME stocks have continued to grow, the main European producers find themselves either short of finished product or in balance. This appears likely to continue through 1995 with all sectors of the industry experiencing improving order books.

The situation in the CIS has also changed quite dramatically. Refined lead production fell by 10 % and exports fell by 40 % between 1992 and 1993. This has been due to a lack of domestic concentrates coupled with a stronger domestic demand, especially from the battery sector.

Due to recent changes that have taken place in the industry's quality assurance requirements, the existence of a two tier market has become more apparent. The LME, on one side, requires little more than a 99.97 % min. Pb, without individual impurity limits, while the industry, in general, requires specific assurances on impurities, banding, dressing levels and general appearance. This leaves the LME, with few exceptions, as the market of last resort for industrial consumers. Hence, a two tier market.

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# Nickel

## NACE 224

The nickel industry worldwide has developed a highly concentrated structure: about 60 % of the metallurgical production of nickel in the market economy countries comes from only four companies.

The EU is the third largest producing area for nickel products, with three companies operating on its territory, along with two other companies in Scandinavia (in Norway and Finland). With regard to nickel mine production, only two EU companies operate mining activities, one in Greece and the other in the overseas territories of France in New Caledonia.

Nickel demand is on a rising trend, determined to a large extent by the increase of consumption in the stainless steel sector, particularly in the newly industrialised countries (NICs).

### INDUSTRY PROFILE

#### Description of the sector

The EU nickel industry processes raw materials, either nickel ore or intermediate products, into nickel products. The range of products for nickel is wide: ferro-nickel, produced by Eramet (F) in New Caledonia and by Larco (GR) for use as a charge product in the fabrication of stainless steels; metal, produced by Inco Europe (UK) in form of pellets and Eramet in France in the form of cathodes for use as an alloying element in various applications (such as superalloys); salts, produced by Inco Europe and Eramet for use mainly in the catalyst and electroplating industries.

#### Recent trends

Since the mid-1970s, nickel consumption in the EU has increased at an average annual rate of 2.4 %. A record level of 240 000 tonnes was reached in 1990, but consumption fell by 9 % in 1991 and by a further 9 % in 1992, essentially as a result of poor economic activity. Demand picked up markedly in 1993, thanks to a production boom in stainless steel caused by increased demand from export markets.

The metallurgical production of the EU grew steadily during the 1980s, reached a peak in 1988 with 89 000 tonnes, decreased slowly thereafter down to 82 000 tonnes in 1992 but recovered to nearly 87 000 tonnes in 1993.

The number of employees in the EU nickel industry decreased by one third between 1982 and 1993, although mine production almost doubled and metallurgical production increased by more than 30 %.

#### International comparison

Among the top four companies producing nickel in the market economy countries, one is an EU corporation, Eramet in France, another owns a plant in the EU, Inco (Canada) in the United Kingdom, and a third has production facilities in Northern Europe, Falconbridge (Canada) in Norway. Table 4 shows the estimated share of the EU in world production of refined nickel. If reference is made to the market economy countries only, the EU share has diminished significantly over the past 16 years. The Canadian share decreased even more during the same period.

In 1993, nickel consumption in the market economy countries reached 667 000 tonnes, with the EU representing 33 % of the total consumption. This share of one-third has been relatively stable since the 1970s. Asia, however, increased its share of consumption from 24 % in the mid-1970s to 34 % in 1993, whilst the US consumption decreased from a 31 % share in 1976 to 20 % in 1993.

### MARKET FORCES

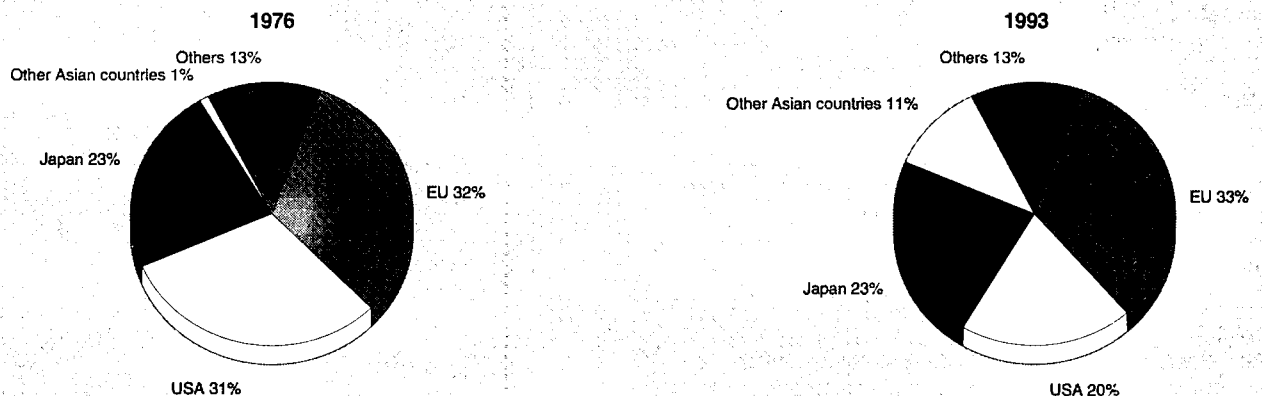
#### Demand

Nickel consumption in the market economy countries grew at an annual rate of 2.1 % between 1976 and 1992. EU consumption increased by 2.4 % per year during this period, while Japanese consumption rose by 3 % per year, and consumption in the USA decreased by 1.7 % per year. East Asian NICs were the fastest developing area from 1986 to 1992, with an average annual growth rate of 9.2 % as new nickel-consuming industries were being installed, especially in South Korea and Taiwan.

Among the various nickel uses, stainless steel plays the leading role. Nickel consumption for stainless steel represents more than 60 % of total nickel demand (63 % in the EU). It grew at a yearly rate of 4.3 % between 1976 and 1992, while nickel consumption in other sectors remained stable.

There are two primary reasons for this rapid evolution of nickel demand in stainless steel. Firstly, the production of nickel-bearing (austenitic) stainless steel rose at a higher rate than that of nickel-free (ferritic) stainless steel. Secondly, due to the improvement of the yield in stainless steel production,

**Figure 1: Nickel**  
Market economy countries consumption by area



Source: Marketing Eramet

**Table 1: Nickel  
Mine production in nickel content**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
New Caledonia (France)	58.3	72.4	64.5	58.3	71.2	96.2	85.0	99.6	100.5	98.1
Hellas	16.6	16.7	10.8	9.7	13.8	17.0	18.5	19.3	18.7	12.6
EU	74.9	89.1	75.3	68.0	85.0	113.2	103.5	118.9	119.2	110.7
World	788.7	827.7	837.9	876.3	918.3	947.3	981.5	947.0	894.7	838.8
Share of the EU in the World total (%)	9.5	10.8	9.0	7.8	9.3	11.9	10.5	12.6	13.3	13.2

Source: Marketing Eramet

**Table 2: Nickel  
Main indicators in volume**

(thousand tonnes of nickel content)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	192.0	174.4	193.4	204.7	226.6	225.5	240.0	216.5	197.4	219.0
Mine production	74.9	89.1	75.3	58.0	85.0	113.2	103.5	118.9	119.2	110.7
Metallurgical production	73.1	77.7	83.5	75.9	88.8	88.5	82.9	86.4	82.1	86.8
Employment (units)	5 722	5 616	5 078	4 363	4 445	4 546	4 519	4 463	4 380	4 260

Source: Marketing Eramet

**Table 3: Nickel  
Top 4 companies by production share (1)**

(%)	1987	1988	1989	1990	1991	1992	1993
Inco (all products)	37	35	34	31	29	32	30
Falconbridge	14	15	15	15	14	14	14
Le Nickel-SLN (ferronickel, matte and ore sales)	8	9	9	8	8	8	8
Western Mining (fiscal years, nickel in concentrates)	8	7	6	8	9	9	8
Total	67	66	64	62	60	63	60

(1) Former COMECON countries excluded.

Source: Marketing Eramet

the rate of growth of primary nickel consumption (4.3 %) was just a little higher than that of secondary nickel (4.1 %).

Production of nickel-bearing stainless steel is influenced both by the overall production of capital goods and by the intensity of use of nickel-bearing (austenitic) stainless steels in the capital and consumer goods sectors.

Over the past 15 years, the use of austenitic steel has increased at a higher rate than industrial production in the OECD countries. This increased use is mainly due to the technical qualities of austenitic steel, which, for many applications, has no acceptable substitute.

Recent developments in export markets show an extremely strong growth of nickel consumption in East Asia. Korea and Taiwan were the first markets to experience rapid growth, followed by China. Demand will increase strongly in the Eastern European countries around the turn of the century.

### Supply and competition

At the end of the 1960s, scarce nickel supplies led to a boom in investments by newcomers. Production, however, did not start until the mid-1970s. Most of these projects were located

in NICs and in Australia, where large nickel deposits were found. As a result, Canada and New Caledonia, which were responsible for around 75 % of the nickel mine production in the market economy countries in the early 1970s, accounted for about 45 % only in the early 1980s.

Up to 1970, about a dozen firms were engaged in nickel production, and increases in output were the result of expanding and modernising existing installations. At that time, all producers were working at near capacity level. Maximum capacity was reached at the beginning of the 1970s, but because of low demand, and subsequently very low nickel prices, producers had to significantly reduce their level of activity after 1975, bringing about a decrease in the rate of use of production capacity. Several facilities closed after 1984, as production costs were too high to enable firms to survive the depressed period of the first half of the 1980s. Real capacity also decreased due to reduced maintenance at most of the plants still in use.

Considerable progress in productivity has been achieved since the 1980s, including a significant reduction in energy consumption. This has enabled some companies to reduce pro-

**Table 4: Refined nickel  
World production, 1993**

(thousand tonnes)

EU	86.8
World	812.5
Share of the EU in the World total (%)	10.7

Source: Marketing Eramet

duction costs so that they are in a better position to cope with the economic ups and downs which are affecting the capital and consumer goods sectors, the major driving forces of nickel demand. Many companies still suffered heavy losses, however.

Production costs decreased in constant terms, and the average break-even price for low cost producers, which was over 6.5 USD per kg at the end of the 1970s, decreased to a level between 4.5 USD and 5.5 USD per kg by the mid-1980s. The most competitive producers remained the sulphide producers in Canada and Australia which were less affected by the high price of oil at that time. After 1985, production costs increased significantly. Producers treating sulphide ore (e.g. Inco) faced increases in wages and social benefits for their workers and lower ore content in their mines due to the lack of extensive mining development work.

Producers processing lateritic ore, including the EU companies Larco and Eramet, also suffered an increase in costs, but to a lesser degree. The decrease in the price of oil and the depreciation of some currencies in Indonesia, Colombia and the Dominican Republic helped these producers to reduce the gap with the sulphide producers, and in some cases to take the lead in terms of costs.

As nominal production capacity was increasing in the market economy countries, net imports from former COMECON countries were also markedly increasing, particularly from the Russian Federation, which rapidly increased its exports to the West and especially to the EU, eagerly striving for hard currency revenues. As a consequence, the share of net imports from former COMECON countries rose from less than 11 % of EU consumption during the 1981-86 period to 19 % during 1987-92. The future trend of deliveries from the CIS will have a vital influence on the supply/demand balance over the coming years.

**Table 5: Nickel  
Major EU producers**

Country	Company	Location	Process	Products	Annual capacity (tonnes Ni)
France	Eramet	Sandouville (Le Havre)	ER (1)	nickel metal salts	13 000
France	Le Nickel-SLN	Doniambo (Nouvelle Calédonie)	F (2)	ferronickel matte	50 000
United Kingdom	Inco Europe Ltd	Clydach (Wales)	VT/CO (3)	nickel metal salts	54 000
Hellas	Larco	Larymna	F	ferronickel	25 000

(1) ER = Electrolytic refining.

(2) F=Smelting facilities for ore.

(3) VT/CO=Carbonyl process.

Source: Marketing Eramet

## INDUSTRY STRUCTURE

### Companies

Only three companies operate nickel production facilities in the EU. Inco Europe Ltd, a subsidiary of Inco Ltd of Canada, processes nickel oxide, an intermediate product supplied by its parent company, into pure nickel and nickel salts. Inco Europe Ltd markets its production throughout the world, although Europe is its most important market owing to its proximity. The American market is primarily supplied by Inco Canada.

Eramet is a 70 % subsidiary of ERAP, which is the holding company of the French state-owned company Elf-Aquitaine. Other shareholders are Elf-Aquitaine with 15 % and Imetal with 15 %. Eramet is the mother company of Le Nickel-SLN in New Caledonia which produces nickel matte and ferro-nickel. Its plant in Le Havre-Sandouville was built in 1978 to replace the facility founded in Le Havre in 1888. Matte shipped from New Caledonia is processed in Le Havre into pure nickel and salts. Eramet's sales program worldwide therefore includes a range of products, i.e. metal, ferro-nickel and nickel salts.

Larco, currently a state-owned company in Greece, was founded in 1963 for the mining of nickel ores and their processing into ferro-nickel. Due to the very small size of the Greek market, production is almost entirely destined for export. The EU market is the prime outlet for the Greek producer.

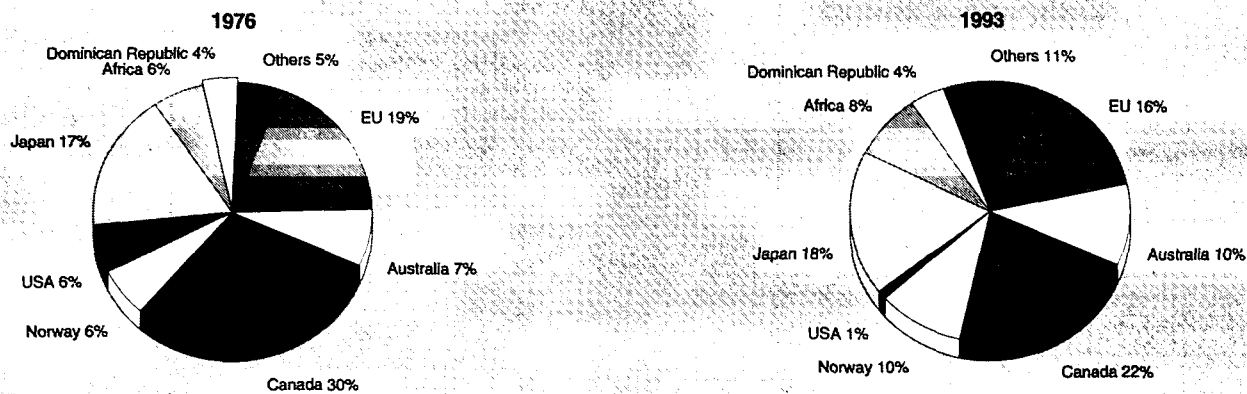
### Strategies

Nickel demand grows steadily and such a growth must be met by a corresponding sustained increase in nickel supply. To allow for such a development, investment in additional capacity at the lowest possible production costs must take place. Expansion at the existing mining and smelting facilities and improvements of productivity are generally lower cost options, but opening and building of new mines and production plants are also required.

Apart from economic considerations, long term stability of adequate supply can best be provided by giving priority to investments in integrated operations. Integrated nickel producers are not dependant on an external supply of nickel ore, and have their own refining facilities with a diversified range of products. They are therefore less dependant on cyclical market developments and are better able to withstand periods of recession.

Nickel producers must keep abreast of market developments: close cooperation between the nickel producers and consumers is necessary for both industries.

**Figure 2: Nickel  
Market economy countries production by area**



Source: Marketing Eramet

### REGIONAL DISTRIBUTION

The nickel market is a global one, but to a large extent, nickel mining areas do not correspond to nickel consuming areas. Major nickel consuming countries are net nickel importers, either in the form of nickel ore and intermediate products or in the form of finished products.

Nickel consumption in the EU represents approximately one-third of consumption in the market economy countries, but the production of the three EU nickel companies accounts for only 16 % of the corresponding output.

Germany is by far the largest nickel consumer in the EU, representing 34 % of total EU demand, but it has no domestic production. France is the second largest market, with a share of around 17 %. Other major nickel consuming Member States are Italy with 17 %, the United Kingdom with 15 %. Belgium (9 %) and Spain (8 %). The other EU countries are not substantial consumers of nickel.

Since the mid-1970s, nickel consumption in the EU has grown by 2.4 % per year on average, although growth rates vary widely among the various Member States. Belgium with a 14 % increase per year and Spain with a 5.8 % increase per year experienced the highest expansion in consumption, while

demand increased by only 0.8 % per year in France and only 0.3 % per year in the United Kingdom.

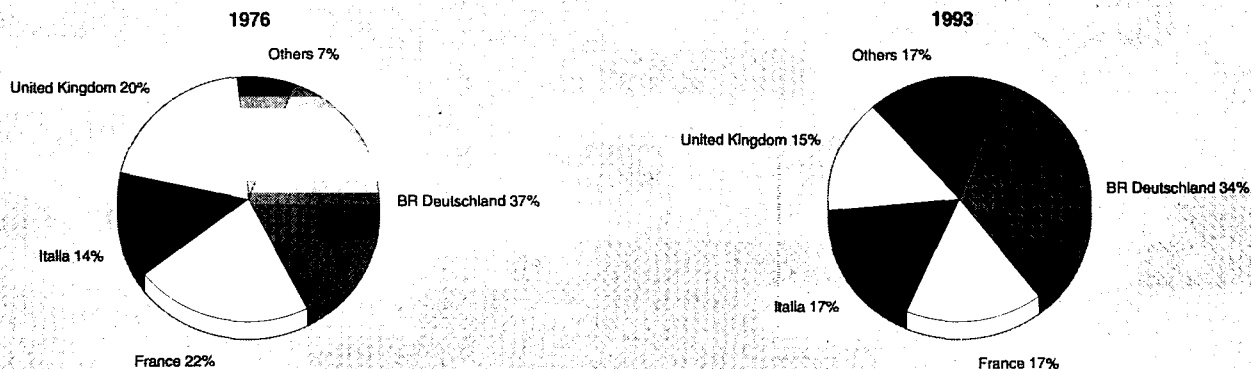
### ENVIRONMENT

Although nickel itself does not create environmental problems, some nickel compounds have properties which are dangerous to the environment and/or dangerous to humans. Most of the nickel producer and user industries have already reduced their emissions to an environmentally acceptable level. At EU level, atmospheric emissions have been controlled and reduced by means of the installation of efficient filter systems. Liquid effluents have been under control for many years now, and their levels comply with regulatory limit values. Solid waste containing water-soluble compounds such as nickel-bearing metallic hydroxides is still a concern. In most cases, however, it is disposed in controlled landfills. Nickel-bearing recyclables (stainless steel and alloy scrap, spent catalysts, etc.) are not an area of concern with respect to their nickel content.

### REGULATIONS

In spite of minimum specific risks for the general environment, nickel and some of its compounds are facing increasing regu-

**Figure 3: Nickel  
EU apparent consumption**



Source: Marketing Eramet

latory pressure at EU level. Skin-contact allergy is a clearly established risk linked to direct and prolonged exposure to nickel in some common products. The European nickel producers support the efforts of the EU Commission to establish rules for the protection of the fraction of the population at risk. Nickel is suspected of inducing respiratory cancer in workers in certain nickel refining processes. In addition, the classification of some nickel compounds as human carcinogens (Directive 67/548) will have a serious impact on industry and will require protective measures for workers exposed to these substances (Directive 90/548).

Like the rest of the non-ferrous metals industry, the nickel industry is concerned with the implementation of the EU regulation on transborder shipments of waste. Too many uncertainties regarding the essential administrative provisions of this legislation present a severe threat to the entire recyclables trade.

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## OUTLOOK

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Nickel consumption should continue to grow at a relatively sustained rate in the medium and long term, although it will fluctuate greatly in the short term due to cyclical variations in general economic activity.

The following factors could result in the continued development of nickel consumption:

- growth of nickel consumption in industrialised countries in connection with the development of new applications, most of them linked with the protection of the environment (Clean Air Act in the USA, Earth Summit of Rio de Janeiro);
- booming demand for nickel in the newly-industrialised countries (NICs), especially East Asian NICs, and in some Latin America countries due to the construction of new plants and the need for durable goods;
- reconstruction and reshaping of a civil industry in the former COMECON countries.

Production areas which show the greatest growth potential for the 1990s are located in the countries with the largest and richest mines, especially New Caledonia, Australia and Indonesia.

The recent creation of the "International Nickel Study Group" has improved the availability of reliable statistical information on the market thanks to the increased cooperation of the participating governments. This should help the decision process at all industry levels and significantly contribute to the transparency of the market.

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# Precious metals

## NACE 224

The EU has the largest refining and fabricating capacity for precious metals in the world, even though its actual mineral resources of such metals are very limited. The recycling of precious metals from scrap and industrial residues has always been an important raw material source for the EU industry. EU environmental legislation now requires all new petrol driven vehicles to be fitted with catalytic converters to reduce pollution. This has stimulated EU demand for platinum group metals.

### INDUSTRY PROFILE

#### Description of the sector

Precious metals include well-known metals as gold and silver as well as the six platinum group metals: platinum, palladium, rhodium, iridium, ruthenium and osmium.

Precious metal activities can conveniently be separated under five headings: mining, refining and production of metals in unwrought forms; fabrication, i.e. processing, alloying and conversion of the metals into wrought or semi-manufactured forms, chemical compounds, catalysts and industrial components; manufacturing i.e. production of goods for retail sale such as jewellery, silverware etc.; trading, i.e. commodity dealing, investment bars and coins.

#### Recent trends

##### Mining

The twelve countries of the EU possess within their borders relatively insignificant sources of gold and silver and prac-

tically none at all for the platinum group metals. Primary precious metals which are actually extracted from ores mined in the EU are mainly by-products of copper or lead and zinc mining.

Among EU Member States, only Spain, France and Portugal appear in the world list of gold producing countries, and in 1993 they yielded under 0.5 % of total world output of 2 281 tonnes. Seven EU countries produce silver (Table 1), but only to a very limited extent: total EU production represents below 2.5 % of total world annual output.

#### Refining and recycling

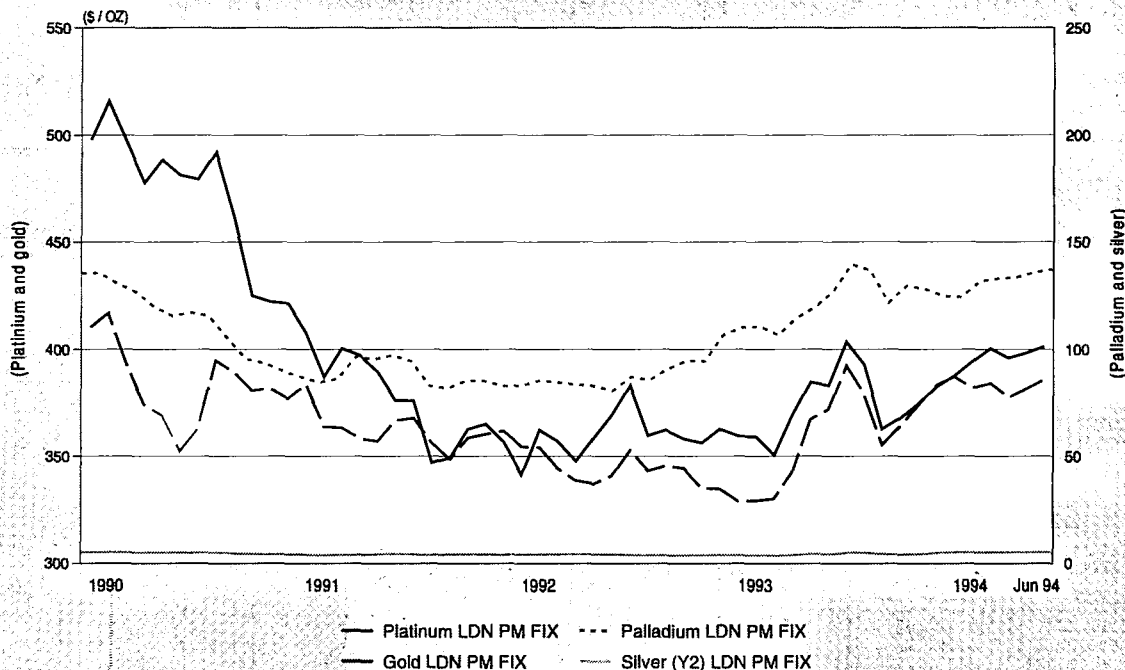
The refining of gold, silver and the platinum group metals in the EU takes place either at the specialist refining and fabricating companies or at base metal refineries equipped to treat such metals either as by-products of non-ferrous metal refining or by recovering them from low-grade industrial residues and scrap materials. Total precious metal refining capacity of the EU firms is the largest in the world.

Consequently mines in all parts of the world still consign large quantities of precious metals in crude or by-product forms to the EU refineries, wherever local facilities do not exist, have inadequate capacity or are unable to treat the mine output satisfactorily to achieve optimal recovery rates or generally acceptable commercial quality.

Base metal refineries with significant precious metal capacities are to be found in Belgium, Germany and the United Kingdom. These typically recover precious metals from lead and zinc, copper or nickel ores, as well as low-grade scrap materials of all kinds, and they supply the pure metals in the form of unwrought "good delivery" bars or plates, grain or sponge.

The largest EU specialist precious metal refining firms are to be found in France, Germany and the United Kingdom. The specialist refiners are also fabricators, able to process the precious metals into alloys and chemical compounds and

Figure 1: Precious metals  
Prices (monthly averages)



Source: London afternoon fix as published in Metal Bulletin

**Table 1: Silver**  
**Mine production of silver**

(tonnes)	1988	1989	1990	1991	1992
EU	355	341	352	350	347
BR Deutschland	20	22	8	4	2
Hellas	61	52	53	53	53
España	227	220	230	233	233
France	21	20	22	23	23
Ireland	6	7	9	11	9
Italia	16	16	11	6	5
Portugal	4	4	19	20	22
World	13 751	14 250	14 275	13 912	14 591
Share of the EU in the world total (%)	2.6	2.4	2.5	2.5	2.4

Source: World Silver Survey 1994; The Silver Institute, Washington DC, USA

**Table 2: Gold**  
**Total gold fabrication in the EU by Member State (1)**

(tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	371.7	420.1	402.5	415.3	471.8	573.0	629.9	658.1	697.8	668.4
Belgique/Belgie, Luxembourg (2)	2.2	2.3	2.0	16.2	10.5	8.0	4.4	2.7	2.4	2.1
Danmark	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	1.0	1.0
BR Deutschland	56.8	57.7	54.8	57.2	65.3	69.8	77.5	80.8	76.8	73.5
Hellas	9.2	11.6	11.1	10.8	10.8	10.5	10.6	10.1	9.4	9.1
España	13.8	16.7	16.7	18.1	25.2	32.1	36.2	34.6	32.1	28.3
France	22.6	23.4	25.7	27.0	29.3	32.7	39.9	39.3	43.3	44.2
Italia	228.6	261.6	246.9	232.8	273.7	359.2	395.9	430.2	473.3	452.3
Nederland	3.9	4.6	4.7	4.5	5.1	5.7	6.3	7.0	8.0	7.9
Portugal	2.5	3.6	3.6	4.2	5.0	5.7	7.6	9.2	11.4	11.2
United Kingdom, Ireland	31.3	37.8	36.1	43.7	46.1	48.5	50.6	43.3	40.1	38.8

(1) Including the use of scrap.

(2) 1993, excluding Luxembourg.

Source: Gold 1994, Gold Fields Mineral Services Ltd.

**Table 3: Silver**  
**European silver fabrication demand, 1993**

(tonnes)	D	F	I	UK	Rest of Western Europe	Western Europe
Silverware and jewellery	361	72	1310	47	313	2 103
Photography	470	360	78	410	610	1 928
Electronics and batteries	351	187	124	124	212	998
Brazing and solders	140	47	59	65	N/A	N/A
Dental	12	3	0	16	N/A	N/A
Mirrors	15	6	25	16	N/A	N/A
Miscellaneous (1)	75	9	31	9	135	681
Coinage	140	56	0	N/A	19	215
Total	1 564	740	1 627	687	1 289	5 907

(1) Rest of Western Europe & Western Europe data include brazing and solders, dental, and mirrors.

Source: World Silver Survey 1994; The Silver Institute, Washington DC, USA



**Table 4: Platinum**  
**Breakdown of demand by application in Western Europe**

(kg)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Autocatalyst										
- gross	1 090	2 020	3 730	7 000	7 620	9 640	11 660	14 930	17 880	19 130
- recovery	0	0	0	0	0	0	-160	-470	-620	-930
Chemical	3 270	2 950	2 330	2 490	1 560	1 560	1 870	1 710	1 560	1 400
Electrical	1 400	1 710	1 240	1 240	1 240	1 240	1 240	930	930	930
Glass	780	930	930	930	930	1 090	780	620	470	470
Investment	3 730	2 800	3 110	2 020	1 710	1 090	1 240	1 240	1 090	780
Jewellery	1 400	1 560	1 710	1 400	2 180	2 330	2 490	2 640	2 640	3 270
Petroleum (1)	-780	-620	-160	780	160	310	1 240	930	620	620
Other	1 560	1 090	1 710	1 560	1 560	1 400	1 400	1 560	1 710	2 180
<b>Total</b>	<b>12 450</b>	<b>12 440</b>	<b>14 600</b>	<b>17 420</b>	<b>16 960</b>	<b>18 660</b>	<b>21 760</b>	<b>24 090</b>	<b>26 280</b>	<b>27 850</b>

(1) In the years 1984-86 the Western Europe petroleum industry sold back to the market more platinum than it purchased new metal.  
Source: Platinum 1994, Johnson Matthey

to supply all forms of wrought materials such as wire, sheet, tubing and industrial components of many shapes and sizes.

Despite the lack of indigenous precious metal mineral sources, the EU can count on substantial "above ground" raw material supplies in the form of scrap and secondary materials sent for recycling both from within the EU and from the rest of the world. There are a number of EU companies who specialise in the collection, pre-processing and trading of such materials before the actual assay and refining stages take place. Typical items are discarded printed circuit boards, obsolete computers, old photographic film, X-ray plates and solutions, spent electro-plating baths etc.

The cost of recovery and recycling is more than justified by the high intrinsic value of the precious metals contained in these scrap and residues. It is not just the economic aspects that encourage the recycling of precious metals but also the environmental issues, where the regulatory authorities are setting ever stricter limits on the tolerable metal content of waste materials sent for dumping.

In this respect, it is unfortunate that as from Spring 1994 the valuable international business of recycling precious metals has been seriously unsettled in Europe by the application to such materials of the Basle Convention on Transfrontier Movements of Hazardous Wastes and the corresponding EU Directive.

The severe delays and high notification procedure costs imposed by the EU interpretation of the Basle Convention are having serious adverse effects on the EU precious metals refining industry and are hindering the obvious environmental and financial benefits to be gained from precious metals recycling and secondary refining in which the EU precious metal industry has developed exceptional skills.

None of the precious metal bearing feedstocks for secondary refining should be classified as "waste", in fact; the precious

metal content of these materials usually has a value far exceeding the cost of treatment and the owners of such materials want to realise the value as quickly as possible and with the maximum environmental safety.

Via its professional associations, the industry is working very actively to exempt transfrontier movements of all precious metal bearing materials from the application of the Basle Convention and in the longer term to redefine these materials as products rather than "waste". To this end, criteria should be established to allow a proper distinction between what should be considered as "waste" and what should not.

#### Trading

The major EU financial centres, particularly London but also Paris, Frankfurt and Luxembourg are significant markets for trading gold and silver both as commodities and for investment purposes. The daily fixing prices quoted by the London Bullion Markets and the London Platinum and Palladium Markets are those most widely used throughout the world as reference prices. "Good delivery" gold ingots and silver bars bearing the stamps of the major EU refiners are to be found in the vaults of banks and commodity traders in all the world's financial centres and international monetary agencies. Private individuals and other financial institutions generally prefer the smaller investment bars where once again it is the major EU refiners whose bars carry the most prestigious marks which are recognised everywhere as a guarantee of quality and accurate assay.

Market forces require the trading of the main precious metals on a 24 hours basis be organised so that forward cover and location swaps be provided for international customers. This push has caused many of the leading EU traders to set up facilities in North America and the Far East to complement their activities in Europe.

**Table 5: Platinum**  
**Demand by region**

(tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Western Europe	12.4	12.4	14.6	17.4	17.0	18.7	21.8	24.1	26.3	27.8
Japan	35.5	38.9	31.4	51.3	59.1	51.9	57.5	63.8	58.2	61.0
North America	28.3	31.4	37.0	28.0	26.9	27.9	24.6	25.3	21.9	23.8
Rest of market economy countries	5.6	5.3	5.3	5.6	9.3	8.2	11.2	13.1	11.8	13.1
<b>Total market economy countries</b>	<b>81.8</b>	<b>88.0</b>	<b>88.3</b>	<b>102.3</b>	<b>112.3</b>	<b>106.7</b>	<b>115.1</b>	<b>126.3</b>	<b>118.2</b>	<b>125.7</b>

Source: Platinum 1994, Johnson Matthey



### *Fabrication*

Most of the precious metals are fairly easily fabricated either as pure metals or as alloys. Gold in particular is usually turned into specific alloys for jewellery or dental purposes in order to improve its wear-resistance or colour. Because of the high intrinsic value and the wide range of forms and alloys required, such metals are usually fabricated or processed in relatively small quantities compared with base metals. One of the few precious metal products manufactured in tonnage quantities is silver nitrate for the photographic industry. A product that has recently entered the multi-million unit scale of production in the EU is anti-pollution car exhaust catalysts, each containing just a gram or so of the platinum group metals, and some members of the EU precious metal industry are strongly represented in this field worldwide. The EU demand trend is discussed in more detail below.

### *Manufacturing*

Converting precious metal alloys into finished products to be sold to the retail trade, is largely the responsibility of the jewellery, silverware and tableware industries which is outside the scope of this article. These industries, however, are major consumers of gold and silver, especially in Italy, as can be seen from the accompanying EU consumption tables.

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## **MARKET FORCES**

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### **Demand**

The industrial and manufacturing demand absorbs the major share of precious metals fabrication, though gold and silver still play roles in coinage (now mostly commemorative coinage). Gold, of course, remains the main investment metal worldwide even in today's highly sophisticated financial circles, though part of its role as an internationally recognised store of value has been taken over by currency trading and futures. EU major precious metal outlets include: jewellery in the case of gold, photographic products for silver, automobile exhaust catalysts for platinum and dental alloys and electronics for palladium.

Consumption trends are closely linked to the outlook for consumer goods and industrial consumables. In the case of the platinum group metals, EU demand in recent years has, however, been driven by legislation and the Single Market. As a result since 1 January 1993 most new European automobiles have been fitted with catalytic converters to control exhaust pollution and reduce acid rain. Such devices have been compulsory since the 1970s in the USA and Japan but only recently has legislation been adopted by the EU and other states of Europe.

Gold and silver are able to rely on the jewellery and tableware markets as a fairly constant source of demand, although this does fluctuate with consumer purchasing power. There is also a small but growing demand for platinum jewellery and watches in the EU. In the case of palladium, world demand has risen recently because of increased use in autocatalysts and electronic components such as those used in mobile telephones.

All the precious metals except gold are consumed mainly in the industrial regions: North America, Japan and Europe. These three zones currently account for 90 % of market economy countries' consumption of platinum and palladium, about 75 % for silver but only slightly less than half of world gold consumption. More than 50 % of world gold consumption in 1993 is thought to have occurred in the developing countries.

### *Gold*

The EU accounts for just under 25 % of total market economy countries' demand for gold (Table 2). In 1993, EU utilisation is estimated to have decreased by 5 %, a reversal of the growth trend of the previous years. It is Italy which traditionally

dominates EU demand. The jewellery industry there used 447 tonnes of gold in 1993, which is about 75 % of the total EU usage for jewellery estimated at 593 tonnes. Much of the Italian production is exported to North America, the Middle East and other EU countries such as Germany and the United Kingdom, although it is Italy itself which is by far the largest jewellery market among EU member states. In 1993, Italian consumers bought some 110 tonnes of fine gold in the form of gold jewellery but this was in fact some 30 % lower than in 1992. This weak Italian domestic demand was compensated for by increased exports. Elsewhere in the EU, particularly France, Spain and Greece, the jewellery markets have shown signs of some recovery.

EU demand for gold for purposes other than jewellery also declined in 1993. The electronics industry and decorative uses had a lower take-off overall. The consumption of gold in dentistry fell back to more normal levels, largely due to the health insurance scheme changes in Germany which came into force on 1 January 1993 and which had caused a major acceleration of dental treatments there in 1992.

### *Silver*

Industrial demand for silver in the EU now represents under 30 % of the market economies countries' total (Table 3). One principal consumer sector in Europe is the photographic industry, where overall demand has grown steadily in recent years. The other major sector is jewellery, cutlery and silver tableware where Italy once used to be by far the largest manufacturer in the world. In the last couple of years however the reported Indian silver jewellery demand has doubled to some 3 700 tonnes and the Italian industry has been overtaken.

### *Platinum*

In 1993, the EU accounted for approximately 22 % of the market economies countries' platinum demand (Tables 4 and 5). Its main use is in catalytic converters for the car industry. As from 1 January 1993, all new petrol engine cars in the EU have to be fitted with such anti-exhaust pollution catalytic systems, all of which contain small quantities of the platinum group metals. EU car production in 1993 was substantially lower than in 1992 when 66 % of the new petrol engine cars in Western Europe were fitted with catalysts. As regards, new diesel engine cars, the proportion fitted with autocatalysts continued to rise in 1993.

Jewellery industry demand for platinum in Western Europe showed significant growth of nearly 25 % over 1992. The jewellery manufacturers of France, Germany and Italy enjoyed a growing demand for platinum products not only in their domestic markets but also in the USA and Japan.

Since 1992, Western Europe demand for platinum has exceeded that of North America mainly because of the EU legislation-driven increase in the requirements of the European car industry. Japan remains however by far the largest consumer of platinum, because there the demand for platinum jewellery is so high. In 1993, 42 tonnes of platinum were used by Japanese jewellery manufacturers compared with 87 tonnes of gold whereas in the EU jewellery trade the ratio was 3 tonnes of platinum to 593 tonnes of gold.

### *Palladium*

EU demand for palladium represents about 16 % of market economy countries' consumption (Tables 6 and 7). The use in dental alloys fell in 1993, especially in Germany following the 1993 health insurance scheme changes. However the volume of palladium used in the automobile industry started to increase significantly in 1992 as new technical developments in autocatalysts started to be exploited in Europe.

### **Supply and competition**

Gold is mined in most continents apart from Europe. The largest output still comes from the Republic of South Africa

**Table 6: Palladium**  
Breakdown of demand by application in Western Europe

(kg)	1987	1988	1989	1990	1991	1992	1993
Autocatalyst	160	160	160	160	160	1 240	3 890
Dental	7 460	8 240	7 780	8 090	9 330	9 330	8 240
Electrical/electronics	6 220	6 840	6 530	6 220	6 220	6 530	6 530
Jewellery	930	1 090	1 090	1 090	1 090	1 090	1 090
Other	2 330	2 490	2 640	2 800	2 490	2 800	1 710
<b>Total</b>	<b>17 100</b>	<b>18 820</b>	<b>18 200</b>	<b>18 360</b>	<b>19 290</b>	<b>20 990</b>	<b>21 460</b>

Source: Platinum 1994, Johnson Matthey

but mines with cheaper production costs have been opened up in America and the Pacific region. World supply from old gold scrap increased in 1993 by over 16 % to 516 tonnes as more old jewellery was recycled in the Middle East, India and the Far East, and was in fact the next biggest source after South Africa's 620 tonnes of primary gold.

Silver is largely a by-product of lead and zinc mines, particularly those in Mexico and Peru, as far as primary mineral sources are concerned. Over 25 % of total 1992 silver output however is thought to have been derived from secondary sources such as scrap and residues from the photographic industry.

Of the six platinum group metals it is platinum which dominates in the South African primary ores; rather smaller amounts of palladium and other precious metals are contained in the ore. However in the CIS and Canada where the platinum group metals are found in nickel ores, more palladium than platinum is actually recovered and the CIS is normally the largest supplier of palladium to the market economy countries.

Much of the platinum group metals used in industry is eventually recycled. As cars fitted with catalytic converters in the 1970s and early 1980s in North America and Japan reach the end of their useful life, a steadily growing source of platinum has been scrap car catalysts, which now yield the equivalent of about 17 % of the platinum currently required for new car catalysts.

The mineral sources of gold and silver are widely dispersed and mining activity is subject to only limited political risk. In the case of the platinum group metals, which rely to such an extent on the sources in the Republic of South Africa and the CIS, there is a risk that internal political events might affect supplies. However substantial stocks are held both by the refiner/fabricators of these metals and also the commodity markets which would be ample for short term needs.

## INDUSTRY STRUCTURE

### Companies

The principal precious metals refiners and fabricators of the EU operate on an international scale and are world leaders

in their field. Prominent names are Degussa and Heraeus in Germany, CLAL in France and Johnson Matthey in the United Kingdom. The US precious metals firm, Engelhard Corporation, is also well established in several EU countries. Major EU base metal refiners with significant precious metal involvement include Union Minière in Belgium, Norddeutsche Affinerie in Germany and Inco in the United Kingdom.

The installed precious metal refining and fabrication capacity controlled by the EU industry as a whole is the largest in the world and exceeds that of equivalent US and Japanese firms. It draws its supplies from all over the world both in the form of primary metal from the mines and secondary or recycled metal. It also delivers its fabricated products not merely within the EU, but also to the developing countries of Africa, the Middle East and Asia. It is such factors which give the EU precious metals industry its international character.

The EU precious metal firms form an advanced technology, high performance industry which is very strongly focused on research and development. This encompasses not merely new uses for the precious metals but also the discovery of techniques for economising the quantities of precious metals used in existing applications.

### Prices

The main precious metals are all traded on international commodity markets, in particular those of London, New York and Tokyo, and prices can be quoted on a 24 hours basis. Thus refiners and fabricators are able to hedge prices quoted to their customers to avoid the risk of price movements. Gold is the metal perhaps most affected by speculation and is usually sensitive to the world political and economic climate, largely because it is the precious metal of most interest to investors and speculators. Although silver and the platinum group metals are industrial metals to a much greater extent, and their prices are therefore subject mainly to supply and demand expectations, in practice they still move in sympathy with the price of gold.

For several years up to 1993, precious metal prices in US dollar terms tended to slide downwards as supply was generally ahead of demand. In the case of gold, the market had to absorb substantial sales by central banks who had surplus

**Table 7: Palladium**  
Demand by region

(tonnes)	1987	1988	1989	1990	1991	1992	1993
Western Europe	17.1	18.8	18.2	18.4	19.3	21.0	21.5
Japan	44.5	47.8	47.1	47.5	56.0	55.4	60.2
North America	32.2	31.7	33.3	33.6	34.1	35.9	41.8
Rest of market economy countries	5.3	5.4	5.3	6.7	8.6	8.7	9.0
<b>Total market economy countries</b>	<b>99.1</b>	<b>103.7</b>	<b>103.9</b>	<b>106.2</b>	<b>118.0</b>	<b>121.0</b>	<b>132.5</b>

Source: Platinum 1994, Johnson Matthey



stocks or needed foreign exchange. Since 1993, precious metal prices have shown an upward trend as demand in some markets such as the US has recovered and there have been several surges in speculative and investment interest (Figure 1).

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# Cobalt

## NACE 224

The EU cobalt industry is the world leader in cobalt powder and oxide production, and a major supplier of cobalt salts. The "cradle" of special cobalt products i.e. powders, oxides and salts is Belgium, where considerable production expertise has been developed since the beginning of the century in the treatment and processing of cobalt metal and raw materials originally coming from the Shaba copper mines in Zaire. Today, cobalt special products are a worldwide business with products originating from the EU, North America, China, the CIS, Australia, South Africa and others. However, the EU still retains a large proportion of the capacity (40 % to 45 %) to satisfy the market, with plants operating in Belgium, Germany, France and the United Kingdom, directly involving at least nine companies.

### INDUSTRY PROFILE

#### Description of the sector

Cobalt metal is shiny, grey and brittle with a closely-packed hexagonal (CPH) crystal structure at room temperature, which changes at 421 C° to a face-centred cubic form. Cobalt is usually supplied to end-users as powder or as oxides, salts. Cobalt is not used as a structural material, but always as an alloy or a binder in the case of sintered products.

Cobalt has unique properties which make it extremely valuable in many industrial applications. It has a high melting point, 1 493 C°, and retains its strength to a high temperature. It is ferromagnetic, like only nickel and iron. It is multivalent and easily enhances catalytic action.

As there are no longer any viable cobalt bearing ores in the EU, cobalt processors rely entirely on imported cobalt feed supplies, be these metal, mining or metallurgical residue or scrap.

All EU special products producers have to source cobalt outside their own business. Previously, cobalt supplies in the market economy countries were dominated by Zaire and Zambia, (70 % of metal production came from these two sources in 1990). This situation has drastically changed during the last few years due to the political turmoil in Zaire and the production problems in both Zaire and Zambia. Other factors such as net exports of Russian metal or the DLA releases (US Defence Logistic Agency) have resulted in Zaire and Zambia's share falling to less than 40 %.

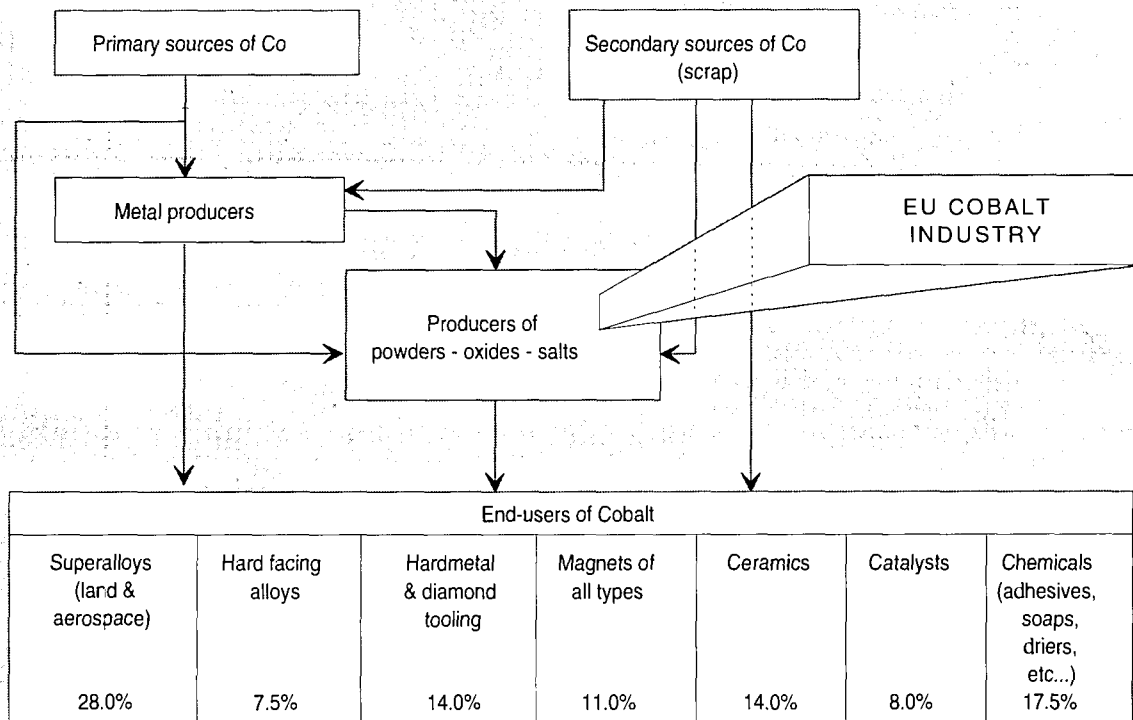
Europe is a major market for EU cobalt special products producers, but they must also compete on export markets as their capacity far outweighs European demand. The main markets are the USA, Japan, Taiwan, South Korea and Pacific Rim countries. There are domestic competitors on these markets but other international companies compete there as well, as they do in Europe with the EU suppliers.

Figure 1 shows the overall cobalt market structure and the EU industry within it. Consumers of cobalt use the metal, as well as cobalt special products, to produce magnets, alloys (super alloys and hard facing), soft magnetic materials, hard materials, catalysts, speciality chemicals etc.

#### Recent trends

Due to a fundamental change in the supply structure, prices of cobalt metal and special products have doubled over the past two years and pricing will very likely remain quite volatile in the foreseeable future. While cobalt metal was the major feed material up to the late eighties, today's cobalt supply is much more diversified. There has been a trend towards the use of lower grade metal - especially of Russian origin or

**Figure 1: Cobalt**  
**Structure of the cobalt market**



Source: Union Minière

**Table 1: Cobalt Products and Applications**

Forms/Products  Applications	Metal (cathodic or powder)	Powders		Oxides	Inorganic salts						
		extrafine	mesh		h y d r a t e	s u l f a t e	c h l o r i d e	c a r b o n a t e	a c e t a t e	n i t r a t e	
Special steels and alloys - high strength steels - high t' alloys - tool steels - Implant alloys - other special purposes alloys	X		X								
Magnetic materials - permanent magnets - soft magnetic alloys - recording tapes treatment	X X		X X			X					
Hard materials - cemented carbides - diamond tools		X X	X X								
Catalysts				X	X	X	X	X	X	X	
Pigments/ceramics				X	X	X		X			
Enameling				X							
Metallic Soaps	X				X	X	X	X	X	X	
Animal feed/ fertilizer additives						X		X			
Advanced electronics				X							

Source: Union Minière

from the DLA's releases - as well as by-products, scrap and residues.

The importance of trade is growing significantly and is interfering more and more with the traditional supply channels (direct producer-consumer relationships). Pricing is no longer dominated by the African Producer Price, but by the published prices of the Metal Bulletin (London) and Metals Week (New York).

Users of cobalt metal have been increasingly creative in switching to lower grade metal to compensate for the lack of availability of high grade metal. Either quality restrictions have been relaxed or additional refining steps have been introduced in order to cope with the lesser quality of the input material and henceforth remain price competitive.

**International comparison**

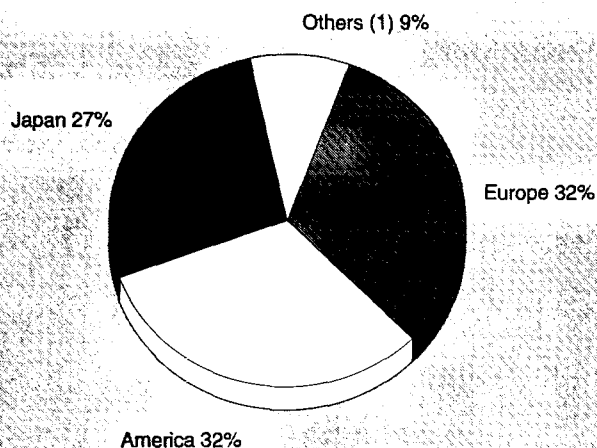
Demand for cobalt essentially arises in the industrialised countries. Europe, North America and Japan take the lion's share of total market economy countries demand which was estimated at 18 000 tonnes cobalt in 1993. The emerging markets

in the Far East (Korea, Taiwan) and China are slowly but surely becoming large users of cobalt. Today's geographic distribution of demand is shown in Figure 2.

The cobalt market is a mature one. For 4000 years cobalt has been used for ceramics; in the past 50 to 60 years, it has been used in superalloys and magnets. There are many new uses in electronic recording, anodising, batteries, amorphous soft magnets. However, these do not currently generate a large tonnage demand. The consumption curve has in recent years been declining, as shown in Figure 3. To some extent, this has been a technological rather than economic shift, although one must to some degree blame the uncertainty about supply which resulted from the late 1970s' turmoil in Zaire. Demand has fallen due to the development of substitute products which is illustrated by the following examples: nickel superalloys, albeit cobalt-containing, replaced cobalt alloys, cobalt-free high speed steels were developed, Alnico magnets were replaced by ferrites, etc.

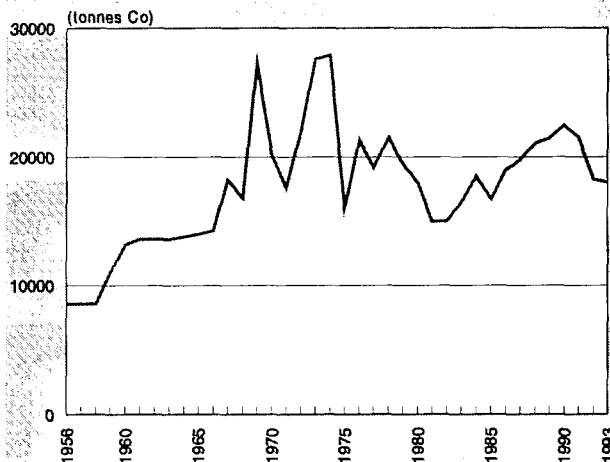


**Figure 2: Cobalt**  
Estimated geographical breakdown of cobalt demand, 1993



(1) Other market economy countries only.  
Source: Cobalt Development Institute

**Figure 3: Cobalt**  
Estimated cobalt demand in the market economy countries



Source: Cobalt Development Institute

## MARKET FORCES

### Demand

Until the 20th century, cobalt was only available or used as an oxide to produce blue colours. Its modern uses developed with Elwood Hayne's work on heat and wear resistant alloys (Stellite), the development of aluminium-nickel-cobalt (AL-NICO) permanent magnets in Japan, and the use of cobalt as a binding agent in tungsten carbide production in Germany.

Cobalt is consumed in various forms and in many different applications, which are summarised in Table 1.

About 18 000 tonnes of cobalt are consumed each year in the market economy countries. At present, demand from EU customers for special cobalt products is about 3 500 tonnes of cobalt per year (estimation based on the early 1990s), 36 % of which in the form of oxides, another 36 % in the form of salts, and the remaining 28 % in the form of powders. This demand mainly comes from the hard materials industry consuming powders, the pigments and ceramic industry consuming oxides, the metallic soap manufacturers consuming salts, the animal feed and fertiliser sector also consuming salts and the catalyst industry consuming salts and oxides.

It should be noted that cobalt demand in the EU includes an additional estimated 3 000 tonnes cobalt per year, consumed in the form of metal by the steel and alloy industry, the permanent magnet industry and some segments of the chemical industry. As there are no cobalt metal producers in the EU, these requirements have to be imported in full.

**Table 2: Cobalt**  
EU cobalt special products manufacturers

Company	Country	Product
Harcros	United Kingdom	Salts/Organics
Chemcat	United Kingdom	Salts & Oxides
Eramet	France	Chloride
Eurotungstène	France	Powders
Hermann C. Starck	BR Deutschland	Powders & Salts
Rhône Poulenc	United Kingdom	Organics
Shepherd Mirecort	France	Salts
Union Minière	Belgique/België	Powders & Oxides
Vasset	France	Organics

Source: Union Minière

### Supply and competition

Competition between special cobalt product manufacturers is fairly strong in all three areas, salts, oxides and powders; the EU companies are world leaders in powders and oxides.

A summary description of the cobalt market at large helps to assess the relative position of the EU cobalt industry. It emphasises the diversity of its expertise taken account of the diversity of manufactured products and their industrial uses; it stresses the international "spread" of its enterprises, which import their feed materials from remote countries and export their products not only within Europe, but also to all parts of the world; it brings to light the challenges which it must face in order to maintain its leadership and market share when competition is tough and demand has basically reached full maturity.

### Mine production

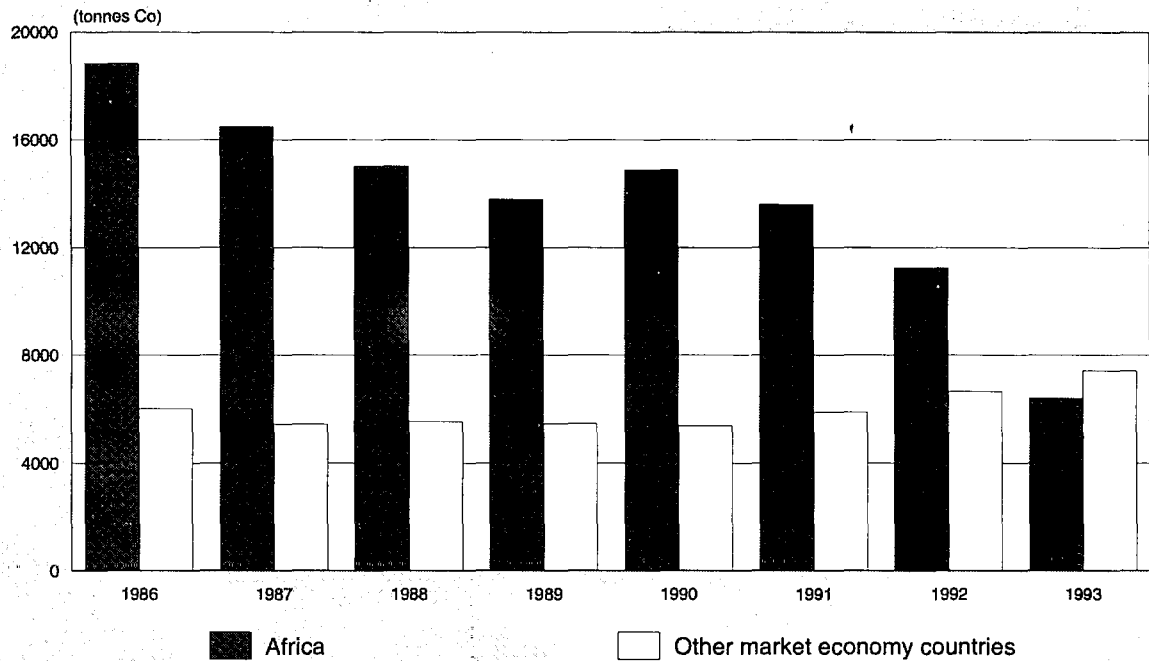
Cobalt essentially arises as a by-product from the processing of copper and nickel ores, but it can also be associated with platinum or other non-ferrous metal ores. It only occurs as a major extracted element in the arsenide ores of Morocco (currently exported to China). African mines were historically by far the largest suppliers of fresh cobalt units from the ground, accounting for nearly 63 % of the market economy countries total output. The bulk of mine production is offered directly to the market in the form of metal which is produced in the integrated operations of Gecamines (Zaire), ZCCM (Zambia), Inco and Falconbridge (Canada). However in recent years a significant portion of the African output has been exported as low grade material (white alloy, slag, etc.). The balance of the output is supplied by other mining concerns, either in the form of oxide or salts, or in the form of cobalt-bearing primary raw materials. Figure 4 shows the development of cobalt supply in market economy countries from 1986.

### Metal production

There are five major cobalt metal producers among the market economy countries. Their 1993 capacity and output are outlined in Figure 5. In 1993 the Canadian company, Sherritt, started treating cobalt nickel sulphides produced at the Moa Bay plant of Cubaniquel under a long term arrangement.

Since 1992, Russia has become a significant supplier of metal to the market economy countries; however, its actual output, arising at four different refineries, is difficult to assess.

**Figure 4: Cobalt**  
Cobalt production in market economy countries



Source: Cobalt Development Institute

About 65 % of metal output is directly supplied to end-users in the special steels and alloys industry, the permanent magnet industry, and some segments of the chemical industry. The remaining 35 % are supplied to cobalt processors, i.e. producers of powders, oxides and salts.

#### Production of powders, oxides and salts

The market for special cobalt products - i.e. fine powders, oxides and salts - ranges from 9 000 to 11 000 tonnes cobalt content per year in the market economy countries. More than 50 % of supplies result from metal processing, some 9 % are the direct cobalt output of mining concerns (Inco's oxide, Eramet's chloride and Rustenburg Plat's sulphate), and the balance is produced from cobalt-bearing scrap, mining by-products or metallurgical residues.

More than 25 companies are active in the special cobalt product sector, though not necessarily supplying the full product range, and competition is fierce. Total installed capacity is estimated at 13 000 tonnes cobalt content per year, of which 34 % for powders, 37 % for salts and 29 % for oxides.

#### Prices

Cobalt has for many years been a producer priced material as shown in Figure 6, with Zaire and Zambia traditionally setting the quoted level (African Producers Price).

Free market prices are quoted by trading companies, some of which have become deeply involved in cobalt in the early 1990s. This phenomenon is largely due to the emergence of significant quantities of Russian cobalt. The volume of free market traded cobalt is difficult to assess but is probably at around 20-25 % of total supply.

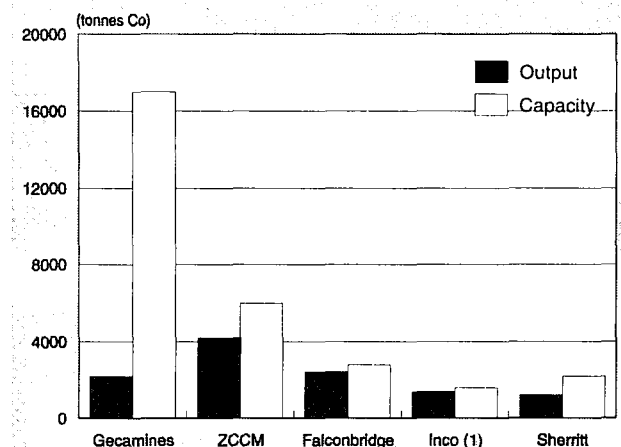
## INDUSTRY STRUCTURE

### Companies

Although the EU has no cobalt mines or cobalt metal production, its industry is extremely strong in the processing of cobalt metal and of cobalt-bearing raw materials into special cobalt products, i.e. powders, oxides and salts. The rated capacity of the EU cobalt processing plants can be estimated altogether at about 6 500 - 7 000 tonnes per year.

All the companies listed in Table 2, with the exception of Eramet (F) which processes its own mining by-products from

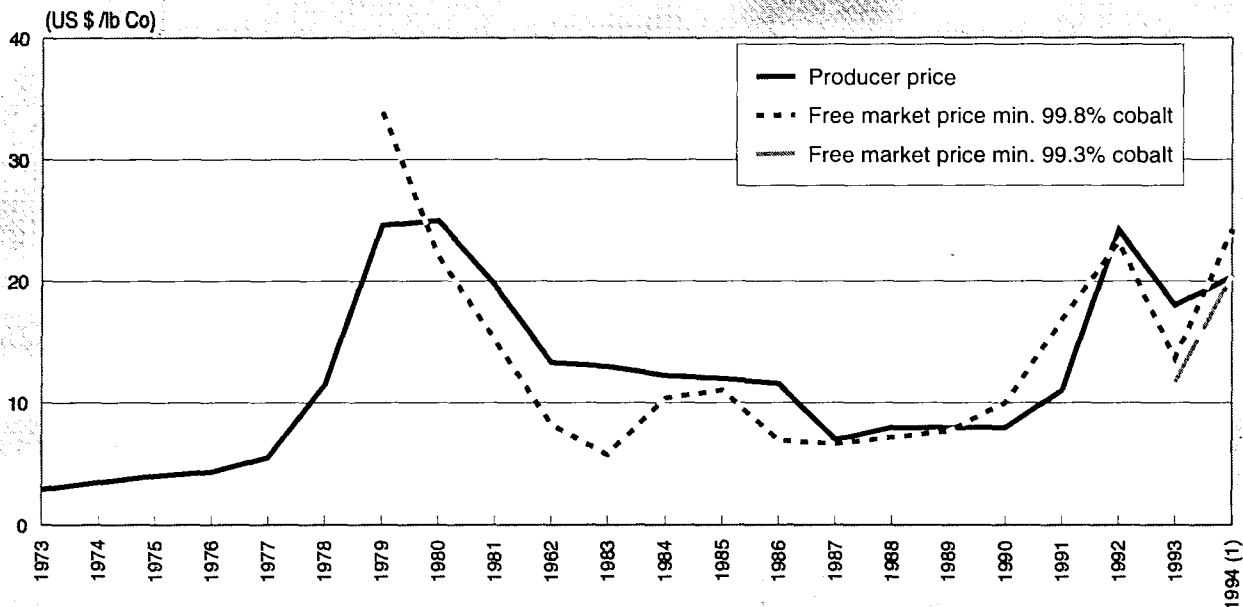
**Figure 5: Cobalt**  
Metal production in market economy countries, 1993



Source: Cobalt Development Institute



**Figure 6: Cobalt  
Metal prices (annual averages)**



(1) January to November

Source: Metal Bulletin, African Producers - Free market in warehouse

New Caledonia, rely on feed supplies purchased on the international markets, be they metal, mining or metallurgical residues, or scrap. Their output is not only intended for EU customers but also for export, since their combined production significantly exceeds EU customer requirements. The EU cobalt processors have one major competitor in Europe, the Finnish plant of the OM Group. The OM Group was formed by Outokumpu (Finland) and has three operating plants, Vasset in France, Kokkola in Finland and Mooney Chemicals in the USA. In 1993, Outokumpu divested of this business, and the company was floated on the US Nasdaq Stock Exchange. The OM Group also competes with the EU cobalt-processing companies on the international markets, chiefly the Americas and Asia, which are significant outlets for the EU products.

Although there are not many competitors with international scope, those that do operate internationally are fairly significant. Some of them supply special cobalt products as a by-product of other base metal activities i.e. Inco's cobalt oxide is a by-product of nickel ore processing in Canada, and Rustenburg Platinum's cobalt sulphate is a by-product of platinum ore processing in South Africa.

A new producer of ultrafine cobalt powder, the Canadian producer Sherritt, started marketing its product in Europe in 1993.

## ENVIRONMENT

Cobalt is classified as non-carcinogenic in the EU (15th Modification to Directive 67/548/EEC). Material safety data sheets describing cobalt products are commonly available to the users from the suppliers, on request. Cobalt metal, oxides, sulphides and carbonates in the form of powder, are listed in the Seveso Directive (82/501/EEC), but will most probably be withdrawn from this list in the new version of the Directive. Current legislation, in force or proposed, regarding Health and Safety is closely followed by the industry, especially with regard to the setting of occupational exposure standards.

Cobalt metal and oxide (CO<sub>3</sub>O<sub>4</sub>) are on Annex I of EINECS (European Inventory of Existing Chemical Substances) (80/C2760) and the industry has collected data for submission to the European Commission, via a leading producer, by July 1994.

## OUTLOOK

The EU cobalt industry faces several challenges. Feedstock must be imported due to the lack of indigenous cobalt sources. These sources are changing as the political scene shifts. Currently, the industry must rely on Central Africa (Zaire and Zambia), Canada/Norway (the Norwegian refinery is linked to Canadian mining operations) and Russia. This latter source is not new, but consumption in Russia has fallen dramatically and surplus production plus stockpiles have rapidly appeared on western markets. To some extent, the new Russian material availability together with the DLA releases have made the industry less vulnerable to African instability.

The EU cobalt special product producers rely heavily on the availability of cobalt-bearing scrap and residue which they recycle. There is therefore great concern about the Basle Convention and related regulations on movements of wastes which, although well intentioned, should not be seen as causing the cessation of vital recycling.

EU producers always face competition but the changes in Russia, and also China, outlined above have also paved the way for sometimes erratic competition from these areas. The industry is, however, strong and expanding in some areas.

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# Ferro-alloys

## NACE 224

*The very depressed state of economic activity in recent years, especially in 1993, has strongly affected the European ferro-alloys industry. Declining output of steel and aluminium in domestic markets, weakness of the industry's traditional export markets, and the appearance of new producers and strong competition have led to declines in the volume of output. Even so, the strengthening of structures and the recovery which will be forthcoming in 1995 allow the industry to look to the future with confidence.*

### INDUSTRY PROFILE

#### Description of the sector

The ferro-alloy sector in the EU covers the production of various metal alloys, generally from electric arc furnaces by carbothermic reduction of metallic oxides.

The two main product categories are bulk ferro-alloys and special products. Bulk ferro-alloys include: ferro-silicon, ferro-manganese, ferro-chromium, ferro-silico-manganese all of which are consumed in large quantities. Special products category includes: ferro-titanium, ferro-vanadium, ferro-boron, ferro-molybdenum, ferro-niobium, ferro-phosphorus, ferro-tungsten, as well as metals such as silicon, magnesium, vanadium, chromium, and other derivatives which are consumed in much smaller volumes.

A characteristic of ferro-alloys is that they are upstream of the production of other metal alloys, mainly steel and cast iron, and to a lesser degree aluminium, zinc, lead, etc. They enable alloying elements to be safely and economically introduced into metallurgical processes, thus giving certain desirable properties on to these alloys.

Bulk ferro-alloys are used almost exclusively in steel making and steel or iron foundries. Advances in metallurgy and increases in yield due to the growing use of continuous casting have contributed to limiting the consumption of bulk alloys. This trend, which has now slowed down, is counter-balanced by the growing proportion of steels using ferro-alloys, especially stainless steels, manufactured in electric furnaces.

The uses of special ferro-alloys are far more varied, and the proportion used in steel making has diminished over recent years in favour of those used in the aluminium and chemical industries, especially silicone products.

#### Recent trends

Consumption of ferro-alloys, which is closely dependent on iron and steel production, was at 3.3 million tonnes at the end of the 1980s. However, the slackening of economic activity in 1990-91 saw consumption decrease to 2.8 million tonnes. From 1992 onwards, economic recovery, coupled with re-building of stocks, has pushed apparent consumption back up to 3 million tonnes in 1993. For the years 1994-96, the more or less stable apparent consumption should grow in line with a slightly increasing demand for bulk ferro-alloys and more important growth of demand for special alloys.

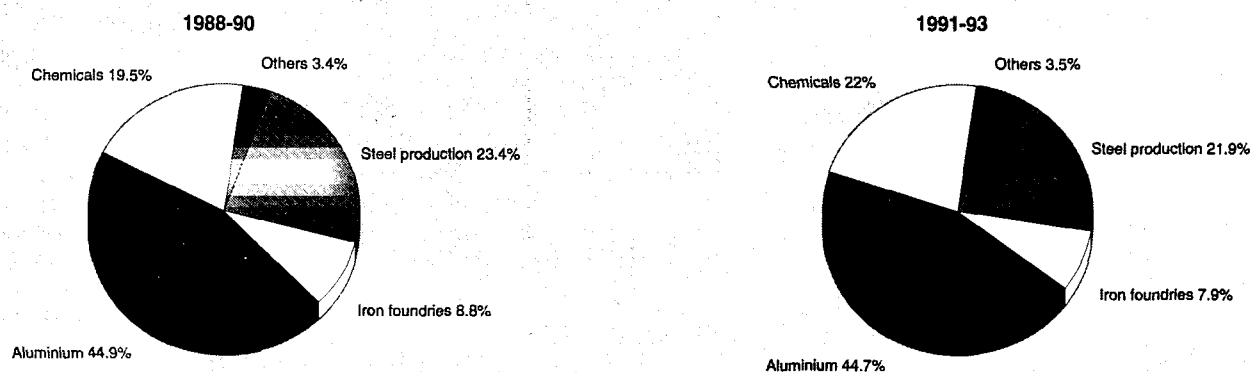
This increase in demand has been met by a growing proportion of imports, at first from the newly industrialised countries and, in recent years, from the countries of Eastern Europe and the CIS. The rapidity of growth in the latter imports has radically changed the EU's supply structure. It has become evident, however, that this penetration has been based on economically unrealistic price practices, which have been penalised by anti-dumping duties, leading to a lesser growth of imports. However, the decisions to decrease output made during the recent difficult years mean that imports will continue to grow during the next years.

Output in the EU has been adversely affected by the repercussions of this penetration and has had to be adjusted downwards; especially in the case of bulk alloys. The number of bulk alloy production locations is decreasing, to the benefit of more productive plants, and use of these alloys is being adjusted accordingly, but with a certain time-lag. However, the special alloys production should benefit from the upturn of 1994.

#### International comparison

In the EU, the United States and Japan, the output of ferro-alloys, traditionally associated with the production of iron and steel, has tended to decline, while domestic consumption is increasingly provided for by imports. This movement has been more noticeable in the EU than in its trading partners, owing to the opening-up of its markets and the geographical proximity of the new exporting countries (especially the CIS). Furthermore, with the EU being the cradle of world production of ferro-alloys, it has always had a considerably higher level of export activity than the United States or Japan. This activity

**Figure 1: Special ferro-alloys  
Breakdown by application**



Source: Euroalliances

**Table 1: Ferro-alloys**  
**Production by country in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
BR Deutschland	464	350	371	268	365	413	334	208	239	174
España	270	275	270	177	198	218	166	129	82	123
France	675	662	571	556	595	658	618	498	547	530
Italia	290	308	285	262	286	331	254	209	209	181
United Kingdom	85	89	112	107	129	163	162	195	150	110
Others	180	195	139	102	112	107	69	40	30	10

Source: Euroalliges

**Table 2: Ferro-alloys**  
**Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	2 981	2 938	2 848	2 859	3 116	3 332	3 097	2 821	2 953	3 050
Production	1 964	1 880	1 747	1 473	1 684	1 891	1 621	1 278	1 257	1 128
Trade balance	-1 017	-1 058	-1 101	-1 386	-1 432	-1 441	-1 476	-1 543	-1 696	-1 922
Employment (units)	N/A	N/A	N/A	N/A	7 800	7 700	7 400	6 900	6 000	5 700

Source: Euroalliges

**Table 3: Bulk ferro-alloys**  
**Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	2 645	2 604	2 490	2 493	2 723	2 904	2 680	2 441	2 600	2 672
Production	1 675	1 599	1 485	1 227	1 434	1 625	1 378	1 070	1 058	948
Trade balance	-970	-1 005	-1 005	-1 266	-1 289	-1 279	-1 302	-1 371	-1 542	-1 724

Source: Euroalliges

**Table 4: Special ferro-alloys**  
**Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	336	334	358	366	393	428	417	380	354	377
Production	288	281	262	246	251	267	244	208	199	179
Trade balance	-48	-53	-96	-120	-142	-162	-173	-172	-154	-198

Source: Euroalliges



is currently faced with a heightening of international competition and is tending to decrease as time goes by.

Domestic producers in the EU, the United States, and even in Japan, have reacted to the growth of imports at excessively low prices by lodging anti-dumping complaints with the competent authorities. In particular, these complaints have been aimed at countries which formerly had State trading systems. Investigations have led, in most cases, to severe anti-dumping duties, highlighting the unfair nature of some of these exports.

### Foreign trade

EU exports consist mainly (60 % by value in 1993) of the so-called special alloys, which are more difficult to produce, for which the consumers' quality requirements are higher and whose unit prices are higher. However, this leads to specialisation with greater value added for EU industry products. Special alloys exports go mainly to the industrialised countries whose export share is over 90 %.

Conversely, exports of bulk alloys to destinations outside the EU are tending to disappear as the world market is increasingly dominated by imports of low-priced products either from the newly industrialised countries or from countries which formerly had State trading systems.

The EU's internal requirements for bulk alloys are increasingly being met by imports from these same countries and from Scandinavia, where production costs have been kept down at relatively competitive levels owing to access to competitive sources of electricity.

While EFTA has maintained its overall market share in recent years, a disquieting increase in the share of the Eastern European countries is observable. These countries, especially the CIS, possess a very large amount of industrial plant capacity, although their productivity is not very high. The collapse of their iron and steel production has led to considerable quantities of ferro-alloys coming on to the market, which have been exported in order to obtain hard currencies. For logistical reasons, the greater part of these exports have gone to the EU. Consequently, the EU ferro-alloys industry has been exposed to considerable competitive pressure and has lost ground in its own market. Steps have been taken to bring about a re-establishment of fair competition, with a view to safeguarding the future of the EU industry. These steps should enable the industrial sectors to be independent in their procurement through the maintenance of a significant level of domestic production.

## MARKET FORCES

### Demand

Overall demand for ferro-alloys is connected with the trends of its main markets (i.e. iron, steel and aluminium) and is affected by the cyclical nature of their activities. However, there are also significant variations between the market sectors.

#### *Iron and steel production and iron foundry activity*

Almost all bulk alloys and one third of special alloys are consumed by the iron industry, within which a distinction must be made between iron and steel production (itself subdivided into oxygen steel-making and electrical steel-making) and iron foundry activity. The demand for iron foundry activity differs both in terms of types of product and of specific consumption.

Oxygen steel-making accounts for 66.5 % of the EU's steel output, but its share in the total is slowly declining. Considerable advances in productivity through continuous casting have been achieved in recent years, and its specific consumption of ferro-alloys has steadily declined (less than 10 kg per tonne of steel at present).

Countering the relative decline in oxygen steel-making, electrical steel-making is steadily increasing its share in production. Assuming a constant product mix, productivity has also improved; although this is another factor leading to a decline in the specific consumption of ferro-alloys. Yet, the increase in the share of high-alloy steels, especially stainless steels, has more than counterbalanced the decline in specific consumption. Demand for ferro-alloys has increased in this market segment.

Iron foundry activity consumes a large proportion of the special alloys used in iron working, and consumption has been more or less stable.

Overall, demand for ferro-alloys for iron metallurgy has moved in line with steel production and has led to a decline in demand for ferro-alloys compared with the high level reached in 1989.

### Aluminium

Ranking second as a customer for ferro-alloys (with only 5.3 % of the total), the aluminium industry is primarily a consumer of special alloys; such as silicon metal and magnesium metal. In special alloys, aluminium now represents nearly half of the market. After a steady increase in demand up to 1989, the aluminium industry was hit by the recession in the building and automotive industries, in particular, in 1992-1993. From the beginning of 1993 onwards, however, the increase in demand for aluminium has had a beneficial effect on demand for silicon and magnesium.

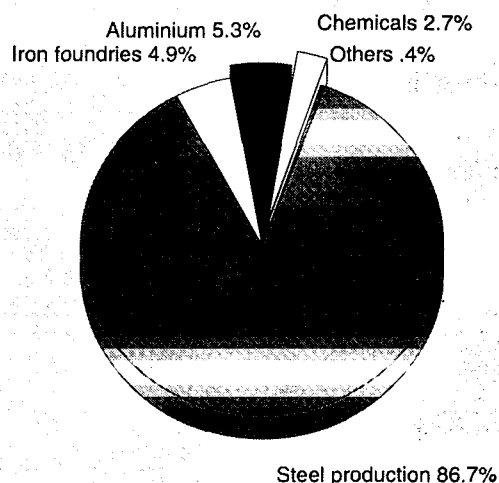
### Chemical industry

This industry mainly consumes silicon metal, which is the raw material of silicone chemistry. Despite the strength of the long-term growth of these products, consumption declined slightly in 1992-1993, but has recovered in 1994.

### Supply and competition

The EU ferro-alloys industry has been faced with a stagnation of its market for the last ten years. Long-term growth has been practically zero, due to the cyclical variations in demand which have led to cyclical variations in prices. In order to adapt supply to market trends and competition, EU producers have undertaken very thorough restructuring programmes. Since the end of the 1970s, the EU has witnessed a continuous process of concentration of production at the most productive locations. During 1990 to 1992 alone, 25 % of the industrial establishments were closed to permit this concentration. Furthermore, flexible management systems, such as winter stop-

Figure 2: Ferro-alloys  
Breakdown by application, 1993



Source: Euroalliages

pages, have been adopted in order to adapt operations to the constraints of a competitive energy supply situation.

Despite these measures, growth in supply from countries outside the EU has continued. However, supply from the EFTA countries (mainly Scandinavia) contracted in 1992-1993 as a result of competition from other exporting countries, especially the CIS, where there are considerable production capacities. With the fall of the CIS's steel production from 165 million tonnes in the mid-1980s to 95 million tonnes in 1993 and 77 million tonnes in 1994, the ferro-alloys which it has stopped consuming have been directed to western markets, especially Europe, for logistical reasons. This supply, provided at prices which are totally unrelated to economic production costs, has created serious distortions of competition.

As a result, European producers have lodged anti-dumping complaints with EU authorities to prevent the industry's efforts from being completely thwarted and the independence of the industrial sectors concerned jeopardised. These lines of action have led to the introduction of anti-dumping duties on a number of products, enabling a certain regularisation of the market to be achieved from 1994-1995 and permitting a revival of supplies from Scandinavia. At the same time, the EU industry has persevered in its activities aimed at improving its costs and offering its customer industries products and services which more distant suppliers are unable to provide.

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## INDUSTRY STRUCTURE

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### Companies

Thirty-two firms are engaged in the production of ferro-alloys in the EU. Some firms are subsidiaries of major industrial groups, such as VIAG in Germany and Pechiney in France, but they represent only a relatively small proportion of the groups activity. Many, on the other hand, are small firms concentrating on the production of a range of ferro-alloys, or merely on a single, very specialised product. All these European firms pay special attention to the quality of their products and to customer service.

### Impact of the Single Market

The impact of the creation of the Single Market on the ferro-alloys sector has been overall positive. Most relevant to the sector are the elimination of controls at internal frontiers and the liberalisation of the energy markets. The elimination of border controls has facilitated cross-border shipping. Other measures promoting the free movement of goods are less important. The products of the ferro-alloys sector have a commodity nature, so that technical harmonisation is not an issue. In contrast, any measures relating to the energy markets are important since ferro-alloys are generally produced in electric-arc furnaces and electricity constitutes one of the main cost items. Crucial is here that no legislation should be passed which would affect electricity prices differently across Member States, as this would distort the competition between producers in different Member States. An area for future policy initiatives of interest to the sector is the harmonisation of waste treatment regulations. Presently, these differ widely across Member States, leading to large variations in waste treatment costs.

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## ENVIRONMENT

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Production of ferro-alloys generally involves the use of open electrical furnaces into which natural products (quartz, lime, various ores, wood, etc.), with a relatively fluctuating physical composition, are loaded.

The European industry has endeavoured to reduce emissions of dust, by installing filtration equipment in its factories, and to recycle the by-products of what it produces to the greatest possible extent. The concentration movement of the last ten years has accelerated this process by making it possible to build larger furnaces with higher yields and emissions which can be more easily controlled than those from a multiplicity of small furnaces. However, these measures are extremely expensive. At present, the EU industry devotes a quarter of its investment capital to installations for protecting the environment, thus responding fully to the EU's priorities.

The ferro-alloys industry, whose basic tool is an electric furnace in which metal oxides are reduced by carbon, is a major consumer of energy and a producer of carbon dioxide (CO<sub>2</sub>). It has, therefore, always regarded reduction of energy consumption as a vital priority. However, progress made in this field is always limited by the laws of thermodynamics, which govern the reactions used. The imposition of a tax on energy consumption and/or emission of CO<sub>2</sub> would not act as an incentive, because the increase in the size of the furnaces has already pushed up yields to very high levels. On the other hand, this tax would have a direct and intolerable effect on the competitiveness of European producers and would give free rein to less efficient consumers in countries where awareness of ecological considerations is still to come.

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## OUTLOOK

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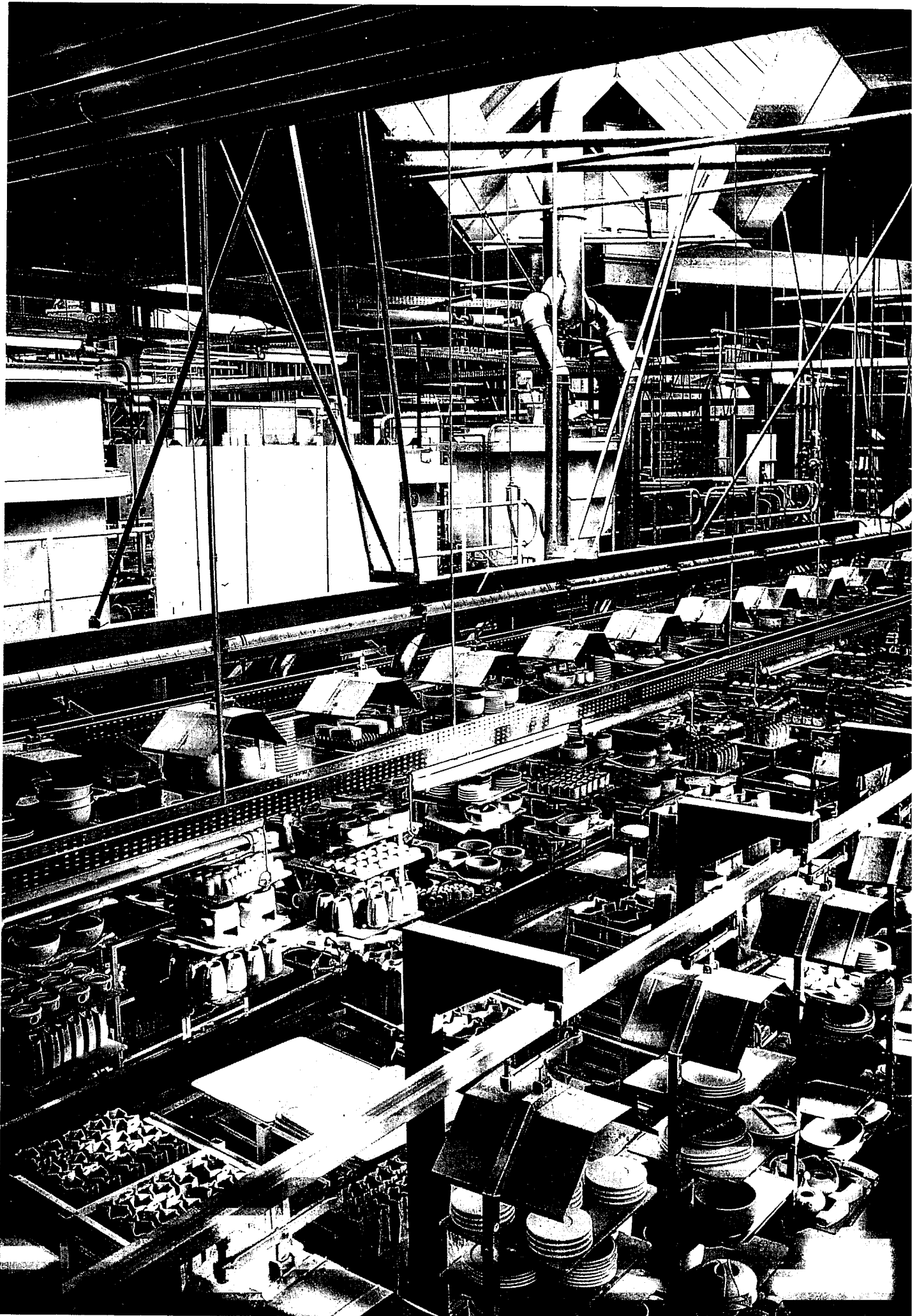
The recession of 1992-1993, which was particularly pronounced in Western Europe, has given way to a recovery which will benefit the automotive and building sectors, the main customer markets of the ferro-alloys industry. Expected to be confirmed in 1995, the recovery should continue throughout the next two years.

The hoped-for improvement in the iron and steel industry will be accompanied by a continuation of productivity gains, with a decline in the specific consumption of ferro-alloys; albeit to a lesser extent than in the recent past. In terms of volume, EU demand for ferro-alloys should stabilise. It looks as if some sectors, such as silicones, will enjoy more sustained growth. This would lead to an increase in demand for corresponding metals or ferro-alloys. Measures adopted by the EU to maintain fair competition within the internal market should allow EU production to benefit from cyclical improvements and permit the EU industry to remain independent of its external suppliers.

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## Overview NACE 24

As non-metallic mineral products are strongly linked to construction, the fates of the two businesses is inextricably connected. Therefore, if construction industry forecasts are achieved, the second half of the 1990s should prove to be more favourable for the non-metallic minerals industry than was the first. And, while the EU industry already is technically advanced and generally competitive on a global level, the process of restructuring and modernisation will help it to move forward even further. Generally speaking, imports form a small part of total consumption, but for certain sub-sectors (particularly for certain glass and ceramic sub-sectors), imports have been growing in recent years, especially from countries with low labour costs. The sector is a major user of fossil fuels and is thus heavily involved in environmental issues regarding atmospheric pollution.

### INDUSTRY PROFILE

#### Description of the sector

Non-metallic mineral products are made up of the following groups: clay products (bricks and roof tiles - NACE 241); cement, lime, and plaster (NACE 242); concrete (NACE 243); glass (NACE 247); and ceramic goods (NACE 248). The working of stone is (NACE 245) is covered in Chapter 2 of the Panorama.

Clay products, cement, concrete, and plaster are used almost exclusively by the construction industry, which also figures prominently as a customer for lime, glass, and ceramic goods (particularly tiles and sanitary ware). The latter products are widely used across a broad spectrum of industries embracing metallurgy, chemicals, food and beverages, electronics, and even electrical and mechanical engineering. A number of glass and ceramic items are domestic consumer items.

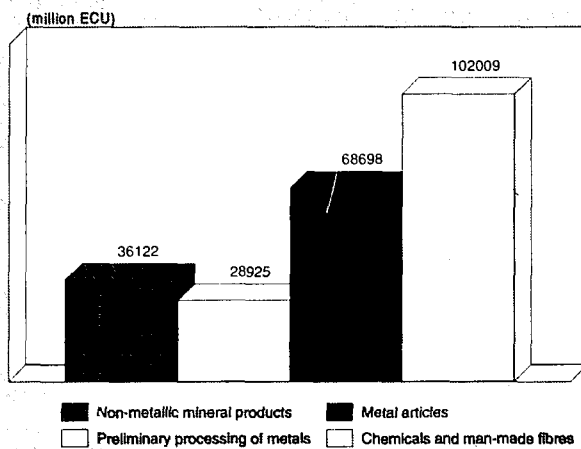
#### Recent trends

EU production of non-metallic mineral products was valued at over 90 million ECU in 1994 and involved materials measured in hundreds of millions of tonnes. The real annual growth rate over the 1984-1993 period averaged 1.5 % for production and 2.0 % for consumption, although this hides the fact that the major growth occurred during the 1987-1990 period in response to the relative boom in construction activity. Overall, imports surged during this period and have continued to grow ever since, although to put things in perspective it should be noted that imports in 1993 amounted to 4.9 % of total consumption compared to 4.0 % in 1984. As an important exporter of many of the products in this group - particularly glass and ceramic goods - the EU maintains a positive trade balance even though the overall level has fallen over the period. Preliminary figures for 1994 suggest that both production and consumption of these products is growing again after two-to-three years of recession in the construction industry in the early 1990s.

#### International comparison

The EU is the world's leading producer of non-metallic mineral products and its 1993 production value exceeded those of the US and Japan by factors of 1.9 and 1.3 respectively. The industries of both the EU and Japan have grown in real terms whilst that of the US has contracted.

**Figure 1: Non-metallic mineral products  
Value added in comparison with related industries, 1993**

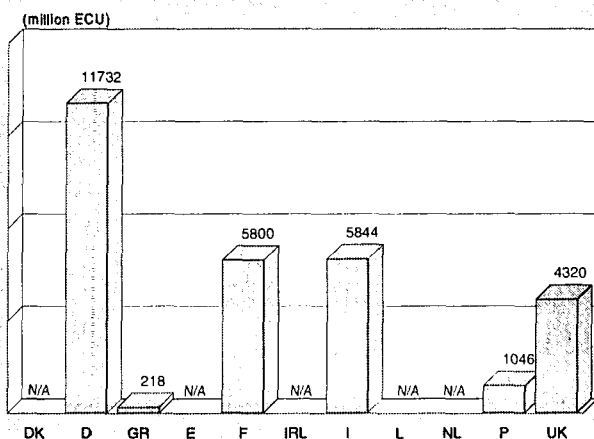


Source: DEBA

#### Foreign trade

Although foreign trade was only a minor part of the total picture - imports averaged almost 5 % of consumption while exports averaged 9 % over the 1984-1993 period - it is actually much more significant in some sectors than others. For this reason, the continuous fall in the export-import ratio from 2.99 to 1.96 between 1984 and 1993 has important implications for the EU glass, ceramic goods and cement sectors. During this period, each of these industries experienced dramatic growth in low-priced imports - from Eastern Europe and Turkey in the case of glass and cement, and from the Far East in the case of ceramic goods. Overall, the EFTA countries and the US are also important sources of non-metallic mineral product imports, although their shares have decreased in favour of Eastern Europe, Turkey and the Far East.

**Figure 2: Non-metallic mineral products  
Value added by Member State, 1993**



Source: DEBA

**Table 1: Non-metallic mineral products  
Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production exports	Extra-EU
Clay products	5 717	5 916	252
Cement, lime and plaster	13 626	13 643	389
Concrete and cement for constructional purposes	27 889	28 054	322
Glass	20 187	21 094	2 670
Ceramic goods	13 220	15 575	3 662
Others	1 930	2 149	581

(1) Apparent consumption and production have been estimated.  
Source: DEBA

**Table 2: Non-metallic mineral products  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	58 161	72 269	80 413	84 163	86 900	86 691	82 569	87 549	92 600	98 500	104 500
Production	62 778	76 177	84 711	88 146	90 403	89 986	86 431	92 255	97 600	103 700	109 800
Extra-EU exports	6 938	6 409	7 197	7 085	7 116	7 216	7 876	9 140	9 900	10 600	11 400
Trade balance	4 617	3 908	4 298	3 983	3 503	3 294	3 861	4 706	5 000	5 200	5 300
Employment (thousands)	1 014.8	933.9	953.4	957.6	945.4	916.7	864.7	835.9	827.0	824.0	822.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Non-metallic mineral products  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.33	-1.77	1.03	-2.72
Production	3.24	-1.72	1.01	-3.04
Extra-EU exports	-1.68	-0.55	-1.18	-4.84
Extra-EU imports	-4.90	-0.47	-2.96	1.04

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 4: Non-metallic mineral products  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	6 938	6 993	6 180	5 982	6 409	7 197	7 085	7 116	7 216	7 876	9 140
Extra-EU imports	2 321	2 416	2 019	2 150	2 501	2 899	3 102	3 613	3 922	4 015	4 434
Trade balance	4 617	4 577	4 162	3 832	3 908	4 298	3 983	3 503	3 294	3 861	4 706
Ratio exports / imports	2.99	2.89	3.06	2.78	2.56	2.48	2.28	1.97	1.84	1.96	2.06
Terms of trade index (1)	151.6	151.0	131.1	119.0	110.4	108.5	100.0	85.7	79.5	86.1	N/A

(1) NACE 24

Source: DEBA



**Table 5: Non-metallic mineral products  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.2	81.6	84.0	88.6	96.0	100.2	100.0	99.4	100.2	103.0
Unit labour costs index (3)	90.0	94.0	94.8	94.9	93.4	95.2	100.0	108.2	112.9	111.7
Total unit costs index (4)	86.8	90.2	89.0	89.1	90.0	95.3	100.0	106.4	109.0	107.6
Gross operating rate (%) (5)	12.9	12.8	15.1	16.2	17.5	16.5	15.4	14.1	13.4	13.5

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

Meanwhile, the value of EU exports of non-metallic mineral products declined in real terms from 1984 to 1993. This is mainly due to the falling contribution of cement, since the level of exports for both glass and ceramic products remained more or less constant during this period. The destinations for these exports are spread throughout the world, although the EFTA countries and the US have consistently taken between 45-50 % of the total value each year.

Intra-EU trade expanded rapidly during the 1980s. Since then, it has levelled off at around 14 % of total activity.

## MARKET FORCES

### Demand

The construction industry accounts for over two-thirds of the consumption of non-metallic mineral products and thus the prosperity of the sector has tended to follow the somewhat exaggerated peak and trough pattern of the past six years. The current period of lower interest rates already appears to be contributing to a renewal of construction activity; and the correspondingly increased demand for non-metallic mineral products can be expected to continue for the short term. The demand for glass and ceramic goods also is affected somewhat by construction activity, but overall consumption is spread out more evenly across a range of industries from general manufacturing to food, beverages and catering. Advanced materials will continue to grow quickly from a small volume base.

### Supply and competition

Most of the products of this group (with the notable exception of flat glass, tiles and tableware) are major bulk items of relatively low value that are based on local raw materials and sold primarily to local markets. Transportation costs are always a major consideration and have generally deterred competition from distant sources.

Some of the higher value products in the glass and ceramics segments have been exempted from such considerations forever, but increasingly during the last decade or so major bulk items, such as cement, are being shipped long distances by sea. The enabling factor is the low cost of ocean transportation when large bulk carriers of 20 000 tonnes or more are involved. Thus, a modern cement plant close to a shipping point can supply markets at competitive prices on the other side of the globe, provided that there is a bulk terminal at the other end to handle and store the product. European producers were actually among the first to take advantage of these opportunities. However, as former importers (for instance, in the Middle East) have installed their own manufacturing facilities, not only have the markets disappeared but new exporters have emerged.

The market in the 1990s is, therefore, much more competitive than before; and certain regions of the EU have become more vulnerable to competition from countries with low labour costs (e.g. Eastern Europe or the Far East). Nevertheless, most EU producers are competitive and will continue to supply the vast bulk of the EU's construction and industrial requirements. The principal threats to this competitiveness would come from any future legislation which reduced the availability of raw materials or raised the cost of energy.

### Production process

Europe has been at the forefront of many technological advances in the processing methods employed by the non-metallic mineral products industries - from specific procedures such as the float glass process and ceramic forming and firing techniques, to energy-saving measures that apply to the industry as a whole. A close relationship exists between this industry and its equipment suppliers which can be expected to be just as fruitful in the future as it has been in the past.

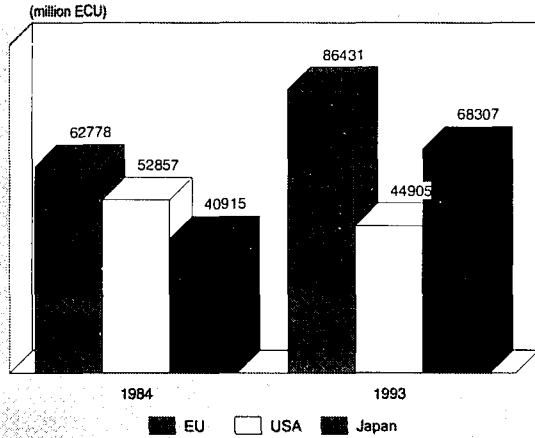
**Table 6: Non-metallic mineral products  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	75 049	88.6	24.4	20.7
20-99 employees	7 906	9.3	22.4	21.8
100 or more employees	1 741	2.1	53.2	57.5

(1) Estimates.

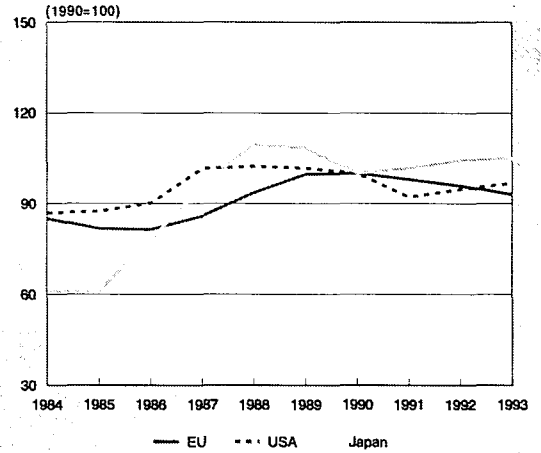
Source: Eurostat "Enterprises in Europe"

**Figure 3: Non-metallic mineral products**  
International comparison of production in current prices



Source: DEBA

**Figure 4: Non-metallic mineral products**  
International comparison of production in constant prices



Source: DEBA

## INDUSTRY STRUCTURE

### Companies

The diversity of products contained in this group is mirrored by the diversity of the companies involved, which range from major international construction groups with turnovers measured in billions of ECU and tens of thousands of employees, to small, family-owned businesses with a handful of employees and a regional sphere of interest. Concentration is high in some segments such as cement and glass, but low in others, i.e. concrete products, bricks and ceramics. Similarly, concentration is high in some countries (e.g. the UK and France), but low in others (e.g. Italy, Spain and, surprisingly, Germany). However, the pace of concentration appears to be quickening as groups acquire a more obvious pan-European status. The top six companies - Saint Gobain (F), Lafarge Coppee (F), Holderbank (CH), RMC group (UK), Pilkington (UK) and Redland (UK) - account for about 25 % of total production

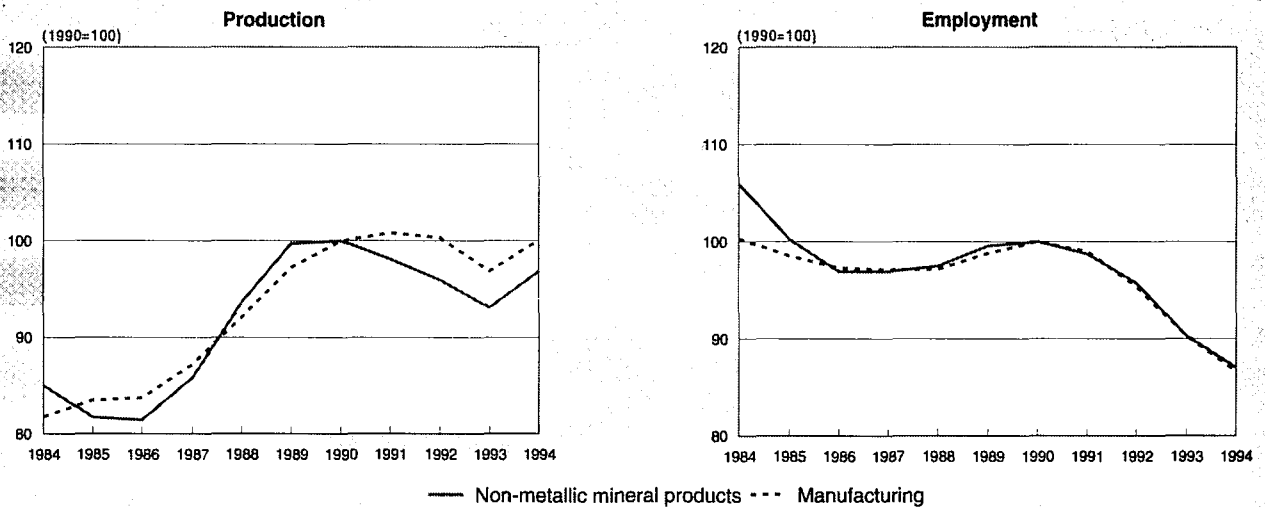
which is low compared to other industries. Nevertheless, it should be recognised that many of the smaller and medium-sized companies involved in non-metallic mineral product manufacture are highly efficient, modern, and deserving of international status in their own particular market niches.

### Impact of the Single Market

The creation of the Single Market is perceived to have had an important and primarily positive impact on the non-metallic mineral products industries in Europe. Sectors such as cement, glass, and ceramic goods had acquired a strong European mentality long before the Single Market programme began, but have seen the implementation not only as a confirmation of the process but also as a means to improve future development.

The free movement of goods, technical harmonisation, energy deregulation, competition policy, and environmental issues are of major relevance to all sectors. The importance of other

**Figure 5: Non-metallic mineral products**  
Production and employment compared to EU total manufacturing industry



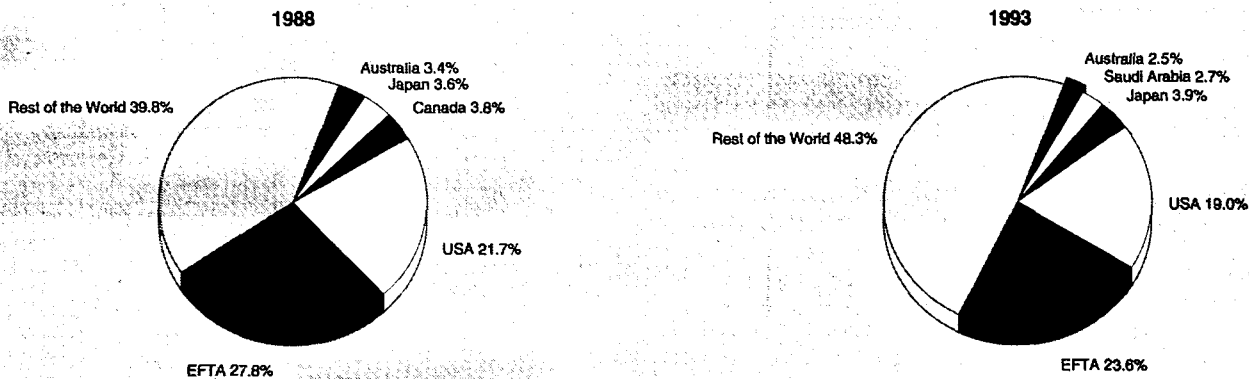
1994 are DEBA estimates.  
Source: DEBA

**Table 7: Non-metallic mineral products**  
**Building materials and glass: the seven largest companies in the EU, 1993**

(million ECU)	Country	Sales	Profit	Employment (units)
Saint-Gobain	F	10 786	198	92.3
Hanson	UK	9 574	955	71.0
Lafarge Coppee	F	4 588	85	30.6
RMC Group	UK	4 065	99	27.6
Pilkington	UK	3 517	51	37.2
Redland	UK	2 842	165	21.0
Italcementi	I	2 804	-68	20.0

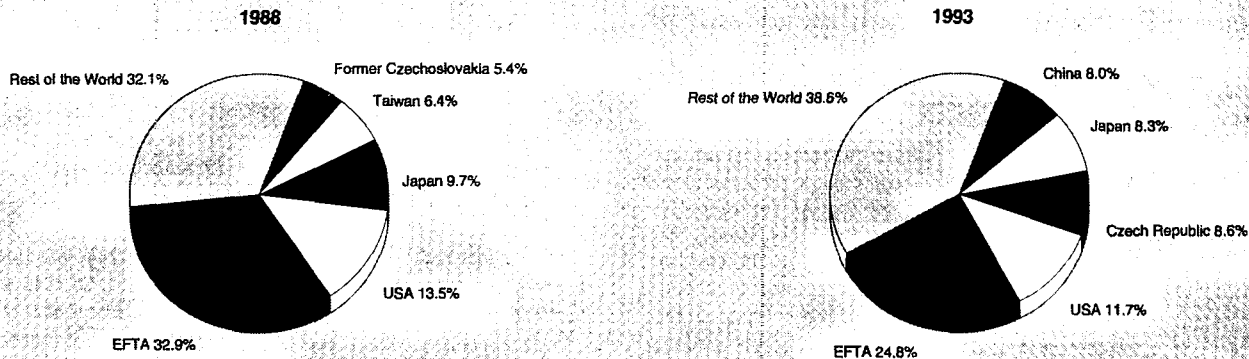
Source: Fortune 500

**Figure 6: Non-metallic mineral products**  
**Destination of EU exports**



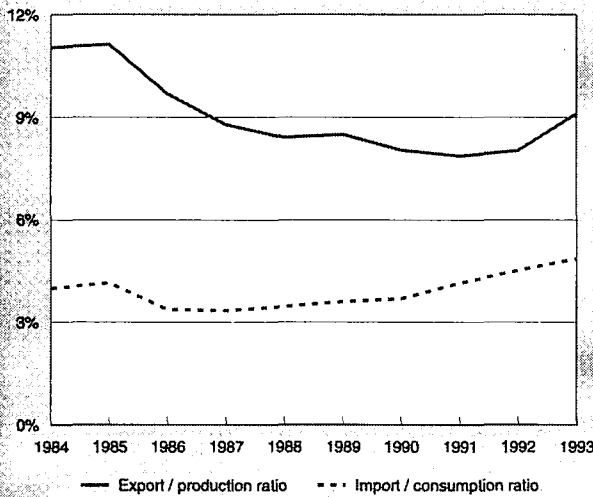
Source: Eurostat

**Figure 7: Non-metallic mineral products**  
**Origin of EU imports**



Source: Eurostat

**Figure 8: Non-metallic mineral products  
Trade Intensities**



Source: DEBA

factors varies according to the sub-sector. For instance, intellectual property is highly relevant to the ceramics goods industries (tableware, ornamental ware, sanitaryware, walltiles, refractories, technical ceramics, etc.) where design or engineering influences are strong, but is only a minor consideration to the cement industry with its large volume commodity status.

With regard to the future a combination of energy, environmental, and competition policy issues are particularly relevant to these highly energy intensive (yet highly energy efficient) industries operating in very competitive international markets. The industries are especially concerned that EU legislation will increase costs to domestic producers and thereby open up European markets to suppliers from other countries which do not play to the same rules.

### REGIONAL DISTRIBUTION

EU production of non-metallic mineral products is widespread throughout the Community. The location of production sites is often governed by the raw materials used, e.g. cement factories based on limestone deposits, ceramics industries close to clay deposits, etc.

### ENVIRONMENT

The non-metallic mineral products sector is one of the major users of fossil fuels and is thus a focus of environmentalists concerned with atmospheric pollution. However, the sector has made major investments to comply with existing legislation and has a very good record in its control of sulphur dioxide and dust emissions. The various industries making up the sector also have been highly successful in introducing technical innovations to reduce unit consumption of energy. In particular, the glass industry is held up as a model for the ecologically sound practice of recycling. This notwithstanding, problems concerning the emissions of the oxides of nitrogen and carbon are proving to be a complex question. As a punitive carbon tax could be the death of much of the sector, efforts must be intensified to find a way to treat these gases by methods which do not themselves consume massive quantities of energy.

**Table 8: Non-metallic mineral products  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	N/A	N/A
BR Deutschland	0.96	0.97
Hellas	1.55	1.55
España	N/A	N/A
France	0.85	0.91
Ireland	N/A	N/A
Italia	1.28	1.20
Luxembourg	N/A	0.00
Nederland	N/A	N/A
Portugal	1.48	2.00
United Kingdom	0.90	0.76

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

### OUTLOOK

Demand for non-metallic mineral products is expected to grow steadily in the latter half of the 1990s in response to the more favourable outlook for the construction industry. Generally speaking, although Eastern Europe has been regarded as a source of cheap imports in the past it is now being seen as a major area of opportunity for EU companies operating in this sector. However, also in this field there are wide differences among the subsectors involved, which are analysed in the following pages.

Written by: B.M. Coope & Partners

# Clay products

## NACE 241

Clay brickmaking is one of the oldest crafts in the world and the Ancient Greeks, Romans, and Etruscans can lay claim to being the earliest EU producers. Italy is still the largest producer in what is still the world's most important clay brick and tile producing region. Despite competition from a wide range of products based on concrete, wood, metal, and plastics, the modern clay brick and tile industry continues to be a major supplier to the EU building industry.

### INDUSTRY PROFILE

#### Description of the sector

The principal clay products for construction purposes are bricks and roof tiles. Clay extraction and treatment (Chapter 2) and brickmaking tend to be carried out by the brickmaking company itself, as a single integrated operation. Nevertheless, there are certain cases where large tonnages of clay are brought in from outside sources, for instance, when low cost by-product fireclays from open-cast coal mining operations are available. Products are sold to the construction and civil engineering industries (Chapter 19).

Bricks are available in a wide variety of types based on size, shape, colour, type of processing, end use, etc. They may be solid, perforated (i.e. with a large number of small holes), or hollow (e.g. horizontal core). Northern climates tend to use solid bricks whereas Mediterranean regions tend to use more hollow bricks. Perforated bricks are common along with solid bricks in Germany, Belgium, and Denmark. Another classification, particularly for solid bricks, divides bricks into commons (suitable for general building purposes, backing, etc.), facings (specially prepared with variations in colour and texture to provide an attractive appearance), and engineering bricks (high strength and low absorption for special load-bearing applications). Not surprisingly, there are strong regional characteristics in brick types, as well as national ones. Nevertheless, the industry has a long history of international dialogue on both technical and commercial levels. The European Tile & Brick Federation (TBE) has been in existence for over 40 years.

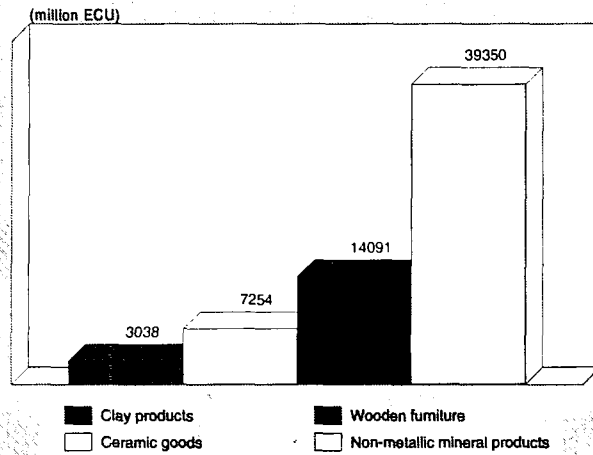
Principal producing countries in the EU are: Italy, Germany, and Spain which together account for about 75 % of total brick production and 65 % of total roof tile output. The UK, France, and the Benelux countries are also significant producers.

#### Recent trends

EU production and consumption of bricks and roof tiles grew almost continuously, in value terms, over the 1984-93 period (at an average 2.8 % and 3.2 % per annum, respectively). However, consumption, in real terms, has risen only marginally (0.14 %) and production has actually fallen (-0.12 %) during the same period. Over the last four years, there has been a decline of over 1 % in both production and consumption, although this trend was reversed in 1993/94. In volume terms, brick sales declined in 1992 and 1993, while roof tile sales grew.

Production patterns have been different for individual countries with Italy and Germany showing strong volume growth since 1984 while France and the UK showed initial growth followed by a clear decline. Future growth is likely to be uneven as well.

**Figure 1: Clay products**  
Value added in comparison with related industries, 1993



Source: DEBA

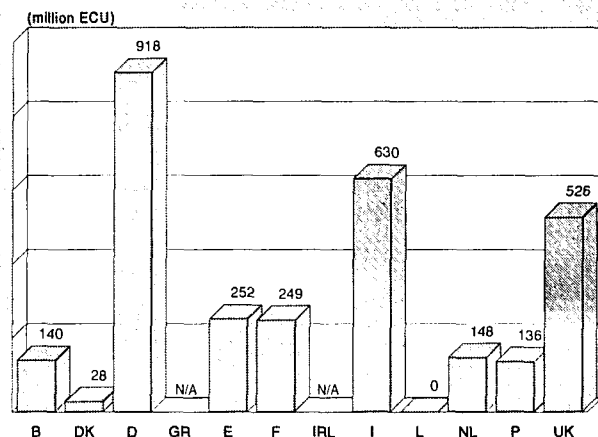
#### International comparison

Production of clay bricks and roof tiles in the EU is considerably higher than that in the USA or Japan, where other materials such as concrete, wood, and plastics are predominant. USA production in 1993 declined by 24.2 % compared to 1984, whereas Japanese production increased by 73.2 %. However, production in the USA increased in 1993 as its economy recovered.

#### Foreign trade

Foreign trade in bricks and roof tiles normally represents only a small part of overall consumption since the products are relatively high-volume, low-value products best suited to serve proximal markets. The types of products are also designed to meet particular building characteristics which tend to be of a regional or national nature. Thus, extra-EU imports represent less than 1 % of total consumption, although extra-EU exports are more substantial, averaging around 4 % of production in recent years. Export trade can be divided into regular trade with neighbouring EFTA countries and more single-project-oriented shipments to destinations such as the

**Figure 2: Clay products**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Clay products**  
**Breakdown of sales by product (1)**

(thousands)	1990	1991	1992	1993 (2)
Bricks m3	45 389	45 942	45 700	44 161
Roof-tiles m2	127 758	126 130	133 666	139 478

(1) For bricks: based on data for Belgium, Denmark, Germany, Spain, France, Italy, the Netherlands, and the United Kingdom. For Roof-tiles: as for bricks, excluding Belgium.

(2) Excludes the Netherlands for bricks and the United Kingdom for roof-tiles.

Source: TBE

**Table 2: Clay products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	4 383	4 987	5 485	5 455	5 891	5 800	5 717	6 081	6 300	6 540	6 820
Production	4 668	5 162	5 680	5 647	6 081	5 994	5 916	6 312	6 550	6 800	7 100
Extra-EU exports	291.3	186.5	211.6	207.5	216.7	232.2	252.4	295.1	320.0	350.0	380.0
Trade balance	284.9	174.1	194.8	192.1	190.3	193.8	198.9	231.6	250.0	260.0	280.0
Employment (thousands)	102.6	85.1	85.4	81.6	79.1	76.3	71.7	70.0	67.5	65.6	63.9

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Clay products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.40	-1.40	0.14	0.71
Production	0.88	-1.36	-0.12	1.00
Extra-EU exports	-8.68	3.74	-3.35	14.04
Extra-EU imports	11.03	32.41	20.07	35.28

(1) Some country data for apparent consumption and production have been estimated.

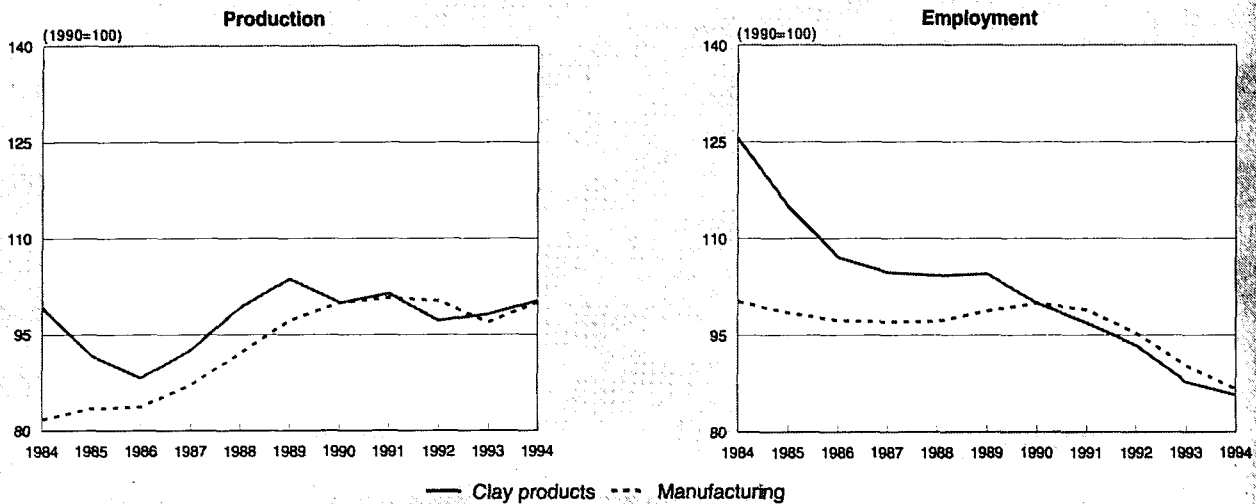
Source: DEBA

**Table 4: Clay products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	291.3	265.7	240.5	233.7	186.5	211.6	207.5	216.7	232.2	252.4	295.1
Extra-EU imports	6.4	5.4	6.8	8.8	12.4	16.8	15.4	26.3	38.4	53.5	63.5
Trade balance	284.9	260.3	233.7	224.9	174.1	194.8	192.1	190.3	193.8	198.9	231.6
Ratio exports / imports	45.5	49.2	35.4	26.6	15.0	12.6	13.5	8.2	6.0	4.7	4.6
Terms of trade index	132.2	128.6	118.6	102.1	99.1	97.2	100.0	106.3	104.4	96.6	N/A

Source: DEBA

**Figure 3: Clay products**  
**Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
 Source: DEBA

Middle East and Far East. Over 25 % of exports are to EFTA countries, but with the inclusion of Austria, Sweden and Finland in the Union there will be a fall in extra-EU trade from 1995. Austria is also a major source of imports into the EU, second only to the Czech Republic which is the source of over 38 % of imports. Trade with the emerging economies of Eastern Europe is likely to increase as these economies develop and closer ties are forged with the EU. Meanwhile, intra-EU trade has more than doubled during the past five years, reflecting an increase in cross-border shipments in the regions of northern Germany, north-east France, and the Benelux countries.

**MARKET FORCES**

**Demand**

Bricks and roof tiles are consumed in building and construction and thus the construction industry is almost the sole customer of clay products. However, there is also a small volume of

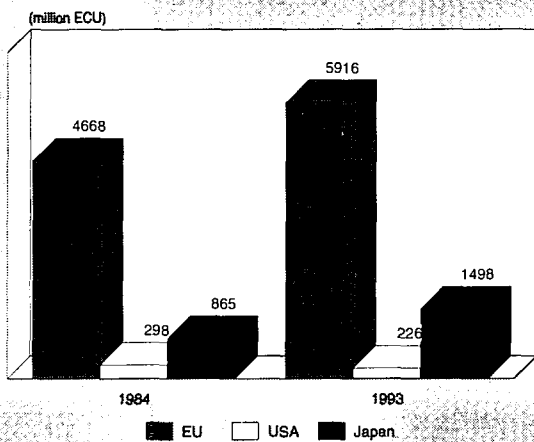
sales to builders' merchants and the DIY (do-it-yourself) sector. Within construction, the main market for bricks and roof tiles is the new residential building sector. As bricks tend to be ordered at the beginning of the construction process, the level of new housing starts tends to be a better guide to demand than more general construction output figures. Bricks are also used in non-residential building for exterior cladding, as well as for walls, pavings, etc. The maintenance market for roof tiles tends to be more important than for bricks.

Other factors affecting brick and tile demand include climate, architecture, taste, and local availability. In addition, as previously suggested there are strong regional and national differences in demand patterns.

**Supply and competition**

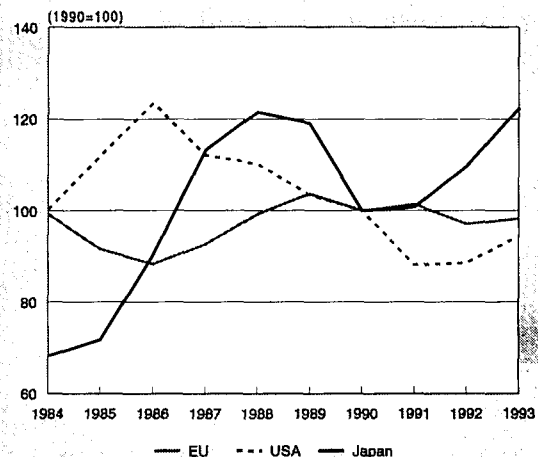
Overall there is more than adequate capacity to meet existing and expected future demand for clay products in the EU; although, once again there are regional variations. In some

**Figure 4: Clay products**  
**International comparison of production in current prices**



Source: DEBA

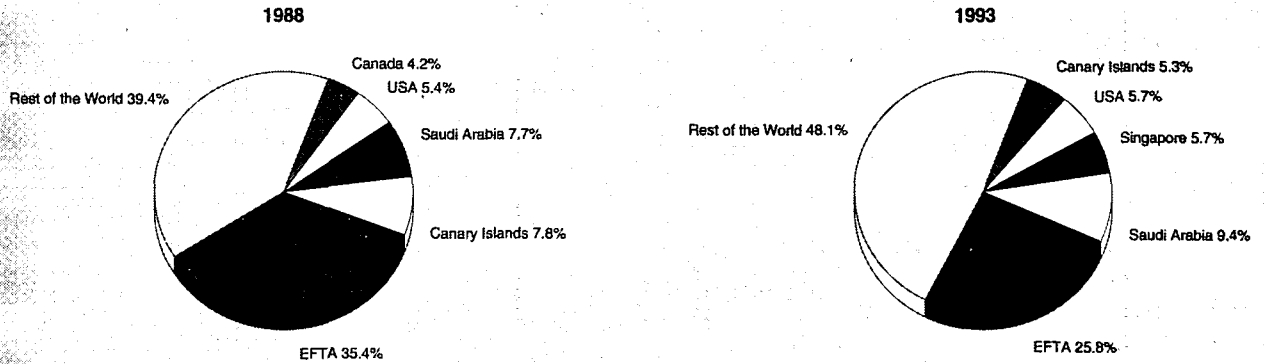
**Figure 5: Clay products**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 6: Clay products  
Destination of EU exports**



Source: Eurostat

areas continuing overcapacity has led to the closure of older and less efficient brickworks whereas in areas such as former East Germany the boom in construction is likely to require the installation of new and modern brick and tile-making capacity.

The EU industry faces very little competition from foreign suppliers for reasons already stated in the trade section, but increasing intra-EU competition is a firm current and future trend. This has been helped by the process of standardisation now underway, a greater awareness of building practices from one EU country to another and the increasing international nature of the companies involved. Investments made by major producers in recent years have significantly brought down operating costs through savings in energy and labour costs and economies of scale. Consequently, the quality and range of products have both been extended.

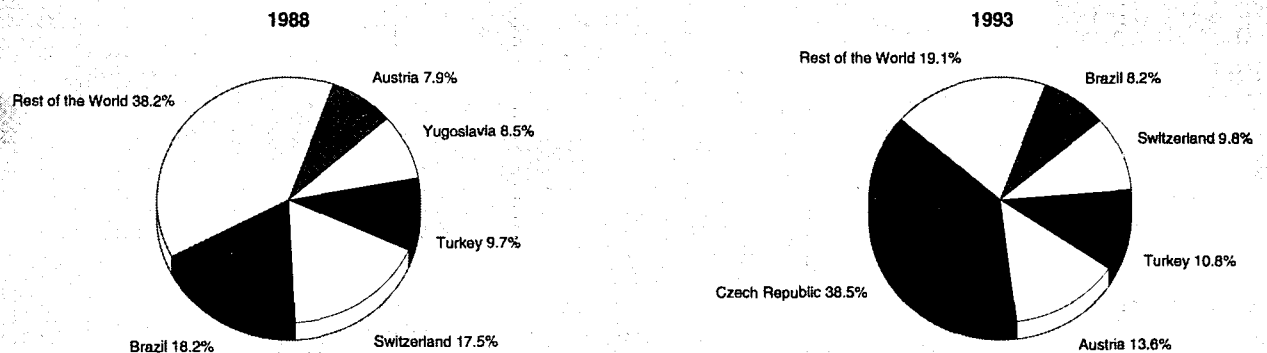
The most important competition that clay bricks and roof tiles have to meet is from competing materials ranging from bricks, blocks, and tiles made from concrete or other materials to completely different building systems.

### Production process

During the past decade the brick and tile making process has undergone major technological improvements at virtually all stages of the production process. A more precise understanding of the mineralogy of brick clays has enabled producers to improve properties and exercise greater control of product quality. In a modern plant, large scale mechanised extraction is followed by clay preparation which may now involve pre-treatment (e.g. weathering), blending, crushing, coarse grinding, fine grinding, and mixing. Additives may include plasticity modifiers (such as lignosulphonate to increase or crushed brick grog to decrease), wetting agents (soaps, etc.), colorants (such as manganese dioxide), deflocculants, and, last but not least, water. Prepared clay may then be extruded, surface-treated, cut (by wire), and dried before firing in a tunnel kiln.

Much effort has been directed in recent years to reducing energy consumption by applying best practice techniques at all stages of the production process. Although extrusion offers the most flexible and economical method to produce high quality bricks (including hollow bricks) other methods are still employed. These range from large factories based on dry or semi-dry presses to small factories using hand moulding techniques.

**Figure 7: Clay products  
Origin of EU imports**



Source: Eurostat



**Table 5: Clay products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.0	79.6	82.5	88.4	95.2	99.1	100.0	104.6	104.0	111.8
Unit labour costs index (3)	88.4	93.5	92.5	91.6	92.1	96.1	100.0	104.9	112.3	104.2
Total unit costs index (4)	91.0	95.0	89.9	88.1	88.6	94.9	100.0	108.2	113.8	108.4
Gross operating rate (%) (5)	14.8	15.1	19.0	21.3	24.4	23.5	21.1	20.2	19.2	22.1

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 6: Clay products**  
**The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Employment (units)
Redland	UK	1 893	21 538
Wienerberger	A	950	5 629
Hanson Brick	UK	600	3 000
Ibstock	UK	201	3 681
Tarmac Building Materials	UK	139	2 406
Erlus Baustoff	D	88	529
Karl Bachl	D	88	924
Scheerders van Kerchove	B	68	798
RDB Edilizia	I	68	531
Roeben Tonbaustoffen	D	68	650

Source: B.M. Coope and Partners

## INDUSTRY STRUCTURE

### Companies

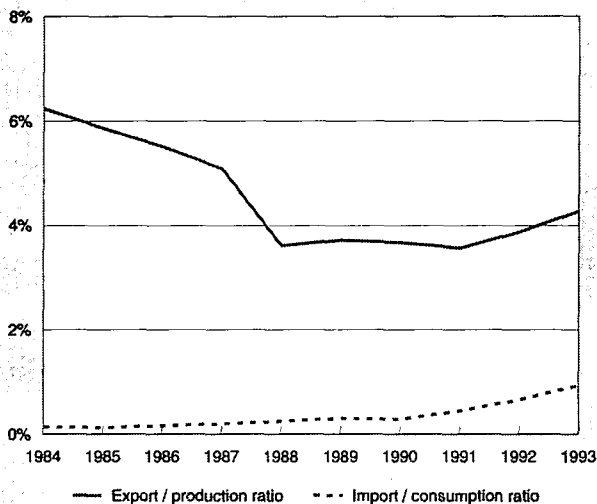
Throughout most of the EU clay brick and roof tile production is in the hands of small or medium-sized companies; many

still privately-owned. In Germany, France, Benelux, and Italy the bulk of production is conducted by companies with annual sales in the 20-60 million ECU range. Most of these companies are based on highly efficient units with modern plants. The relatively small size is a reflection of the localised nature of the market. Nevertheless, the process of concentration is gaining momentum.

Concentration is most advanced in the UK where the clay brick and tile industry is now dominated (in production terms) by the conglomerate, Hanson Industries (through its subsidiaries, London Brick Co. and Butterley Brick); by two major diversified construction groups, Tarmac and Redland; and the large brick specialist, Ibstock Johnsen. Other companies of note include: Marshalls, Baggeridge Brick, and the building products division of Hepworth. In recent years several of these companies have expanded their activities in to other EU countries by acquisition. Redland, in particular, now operates on a pan-EU scale with its brickmaking in Germany and Benelux handled through a joint venture with Koramic of Belgium and roof tile activities operated through Braas in Germany and Italy and Coverland in France.

Meanwhile, other prominent companies operating in the EU include: Wienerberger Ziegelindustrie, Karl Bachl, Erlus Baustoffwerke, Roeben Tonbaustoffe, Josef Meindl, and F V Muelner in Germany; Guiraud Frères, Huguenot Fenal, and Sturm in France; Scheerders Van Kerchove in Belgium; and RDB Edilizia, Industrie Bitossi, and Moccia Irme in Italy. In response to increasing productivity the total number of employees in the industry has fallen steadily with the employment index (1990 = 100) at a level of 85 in 1994 compared with 126 in 1984.

**Figure 8: Clay products**  
**Trade Intensities**



Source: DEBA

**Table 7: Clay products  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.67	1.29
Danmark	0.93	0.48
BR Deutschland	0.82	0.95
Hellas	N/A	N/A
España	1.23	1.32
France	0.50	0.43
Ireland	N/A	N/A
Italia	1.56	1.57
Luxembourg	0.00	0.00
Nederland	0.75	0.97
Portugal	2.70	3.55
United Kingdom	1.28	0.89

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

### Impact of the Single Market

The impact of the creation of the Single Market on the clay products sector has been significant and primarily positive. Traditionally the brick and roofing tile industries of Europe have been drawn on national and even regional lines but over the past 10 years there has been increasing intra-EU activity involving trade, technical harmonisation, and countries operating in more than one country. The levels are still modest compared to other industries but the creation of the Single Market is seen as a contributory factor to the process and the free movement of goods and services as relevant to future development. However, many national and regional characteristics will remain and will generally be perceived as contributing to the cultural variety of the Union rather than as continuing internal barriers to trade. Meanwhile key issues affecting the industry which should also be afforded future priority include energy deregulation, public procurement policies, and policies affecting small and medium sized enterprises.

### REGIONAL DISTRIBUTION

The location of brick and roof tile manufacturing facilities is governed by the location of suitable clay deposits and proximity to major centres of building activity. Deposits of suitable clays are widespread throughout the EU wherever sedimentary rocks are in evidence. Thus, most operations tend to be concentrated in low-lying regions rather than in upland or mountainous regions.

### ENVIRONMENT

The principal environmental issues concerning the clay products industry involve reparation of former clay workings and emissions from the firing process. However, claypit restoration is essentially a mining activity, (see Chapter 2) thus the central issue concerns firing. Most modern brickworks tend to use gas as fuel, if available, although coal, oil, and certain waste materials are also used where local conditions apply. Thus, attention must be paid to both gaseous and dust emissions. It should be noted that in recent years the clay products industry has successfully devoted much attention to energy saving techniques based on recycling of waste heat, insulation, and best practice operating methods.

### OUTLOOK

There are signs of renewed growth in brick production and consumption in the UK, where the slump in brick sales has been most marked in recent years, although growth in the housing market has been modest. Recovery in other EU countries (apart from eastern Germany) is currently fairly modest, but the brick and tile industry should enjoy strong demand in the latter part of the 1990s in accordance with a generally good performance by the construction industry. Overall recovery from the recession in Europe has been cautious.

Written by: B M Coope & Partners

The industry is represented at the EU level by: European Tile and Brick Federation (TBE). Address: Obstgartenstrasse 28, P.O. Box, CH-8035 Zurich; tel: (41 1) 361 9650; fax: (41 1) 361 0205.

# Cement

## NACE 242

Economic activity in Cembureau member countries recovered slightly in 1994 due to an improvement in the construction sector. Trends in consumption and production showed marked differences between EU Member States. With a recovery forecast in the construction sector for 1995, the outlook for the cement industry is improving.

### INDUSTRY PROFILE

#### Description of the sector

Activity in the cement industry is connected to construction activity and is closely linked to the general economic situation. Cement is an important basic material for building and civil engineering works, representing major public and private investment.

Cement production consists of two essential phases:

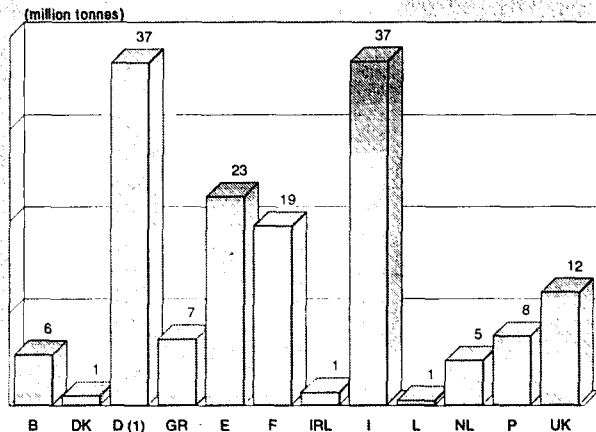
- manufacture of a semi-finished product, so-called "clinker", obtained from the calcination in a high-temperature kiln (1 450°C) of raw materials (clay, limestone, etc.) which are previously prepared in paste or powder form, depending on the production process used (i.e. wet or dry); and
- manufacture of cement as a finished product, obtained by the homogeneous mixture of the ground clinker and calcium sulphate with or without, depending on the type of cement, one or more additional components: slag, fly ash, pozzolana, filler, etc.

#### Recent trends

In 1993, EU consumption amounted to 157 million tonnes, about 12 % of world production compared with 21 % in 1980. EU cement production amounted to 158 million tonnes in 1993.

After high economic growth in Western Europe in 1987-89, economic activity slowed dramatically in the second half of 1990 and growth virtually ceased in the first half of 1991. Consequently 1991, 1992 and 1993 marked a heavy downturn in consumption of cement for a number of EU countries. In 1993, total EU cement consumption decreased by a further 8 %, an 11 % decrease since 1990.

**Figure 1: Cement Consumption by Member State, 1993**



(1) Includes former East Germany.

Source: Cembureau

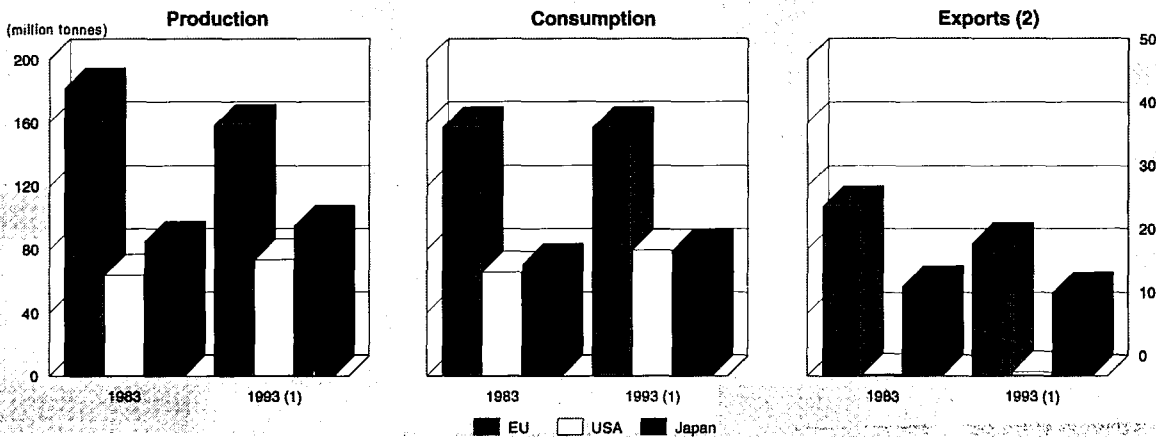
Differences in EU countries are, however, varied: Italian consumption decreased by 16 %, while French and Spanish consumption decreased by 11 % and 13 %, respectively. Germany, aided by the reconstruction works in the new Lnder, maintained its consumption, but increasing tonnage was imported from East European countries.

#### International comparison

World cement production has been estimated at 1 280 million tonnes for 1993. The major cement producing countries were: China (360 million tonnes), Japan (94.8 million tonnes), CIS (80 million tonnes, estimate), USA (74 million tonnes), India (55.8 million tonnes), South Korea (49.7 million tonnes), Italy (34.8 million tonnes), Turkey (32.7 million tonnes), Germany (32.5 million tonnes), Thailand (27.8 million tonnes), and Mexico (27.6 million tonnes).

In 1993 total world production of cement (excluding China) showed a slight decrease which was partly influenced by Europe. However, the overall market trend (including China) is increasing by about 3 %. European countries, as a whole, and Japan witnessed a new decline, while the USA showed an increase of about 6 %.

**Figure 2: Cement International comparison of main indicators in volume**



(1) Cembureau estimates.

(2) Exports to third countries.

Source: Cembureau



**Table 1: Cement**  
**Main indicators in volume (1)**

(million tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Consumption	150	145	148	154	167	175	176	172	170	157
Total exports	25	22	20	17	17	16	16	16	19	21
Trade balance (2)	19	15	13	7	5	1	0	-2	-3	1
Employment (thousands)	72	69	65	63	N/A	N/A	N/A	N/A	N/A	N/A

(1) From 1984 consumption data includes former East Germany.

(2) Total exports - total imports.

Source: Cembureau

**Table 2: Cement**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93
Consumption	3.3	-2.6	0.5
Total exports	-8.5	6.6	-2.1
Total imports	20.1	7.5	14.3

(1) From 1984 consumption data includes former East Germany.

Source: Cembureau

### Foreign trade

World trade in cement only accounts for about 6 % of total production, mainly due to the cost of ground transportation. The largest quantities are primarily distributed by sea and consumed at a limited distance from the port.

Moreover, foreign trade is marked by a very pronounced geographic polarisation. As in previous years, 40 % of imports were recorded in only six countries in 1993: the USA, Germany, Taiwan, Singapore, Spain and Italy, while more than 40 % of the world's exports came from five countries: Japan, Greece, Korea, Canada and Spain.

Japan increased its exports of cement by a further 14 % in 1993, with an export volume amounting to 13 million tonnes. In 1993, the USA, Taiwan and Germany each imported about 6 million tonnes. The amount of cement imported in Germany again increased, with tonnage coming mainly from Eastern Europe.

Recovery of consumption in the USA had a positive effect on their imports, which increased by 1 million tonnes to 7.1 million tonnes. However, the application of the ITC's (International Trade Commission) anti-dumping duties kept Mexican, Venezuelan and Japanese exports at 1992 levels.

Due to the consumption decrease in the EU, imports decreased slightly in 1993 to 20 million tonnes. However, the share of imports from Eastern Europe has increased four-fold since 1987, and continues to increase. Total imports from Eastern European countries represent about 13 % of EU consumption and about 30 % of total world trade. In 1993, imports increased in Spain and Italy up to 12.2 % and 8.5 %, respectively, of domestic consumption.

The EU's main exporter was Greece, exporting 50 % of its production.

### MARKET FORCES

#### Demand

As mentioned, consumption is linked directly to activity in the building sector and, more accurately, to investments made in residential and non-residential building and civil engineering works.

#### Supply and competition

EU capacity is currently more than sufficient to cover internal demand. Nevertheless, there is continued exposure to cement imports from East European and developing countries at artificially low prices (dumping conditions). Unfair competition from countries where environmental and social protection is non-existent could have a very damaging impact in the areas where these imports are concentrated. Consequently, the legal resources for defence against concentrated dumping at the borders have to be reinforced. Whereas overall economic harm to the EU may appear limited, the same does not hold true at the regional level where border dumping leads to a "knock-on" effect.

#### Production process

Productivity in the cement industry rose by about 30 % during the last ten years due to the introduction of more efficient and sophisticated production tools, with advanced automation of operations requiring higher qualifications from the staff.

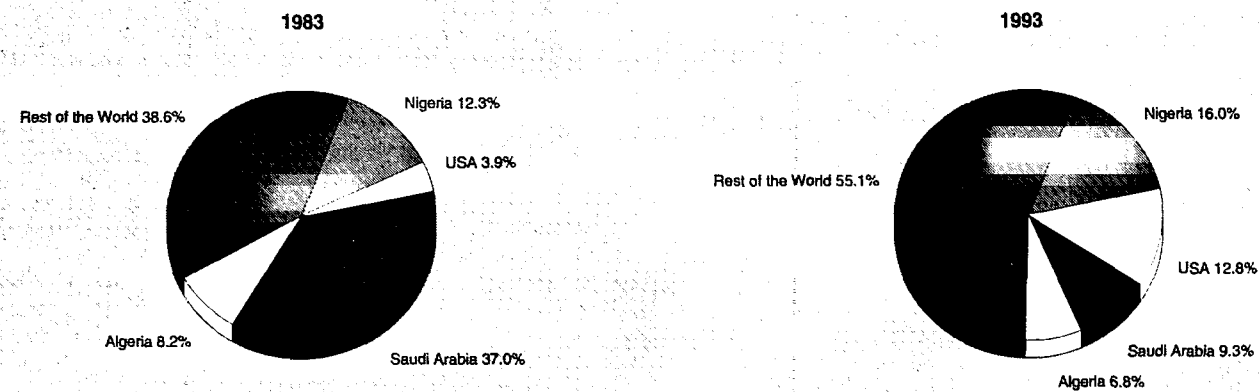
**Table 3: Cement**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	812.1	652.0	508.0	436.2	331.4	328.9	298.8	305.1	299.4	342.0
Extra-EU imports	28.3	34.2	39.6	48.5	118.7	161.6	219.6	281.5	348.2	347.7
Trade balance	783.8	617.9	468.4	387.7	212.6	167.3	79.3	23.6	-48.8	-5.6
Ratio exports/imports	28.7	19.1	12.8	9.0	2.8	2.0	1.4	1.1	0.9	1.0
Terms of trade index (1)	122.4	116.6	101.0	95.4	97.4	103.2	100.0	100.4	107.6	106.8

(1) NACE 242: includes cement, lime and plaster.

Source: Eurostat

**Figure 3: Cement  
Destination of EU exports (1)**



(1) Based on volume data, for Cembureau members.  
Source: Cembureau

Cement production requires large quantities of energy. Fortunately, significant advances have been made in recent decades in reducing the energy required to produce a tonne of cement. A recently published European Commission Report concludes that only a 2.2 % real energy saving potential exists within the cement sector. Average energy consumption per tonne of clinker produced in the EU today amounts to under 900 kcal/kg. However, this value may vary widely from country to country, depending on the production method applied. Energy consumption in relation to cement manufacture also depends on the policy pursued by the different national industries as regards investment and product development.

The industry continues its efforts to reduce energy consumption by:

- seeking cheaper energy (diversification of fuels); and
- rational use of energy (new manufacturing processes, development of composite cements, heat recovery, etc.).

## INDUSTRY STRUCTURE

### Companies

There are nearly 300 plants in the EU, belonging to 138 companies. Restructuring and market positioning of the leading companies is expected to continue.

There are no generally accepted criteria for ranking cement companies or groups, as both turnover and capacity can be defined in different ways. Published turnover in consolidated accounts may include non-cement activities and the existence of trading affiliates can lead to different quantities of cement being produced and distributed by a company. In addition, the calculation of capacity in part-owned companies can be treated differently.

Taking into account the above reservations, the largest operating companies in the world having cement interests in Europe are generally regarded to be (in alphabetical order): Blue Circle (UK), Cemex (Mexico), Dyckerhoff (D), Heidelberger (D), Holderbank (CH), Italcementi (I), Lafarge Coppe (F), Scancem (N/S).

### Impact of the Single Market

The impact of the creation of the Single Market on Europe's cement industry has been significant and positive. Cement companies tend to be large organisations with international operations and interests. For them the Europeanisation process was underway long before the Single Market programme was

introduced but it provides confirmation and a channel for future progress.

The transportation cost element associated with moving high-bulk, low-cost product by land means that most cement is consumed within 250 km of the point of production and thus intra-EU trade concerns less than 10% of total shipments. Nevertheless freedom of movement of goods is a highly relevant issue with particular reference to technical harmonisation, mutual recognition of rules, and competition policy.

As a major consumer of energy based on fossil fuels the cement industry regards the liberalisation of energy supply and pricing as highly important. Within this context indirect taxation and environmental protection issues are highly relevant with particular reference to the carbon tax.

The cement industry sees as future Single Market priorities the clarification of competition issues (dumping, subsidisation), and energy/environment factors, including the recognition by all parties that other countries must play the same rules.

## ENVIRONMENT

As public concern for the environment steadily increases, so does the activity of the EU Council, Commission and Parliament in tackling environmental issues.

A significant body of legislation is currently being developed which impacts on the industry. Particularly relevant to the sector are proposals for a CO<sub>2</sub>/Energy Tax, Integrated Pollution Prevention and Control, Waste Classification, and Incineration of waste and hazardous waste.

The industry has, at an operational level, invested heavily in environmental protection measures and strategically continues to work with the relevant legislators to develop appropriate legislative instruments in environmental protection.

## REGULATIONS

A European pre-standard for common cements, ENV 197-1, was adopted in 1992 by the members of CEN. This pre-standard will assist convergence of national standards as a full EN (Euronorm) is prepared. Pre-standard ENV 197-2 "Cement Conformity Evaluation", which sets out a European scheme for cement certification, was agreed by CEN members in 1994. Convergence of national certification schemes will now take place in anticipation of a final decision on the matter by the European Commission.

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## OUTLOOK

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Economic activity in Cembureau countries recovered slightly in 1994 with evidence of an improvement in the construction sector. According to Euroconstruct, the European construction sector shows flat output for construction in 1994 and a recovery of at least 2 % for 1995. The downward trend in demand for cement in the EU has apparently slowed down in 1994.

Written by: Cembureau

The industry is represented at the EU level by: Cembureau The European Cement Association. Address: Rue d'Arion 55, B-1040 Brussels; tel: (32 2) 234 1011; fax: (32 2) 230 4720.

# Precast concrete

## NACE 243.2

A fall in the precast concrete activity has been noted in most EU countries from 1990 onward. Precast concrete activity closely follows developments in the construction sector, which is virtually its only client. Drops in activity were strongest in France, Italy and the United Kingdom. Almost at the same time, a strong rise in precast concrete production was noted in Germany. Although the industry is mainly made up of small to medium-sized companies, some merger and acquisition activity has taken place. Stricter EU legislation on pollution control will influence the precast concrete industry, while the limited expansion possibilities for mining and quarrying might pose supply problems for the industry.

### INDUSTRY PROFILE

#### Description of the sector

The precast concrete industry is the collective name given to all enterprises that manufacture precast concrete products at specially equipped plants and which operate independently of weather conditions. Products are delivered to the construction sector ready to be put in place in building and road constructions, civil engineering works, etc.

Concrete is made from a mixture of sand, water, cement, gravel or other aggregates, and other possible additions. As an industrial sector, the precast concrete industry is situated between the suppliers (i.e. cement manufacturers and quarries) and the customers (i.e. the construction sector).

The precast concrete industry covers a wide range of products :

- products for road construction (paving flags, stones and blocks, kerbs, safety and sound barriers, sewerage and drainage pipes, accessories, etc.);
- elements for building construction (masonry units, cladding elements in architectural concrete, floor elements, beams and columns, wall elements for industrial, commercial and agricultural buildings, etc.);
- elements for civil engineering works (bridge girders, tunnel elements, etc.); and
- units for various other purposes such as flood protection, urban and garden landscaping, lighting poles, and agricultural installations.

Furthermore, the following general characteristics of the precast concrete industry can be highlighted :

- relatively low value-added content of certain mass-produced precast concrete units;

- strong dependence upon the efficiency of the business (i.e. the degree of mechanisation of the production process and the effectiveness of management); and
- a predominance of small and medium-sized businesses (in some countries the majority of the enterprises are still family-owned). Although some of these businesses have recently been bought up to form bigger concerns, the number of production sites remains largely unchanged (even after the inevitable rationalisation).

National and regional distribution in the EU precast concrete industry are very much interrelated and are influenced, to a large extent, by factors such as the demographic situation, climatic conditions and the traditional use of certain construction materials.

#### Recent trends

In 1993, it is estimated that turnover in the EU approximated 20 billion ECU and employment was at about 180 000.

In the industrialised countries, activity in the precast concrete industry largely depends on the overall economic climate and on activity in the construction sector in particular (99 % of production goes to the construction sector). However, trend differences can be observed between residential building, non-residential building and road construction (the latter absorbs roughly 30 % of precast concrete production).

In recent years, the general economic downturn has caused a considerable fall in overall precast concrete production, estimated at some 20 % (excluding Germany). However, the precast concrete industry is still doing well in Germany and this positive trend is expected to continue for the next few years.

Employment in the precast concrete industry follows overall production trends, but is more elastic, i.e. a considerable decrease in production does not necessarily lead to an equal drop in employment.

#### International comparison

Due to climatic conditions, prefabrication is in principle more developed in the northern countries. This explains the relatively high level of precast concrete activity in the Nordic countries. However, the recent economic crisis has had severe consequences for activity in Sweden and, especially Finland, where production in current prices has declined more than 50 % from 1990 to 1993.

Notwithstanding local competition from neighbouring East European countries, production volume in Austria remains satisfactory. Switzerland is a typically local industry with a very closed market which is probably due to the rather heavy weight of the product and the inherent transportation possibilities.

The level of activity in the North American precast concrete industry varies according to the product branch. However,

**Table 1: Precast concrete**  
**Main indicators by country in current prices, 1993**

	B	DK	D	F	I	NL	UK	FIN (1)
Turnover (million ECU)	730	N/A	4 900	1 722	N/A	1 000	N/A	186
Production (thousand tonnes)	8 800	2 400	59 990	27 049	20 420	N/A	N/A	N/A
Employment (thousands)	6.4	3.6	57.7	21.8	29	8.5	9.7	4.2
Number of precast concrete plants:								
Total	363	120	1 643	900	1 400	150	180	80
With 50 or more employees	22	18	324	60	135	50	N/A	N/A

(1) Turnover estimated.  
Source: BIBM



**Table 2: Precast concrete  
Production by country in current prices**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
Belgique/België	249	297	347	378	457	501	516	600	592	590	590
Danmark	320	387	392	384	365	360	318	318	285	N/A	N/A
BR Deutschland	2 082	2 280	2 402	2 628	2 942	3 338	3 774	5 091	5 100	5 200	5 356
France	1 216	1 322	1 405	1 561	1 667	1 788	1 819	1 745	1 722	N/A	N/A
Italia	1 530	1 460	1 530	1 640	1 820	2 010	1 980	1 670	1 180	1 400	N/A
Nederland	475	523	550	633	680	680	660	660	963	1 009	1 055
United Kingdom	1 852	1 821	2 094	2 731	3 012	2 747	2 368	1 626	1 623	N/A	N/A
Finland	320	308	370	435	549	556	370	207	210	210	230

(1) Estimated.

(2) Forecast.

Source: BIBM

large structural elements for industrial applications, large-diameter pipes and paving blocks seem to be the most successful products of the last decade, while concrete masonry units have recently recovered some of the attraction lost in the early 1980s.

### Foreign trade

Generally, precast concrete products are heavy and bulky in relation to value. The average value of one metric tonne of precast concrete product is approximately 100 ECU (but for some standardised non-reinforced products manufactured on a large scale, this value can be as low as 40 ECU). Consequently, long-distance transportation of precast concrete products is unusual and trade is mostly limited to a single border crossing. However, there are exceptions. For example, technologically, highly-advanced precast concrete products (i.e. sophisticated cladding elements in architectural concrete) and certain speciality products (i.e. high-quality decorative tiles).

## MARKET FORCES

### Demand

Activity in the precast concrete industry strongly depends on activity in the construction sector, which in turn is dependent on the overall economic climate. As a consequence, periods of high activity in the precast concrete industry are succeeded by low-activity periods which leads to costly overcapacity.

Another factor causing variations in activity levels is the financial situation of public authorities. Approximately one-third of construction sector activity covers public works

(involving road construction, civil engineering works, etc.). Consequently, when public authorities experience financial difficulties, the construction sector is impacted which in turn influences demand for precast concrete.

In the German precast concrete industry it is evident that the current high activity level is a consequence of the immense reconstruction operations in the former East German states.

### Supply and competition

The precast concrete industry faces competition from traditional construction procedures with an intensity that varies from country to country and which is closely related to the marketing skills of the local industry. Indeed a wide range of substitution products are offered ranging from classical materials, such as clay brick and timber, to newer materials, such as PVC and glass fibre reinforced plastics.

However, some precast concrete plants have considerably improved their competitiveness through an extensive mechanisation and automation process. These operations make it possible to significantly compress the cost per unit. As a consequence, these plants have become competitively operational over a much wider geographic area. Moreover, the price of precast concrete products could be kept down to a remarkably low level, thus securing precast concrete products a strong position against substitution products.

Depending on their type, precast concrete products are either distributed by direct sale to building contractors, which accounts for at least 80 % of the total output, or through the sale to building material retailers, which accounts for the remaining 20 %.

**Table 3: Precast concrete  
Employment by country**

(thousands)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
Belgique/België	5.3	5.0	5.1	5.3	5.7	5.9	6.3	6.4	6.4	6.3	6.2
Danmark	4.0	4.3	4.8	5.0	4.9	5.8	3.4	4.0	3.6	N/A	N/A
BR Deutschland	43.6	42.3	43.2	43.7	44.1	46.5	49.9	51.6	57.7	51.0	50.0
France	23.6	23.3	23.3	23.7	24.2	24.6	24.1	23.6	21.8	N/A	N/A
Italia	19.2	19.0	23.0	25.0	37.5	38.7	35.3	32.7	29.0	27.6	24.2
Nederland	7.9	7.7	7.6	7.6	8.0	8.0	8.2	8.5	8.5	8.5	8.5
United Kingdom	13.0	13.0	13.0	13.5	13.0	12.5	11.0	9.7	9.7	N/A	N/A
Finland	7.0	6.9	6.9	7.2	8.1	8.4	7.0	4.8	4.2	4.0	4.1

(1) Estimated.

(2) Forecast.

Source: BIBM



**Table 4: Precast concrete  
Average hourly wage costs by country**

(ECU)	1985	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
Belgique/België	13.0	14.4	14.7	15.1	16.3	17.2	19.0	19.5	20.0	N/A
Danmark	8.5	10.1	11.0	11.0	15.0	15.6	16.0	17.0	N/A	N/A
BR Deutschland	11.8	13.2	13.6	14.2	15.0	16.1	17.9	18.1	18.5	20.0
France	8.4	9.1	9.4	9.8	10.4	10.7	12.0	8.2	N/A	N/A
Italia	9.7	10.9	11.2	12.6	13.3	15.8	13.9	19.5	20.4	N/A
Nederland	15.4	16.4	16.7	17.0	17.0	17.9	18.5	19.0	19.2	19.3
United Kingdom	N/A	N/A	N/A	N/A	N/A	8.5	8.8	N/A	N/A	N/A
Finland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14.0	14.3	14.4

(1) Estimated.

(2) Forecast.

Source: BIBM

## Production process

Over the last fifty years, mechanisation has changed the face of the precast concrete industry considerably. Before and in the first years after World War II, the manufacture of concrete was essentially a handicraft trade. Moreover, the material was mainly used for non-structural applications and was not reinforced.

Technological developments in the early 1960s in reinforced and prestressed concrete led to breakthroughs of various plant-manufactured structural elements for building construction and civil engineering. At the same time, light-weight concrete was applied in the precast concrete industry for the manufacture of masonry units, and wall and floor elements.

The construction boom in the late 1960s and early 1970s, as well as, the increase in building costs, led to a further industrialisation of the precast concrete industry. Profits were reinvested in to both plants and modern machinery, such as semi-and fully-automated batching and manufacturing equip-

ment. In addition, handling, packaging and transporting techniques were revolutionised.

Recent developments in the automation process (including the use of sophisticated soft-ware) have brought the industry to a new level of technical excellence which has further increased productivity.

The following are particular technological aspects for precast concrete manufacturing:

- precast concrete products are manufactured at a plant with a permanent location in controlled conditions;
- production is based on a proper scientific concrete technology, such as the use of 0-s slump concrete, hot concrete and pretensioning techniques, particular moulding and compaction techniques and accelerated hardening techniques;
- advanced quality control, which goes beyond the checking of the fresh concrete. Quality control includes the control of: dimensional accuracy, the properties of the hardened

**Table 5: Precast concrete  
Intra-EU trade**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
Belgique/België, Luxembourg											
Value (million ECU)	34.2	42.7	46.3	55.4	63.6	74.7	70.5	69.9	85.0	100.0	N/A
Quantity (thousand tonnes)	735.0	783.0	782.0	953.0	1 003.0	983.8	976.0	921.3	1 043.0	1 050.0	N/A
BR Deutschland											
Value (million ECU)	50.7	47.8	51.0	49.4	64.2	82.5	117.4	190.8	200.0	200.0	200.0
Quantity (thousand tonnes)	400.0	447.0	433.0	417.0	521.0	599.0	782.0	1 382.0	1 495.0	1 495.0	1 495.0
France											
Value (million ECU)	51.6	62.4	69.7	84.9	100.6	104.1	107.4	N/A	N/A	N/A	N/A
Quantity (thousand tonnes)	550.7	645.5	678.6	822.1	891.7	843.7	872.0	N/A	N/A	N/A	N/A
Nederland											
Value (million ECU)	N/A	N/A	N/A	N/A	N/A	N/A	85.0	92.3	90.0	95.0	100.0
Quantity (thousand tonnes)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
United Kingdom											
Value (million ECU)	N/A	13.0	16.0	26.0	31.0	46.0	32.8	25.1	N/A	N/A	N/A
Quantity (thousand tonnes)	N/A	48.3	51.3	93.4	123.2	93.4	64.2	57.8	N/A	N/A	N/A

(1) Estimated.

(2) Forecast.

Source: BIBM



**Table 6: Precast concrete  
Cement consumption (1)**

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)
Belgique/België	17.4	18.0	18.6	21.0	21.3	22.2	22.2	24.0	24.0	24.5	24.5
Danmark	44.0	45.0	45.0	41.0	41.0	40.0	40.0	41.0	41.0	N/A	N/A
BR Deutschland	26.0	26.0	26.0	26.0	25.0	26.0	27.0	27.0	28.0	28.0	28.0
Hellas	3.4	N/A	1.0	1.9	2.0	2.0	N/A	N/A	N/A	N/A	N/A
España	N/A	11.0	16.0	20.0	21.0	22.0	N/A	N/A	N/A	N/A	N/A
France	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	N/A	N/A
Irland	29.0	27.0	27.0	27.0	29.0	N/A	N/A	N/A	N/A	N/A	N/A
Italia	13.3	13.3	13.2	13.1	13.1	15.0	15.0	12.0	14.0	14.0	N/A
Luxembourg	12.0	14.0	16.0	19.0	N/A	9.9	N/A	N/A	N/A	N/A	N/A
Nederland	34.0	35.0	37.0	38.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Portugal	11.1	10.5	10.8	10.7	11.1	10.6	N/A	N/A	N/A	N/A	N/A
United Kingdom	24.4	27.3	25.0	25.0	26.0	27.0	26.5	26.0	26.5	N/A	N/A
Finland	45.0	45.0	43.0	52.0	53.0	47.0	36.0	29.0	26.0	26.0	28.0

(1) Percentage of cement consumption by the precast concrete industry in the total national cement consumption.

(2) Estimated.

(3) Forecast.

Source: BIBM

concrete, and the position of the reinforcements. Control is done before the product has been incorporated into construction. This important factor should be taken into account when comparing precast concrete with other, traditional building methods; and

- not only are manufacturing methods and plants highly automated, but production is also characterised by an ever increasing level of industrialisation and standardisation.

These specific and scientific approaches in concrete technology help to guarantee a high and consistent quality of precast concrete products.

Basically, most "new" products in the precast concrete industry are evolutions of existing elements. Nevertheless, the industry has also developed (and is successfully marketing) valuable solutions in areas relating to environmental problems. One such development is sound barrier walls to protect residents living near highways or railways from noise hindrance.

## INDUSTRY STRUCTURE

### Companies

As already mentioned, the precast concrete industry remains predominantly composed of small to medium-sized enterprises (which in some countries are still family-owned), in spite of a recent rationalisation movement. This movement has been spurred on by two concurrent factors. First is the fragmentation of family-owned businesses (that had grown to considerable sizes since World War II) due to succession problems. And, second, in the context of the Single Market, is the trend towards concentration in view of allowing large construction companies to control supplies on the foreign markets they enter, or creating concrete companies large enough to deal with the big construction companies on an internationalised market.

The rationalisation movement inevitably reduced the total number of enterprises, but not to the extent expected. Most production sites remained in business, mainly because of the rather heavy weight of many precast concrete products and the transportation costs involved. For instance, after a company in one of the bigger countries had bought up 25 smaller enterprises, some 15 remained operational.

Even though there is not complete information on EU employment in the precast concrete industry, a reasonable estimate is around 180 000 people. The number of employees

is spread over nearly 5 000 precast concrete plants, of which approximately 600 employ more than 50 people.

Following years of growth up to 1990, employment has now come to a relative standstill in some countries. However, in some countries, such as the Nordic countries, the United Kingdom and Italy, it is falling as a consequence of the economic situation.

On the labour market, wage costs have risen in recent years as a result of reduced working hours, as well as, a shortage of skilled labour. The overall average hourly wage cost in 1993 was approximately 18.5 ECU. Skilled manual workers constitute about 25 % of employment in the precast concrete industry. These workers are involved in special production procedures such as reinforcement steel bending and netting and the finishing of architectural concrete (e.g. polishing).

In recent years, technological developments and automation have given rise to a considerable demand for highly qualified labour skilled in the latest technologies. In several Western European countries the limited number of these labourers are in high demand, as younger school graduates do not appear to be strongly attracted towards this occupation. To cope with the problem, the industry has set up specific programmes ranging from training courses for young adults and/or unemployed people, the publication of manuals, and campaigns designed to improve both the image of the industry and the attractiveness of jobs in precasting. For example, the industry in Germany regularly organises a nation-wide promotion day offering younger people the opportunity to visit precast concrete plants.

### Strategies

As mentioned, some degree of concentration has occurred in the industry in recent years. Besides mergers and acquisitions, the industry also aims to increase productivity (estimated to have risen by roughly 50 % over the last fifteen years) and improve quality. Towards these goals, the precast concrete industry has raised fixed investment by about 50 % from 1985 to 1993. These investments reflect significant efforts towards innovation in the sector and involve not only replacement of older equipment and installations but also an increase in capacity, thus enhancing the competitiveness of plants.

Precasters have also become aware of the market advantages of guaranteeing the adequate durability of products (implying both soundness and long-term appearance) and improved de-

sign. Hence, the active participation of the industry in EU harmonisation, certification and standardisation work in view of the implementation of the Construction Products Directive; the CE quality label.

Technological evolution also constitutes as an influential factor. Indeed, the technical realisation of new types of beams or girders with, for instance, larger spans would automatically create a higher demand for these structural elements. Furthermore, certain technological innovations that help avoid the carrying out of complex and difficult tasks on traditional building sites enable the precast concrete industry to offer attractive and efficient solutions to builders; e.g. elements for railway bridges with incorporated railway tracks.

### Impact of the Single Market

The impact of the creation of the Single market on the precast concrete industry has not been great but is regarded as positive due to the effect on general economic activity in the construction sector. Trade between countries tends to be limited since most of the products are large and heavy but some of the more specialist items do cross both intra-EU and extra-EU borders. Thus the freedom of movement of goods, services, and capital are all seen as relevant.

Where the Single Market is seen to have had the greatest effect is in the area of technical harmonisation, standardisation, and certification. This is seen as particularly important to the future development of the industry in Europe. Since the industry is largely made up of small to medium sized enterprises (often family-owned companies) issues concerning SMEs (access to finance and a lowering of the administrative burden) are highly relevant.

### REGIONAL DISTRIBUTION

National and regional distribution are narrowly intertwined.

The precast concrete industry is particularly important in the Federal Republic of Germany, relatively important and advanced in the Netherlands and Belgium, and, to some extent, in France and northern Italy. In some countries, there is a higher concentration of the precast concrete industry in certain regions; e.g. the South West of the United Kingdom.

Geographical factors also play an influential role in the precast concrete industry. The more densely populated a region, the more important and developed the precast concrete industry tends to be because these regions have a higher demand for building, water and road construction. Since precast concrete products are heavy and costly to transport, production takes place near the centre of demand. An example of this is the triangle of dense population in Belgium, the Netherlands and Germany, in contrast to the more sparsely populated regions in central France and Spain.

Climatic conditions also play an important role. In general, the further north a country is situated, the more developed its precast concrete industry. Traditional building activity in northern countries often has to be suspended during the winter due to bad weather conditions, while precast concrete products allow uninterrupted building activity.

Traditional use of certain construction materials has influenced the degree of development and strength of the precast concrete industry in various Member States. In the Netherlands, for example, a boom began for precast concrete pavers when traditional clay pavers became too expensive. This secured the Dutch paving industry a strong position which allowed large-scale production at a favourable cost. Another result of this situation was that transportation beyond The Netherlands' borders became possible. By contrast, the British precast concrete flooring industry has encountered great difficulty in breaking into the traditional timber floor market for low-rise housing.

The percentage of the precast concrete industry in total national cement consumption illustrates the actual penetration of the precast concrete products on the construction market. It shows a rather positive trend in most countries; especially in countries where the industry has successfully commercialised its precast concrete solutions. Indeed, by producing certain construction materials at fixed plant sites, instead of at building sites, construction costs may be significantly reduced.

### ENVIRONMENT

EU legislation on pollution control will have its influence on the precast concrete industry. National legislation concerning environmental protection is particularly aimed at reducing emissions from the raw materials and manufacturing industries. Hence, considerable know-how and capital investment in environmental protection are required of these industries. By means of modern techniques (such as waste-water treatment installations) the pollution of air, water and soil may be controlled notwithstanding growing production. Modern techniques will thus help dissociate industrial production and economic growth from environmental exploitation.

In the precast concrete industry, a noise problem may occur as increasing urbanisation encroaches upon precast concrete plants. However, the industry has already recorded some success in reducing noise levels. Unfortunately, machine manufacturers are not sufficiently aware of the problem and generally only take action when pressed by their clients, the precast concrete manufacturers.

Increased restrictions on gravel extraction, anticipated in a number of Member States, could affect the concrete industry by rendering raw material supplies more difficult in the long term. Raw material shortages might arise in some countries. In addition, the quarries supplying the precast concrete industry with sand and aggregates are either forbidden to extend further, or are threatened with closure. Since about 80 % of concrete is made up of sand and aggregates (1 m<sup>3</sup> concrete requires two tonnes of these raw materials), this may cause serious short-term problems, not only for the precast concrete industry but also for the construction industry as a whole.

Consequently, certain research programmes are being conducted with the aim of recycling concrete debris, crushed concrete and waste concrete. Due to requirements for high-quality inputs, however, the precast concrete industry has only limited opportunities for using such recycled materials. Moreover, high-quality aggregates are also a prerequisite to meeting the stringent performances demanded of precast concrete products. Furthermore, these aggregates play an important role in one of the major advantages of precast concrete, i.e. smaller dimensions of the components which reduce their weight, improving transportation costs.

### REGULATIONS

The Single European Market and the coming into effect of the Construction Products Directive (CPD) have emphasised the urgency of work on harmonisation, standardisation and certification.

Adoption of common standards and quality certification systems at the EU level are essential for the precast concrete industry. Consequently, the industry has a preference for the most stringent level of attestation of conformity involving product certification by an approved third party. Such certification would help to maintain client confidence in the high quality of the products, improve the quality image of the concrete products, and reduce the chances of having regulatory attestation exist next to a voluntary certification system.

Unfortunately, competent EU bodies do not share this view, but instead opt for a low-cost conformity attestation. This attitude is most regrettable since it could impede development of high-quality products.

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## OUTLOOK

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In general, 1994 and 1995 are expected to show mixed results in various Member States. Steady growth is foreseen in Germany and a near status quo in Belgium and the Netherlands, while France recovers slowly from a deep recession. In Italy, however, the situation is still rather bad and expectations remain low. This situation also applies to other Mediterranean countries due to an overall unfavourable economic climate which is discouraging investment in industrial buildings and, to a large extent, in private housing. As mentioned, activity in the precast concrete industry is largely dependent on construction activity. Thus, any improvement there will have a favourable impact on the economic situation in the precast concrete sector. The specific advantages of using precast concrete products for construction will, in the medium to long term, inevitably result in a larger share of the sector in overall construction volume.

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# Ready mixed concrete

## NACE 243.6

With falls in production throughout Europe being more prevalent than increases, overall production fell by 9 % in 1993. Prospects for the immediate future will do well to recover this loss in production in the short term. The industry continues to work hard to ensure that current and prospective EU regulations will be those that the industry can meet in the normal course of business.

### INDUSTRY PROFILE

#### Description of the sector

The ready mixed concrete industry covers the off-site manufacture of fresh, unhardened concrete and its transport to the location where it is placed. It is, by definition, a local industry offering little or no potential for trade, even within the EU. In fact, the fresh product can only be transported for short distances, seldom more than a few tens of kilometres.

The European ready mixed concrete industry is a relatively new industry which has contributed substantially to the modernisation and efficiency of the building construction industry in each country. Although the use of concrete goes back to Roman times, the production of ready mixed concrete from an exclusively designed plant probably started at the beginning of this century with Germany leading production in 1903, followed by the USA in 1913. More widespread use of the product developed when the UK and France established their industries in the early 1930's. Today there are few countries in the world which do not have a ready mixed concrete industry.

Over the life of its 27 year existence, European Ready Mixed Concrete Organization (ERMCO) members have concerned themselves with improving the quality of their product and ensuring that concrete is designed for the purpose specified. They have also sought means for improving the marketing of the product against its main competitors: wood, bricks and steel.

#### Recent trends

The year under review is the second year following the completion of the European common market standards and the removal of many technical barriers to trade. Attendant activities have mainly been concerned with the drafting of EU directives covering construction products, certification and testing, and Eurocodes and CEN standards for concrete. These documents place a great emphasis on quality and should enable the standards already achieved by the industry to be fully recognised.

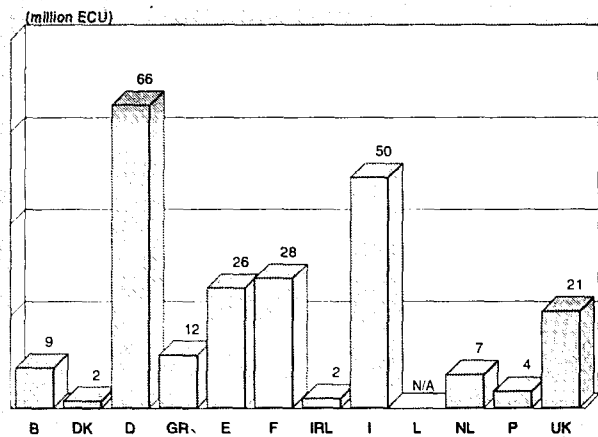
Production by EU Member States during calendar year 1993 totalled 225.58 million cubic metres, a fall of 9 % compared with the previous year. For the immediate future the industry will do well to recover to its earlier levels.

### MARKET FORCES

#### Demand

After the long period of uncertainty brought about by the Gulf war and the break up of the former Soviet Union, there is now a more hopeful and optimistic spirit in Europe. The general relief towards the end of 1993 at the completion of the Uruguay Round of the General Agreement on Tariffs and Trade has been followed by positive signs, including the continuing Israel/Palestine peace initiative, the possible end to

Figure 1: Ready mixed concrete  
Production volume by Member State, 1993

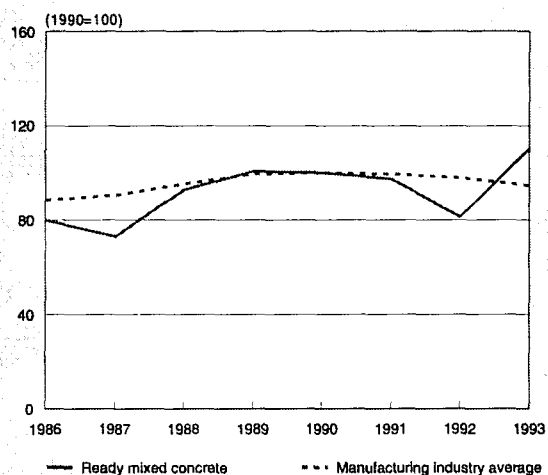


Source: ERMCO

hostilities in the former Yugoslavia and tentative improvements in the East European economies.

All this has led to a mood of growing confidence in the minds of authorities and businesses alike. As the overall level of trade struggles to improve, the European ready mixed concrete industry is ready to meet any increases in demand. ERMCO continues to be active in representing and defending the interests of the industry in the fields of Industry Policy, Standardisation, Certification and the Environment. However, any improvement in consumer confidence has yet to be reflected in increased construction investment and from there to production levels of the European ready mixed concrete industry. In addition, the future outlook is not evenly spread among Member States: while some countries are emerging from recession, many of the others, which have suffered recession for several years, are only hoping for a return to equilibrium in the year ahead. Likewise, the high level of unemployment still depresses the whole European economy, while inflation rates are, for the most part, at their lowest point for many years.

Figure 2: Ready mixed concrete  
Production in volume compared to EU manufacturing



Source: ERMCO, Eurostat

**Table 1: Ready mixed concrete  
Production by country**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	N/A	N/A	6 719	6 141	7 808	8 454	8 407	8 198	6 850	9 278
Belgique/België	N/A	N/A	199	230	259	274	309	344	358	468
BR Deutschland	2 307	2 072	2 072	1 988	2 248	2 386	2 413	2 441	2 350	3 723
Hellas	N/A	N/A	405	339	456	527	367	206	150	176
España	430	N/A	517	434	580	580	672	765	N/A	N/A
France	1 069	1 132	1 155	1 041	1 422	1 510	1 623	1 737	1 731	2 159
Irland	71	85	86	87	97	114	71	28	68	76
Italia	1 125	1 350	1 256	1 064	1 437	1 724	1 429	1 133	900	987
Nederland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portugal	N/A	N/A	N/A	N/A	N/A	N/A	180	197	182	204
United Kingdom	1 064	1 122	1 029	958	1 309	1 339	1 343	1 347	1 111	1 485

Source: ERMCO

## INDUSTRY STRUCTURE

### Companies

The ready mixed concrete industry is a fragmented one, which not being organised into large monopolistic groups, can never achieve a dominant position in the market. Ready mixed concrete producers are typical of SMEs (small and medium enterprises) in Europe.

Despite its importance to the European economy, producers of ready mixed concrete occupy a very weak position between their customers and raw materials suppliers. On the one hand, their customers (contractors) can always manufacture their own concrete if they choose; while, on the other hand, ready mixed producers are totally dependent on supplies of cement and aggregate from producers of major groups who do not tolerate late payments.

A limited amount of progress has been made in the past year concerning the growing practice of payment delays by Public Administrations and Authorities for work done by the Prime Contractor. As a consequence of delayed payments, contractors are deferring payments to sub-contractors and suppliers to

the extent that the continued financial viability of many SMEs is being seriously threatened.

In its position paper submitted to the DGXXIII, Enterprise Policy and Distribution Trades, ERMCO strongly supports the introduction of a Community legal framework governing payment periods. Over the last year or two, ERMCO members have noted a marked increase in payment delays, some as long as 150 - 200 days. It must be explained that although the ready mixed concrete industry's main customers are private contractors and builders, some ready mixed concrete companies also sell directly to local and national public authorities. During the course of the year, the Directorate General XXIII, Enterprise Policy, Distribution Trades, started its own enquiries into such delays, which after consideration, resulted in a favourable resolution in the European Parliament. The subsequent public hearing on the subject resulted in, among a variety of other proposals, a proposed ERMCO sector agreement between the industry's suppliers and their customers. The proposals put forward have received an encouraging response from the Director General of DGXXIII.

**Table 2: Ready mixed concrete  
Start up, production and consumption**

	Start of production	Number of plants (1)		Production (2)		Consumption (3)	
		1992	1993	1992	1993	1992	1993
Belgique/België	1956	235	240	8.30	8.75	0.83	0.88
Danmark	1926	100	95	1.70	1.50	0.31	0.27
BR Deutschland	1903	2 193	2 527	57.60	65.80	0.72	0.81
España	1942	803	803	33.00	26.00	0.74	0.74
Hellas	1968	430	430	11.50	11.50	1.15	1.15
France	1933	1 600	1 570	31.70	28.15	0.56	0.50
Irland	1961	142	142	2.10	2.05	0.60	0.58
Italia	1962	2 500	2 500	70.00	50.00	1.23	0.88
Nederland	1948	195	194	7.66	7.20	0.50	0.50
Portugal	1966	113	128	3.50	3.60	0.40	0.40
United Kingdom	1930	1 150	1 125	20.78	21.03	0.35	0.35
EU (4)		9 461	9 754	247.84	225.58	N/A	N/A
Japan (5)	1950	5 354	5 354	185.00	162.93	1.8	51.58
USA	1913	10 000	4 500	140.00	184.13	0.62	0.71

(1) Units.

(2) Million cubic metres.

(3) Cubic metres per head.

(4) Excluding Luxembourg.

(5) Latest figures available.

Source: ERMCO

## Impact of the Single Market

The creation of the Single Market has had little direct impact on the ready-mixed concrete sector in Europe. There has been an indirect impact, however, since the construction industry in general has benefited from the greater economic activity ascribed to Single Market measures. Not surprisingly some of the larger construction materials companies who include ready-mixed concrete amongst a range of interests see the Single Market as more relevant than small or medium sized companies operating in one country or region.

The local nature of the industry and the short distances involved in supply of the product means that the European dimension tends to focus on technical factors such as common standards, quality control, and environmental protection. The process of discussion of these issues was well advanced before the Single Market programme. With regard to the future, improved access to finance for small and medium sized enterprises is an important issue.

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## ENVIRONMENT

ERMCO was early to recognise, through the establishment of its Environment and Consumers Task Group, that environmental performance and energy conservation would become major political/economic issues in Europe. Already, the Environmental Check List has formed the basis of many ERMCO policies and has received an emphatic welcome throughout those countries which have ERMCO representation. Liaisons have also extended further afield, notably to the United States and to Canada, where exchanges of documents have ensured that all knowledge is pooled.

Guide-lines on pollution control seek to ensure improved management and control of production processes including a system of licensing, linking all aspects of the chain of production and its use of resources. Efforts are being made to ensure a level playing field whereby site contractors, currently excluded from many technical and environmental controls, will be required to comply with the full range of environmental controls and waste management. This would ensure that site mixed, ready mixed and precast concrete are all subject to the same rules.

ERMCO has concluded that the question of CO<sub>2</sub>/Energy Tax is more related to cement production than to concrete; but, nevertheless has given its support to various submissions by Cembureau. It is considered that ready mixed producers can help achieve various targets by taking reasonable steps to include the use of less cement with more efficient mix design and replacement materials. The threats and opportunities of such taxes would significantly increase both cement costs and transport costs, but the present tax proposals could give concrete the opportunity to be promoted as a low-energy intensive product.

The launch of the European Environmental Agency with a set of priorities to coordinate information in areas of interest to the ready mixed concrete industry could be an arena for ERMCO to register its interests.

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## REGULATIONS

Basic policies for ERMCO Members cover the main aspects of Standardisation and Certification.

For Standardisation, the same standards must apply to all types of concrete including ready mixed, site mixed and precast. For efficiency and economy, standards should, whenever possible, be expressed in performance terms. The industry's technical experts maintain a strong presence on the key CEN Committees and Working Groups and actively disseminate these policies.

Progress has been made in the past year by the European Standards Technical Committee (CEN/TC104) by achieving a majority vote for the pre-standard document prENV206 for concrete (including water, admixtures, additions and execution). To reach this compromise Agreement, in a number of cases, the pre-standard makes reference to national standards or regulations valid in the place of the use of concrete. Under CEN Rules, the pre-standard has only a limited life before a fully harmonised European Concrete Standard, document EN206, must be agreed. It is ERMCO policy to apply the same standards and principles to all types of concrete. It is also ERMCO policy that the ready mixed industry should not be asked to achieve standards which are technically inappropriate and commercially unrealistic.

Certification policy states that all concrete, including site mixed (contractors) concrete, ready mixed and precast concrete should be subject to the same levels of Quality Control and Attestation of Conformity.

Unfortunately, the past year has seen a marked slow down of progress on Certification matters. Few, if any, Member States have been able to fully implement the Construction Products Directive (CPD). One of the main difficulties has been the lack of direction on Attestation of Conformity given by the Standing Committee for Construction, which is responsible for the implementation of the CPD. Various ways and means of trying to solve this matter have been suggested, but further guidance from the Standing Committee is still awaited.

ERMCO priority tasks in the short/medium term still remain the preparation of a quality system for ready mixed concrete and the determination of an appropriate level of Attestation of Conformity. A framework document of the former has been prepared and approved by the ERMCO Meeting of Representatives. This will be circulated to all Members for use as a reference document to compare with existing factory production control procedures, or when preparing new ones. This document will, in due course, be submitted to CEN/TC104 for inclusion in EN206.

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## OUTLOOK

The economic picture ahead indicates that the industry is poised and ready to meet increases in demand as trade struggles to improve. However, before the production levels of the ready mixed industry can appreciably increase, there needs to be an improvement in construction investment. Fortunately, the EU Growth Initiative has been of valuable assistance in encouraging investment in infrastructure and several Member States are benefiting from temporary loans.

The ready mixed industry, through the individual Members of ERMCO, is playing a significant role in establishing realistic standards for concrete manufacture, quality control and environment protection.

Nevertheless, annual production of EU Members of ERMCO will do well to recover this years drop in production over the next three years.

Written by: ERMCO

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# Glass

## NACE 247

The EU is the world's largest glass producing and consuming region. After a period of restructuring and technological advance during the 1980s the EU industry is modern, efficient, and competitive in world markets. Good steady growth during the 1983-91 period was temporarily halted in 1992/93 but resumed in 1994 and is likely to continue. The industry has an excellent environmental record and is at the forefront of recycling developments. Although the new relationship with Eastern Europe is creating some problems of low-priced competition to EU producers they are likely to be outweighed by the mutual benefits of an expanded European market in the later 1990s.

### INDUSTRY PROFILE

#### Description of the sector

The glass industry can be divided into five main sections -- container glass (consisting primarily of glass bottles and also known as hollowware), flat glass (consisting primarily of window glass), tableware (domestic glass), glass fibre (for insulation and reinforcement), and special glass (such as optical and industrial glassware). In tonnage terms container glass accounted for 65 % and flat glass 25 % of total EU glass production of 22.9 million tonnes in 1993.

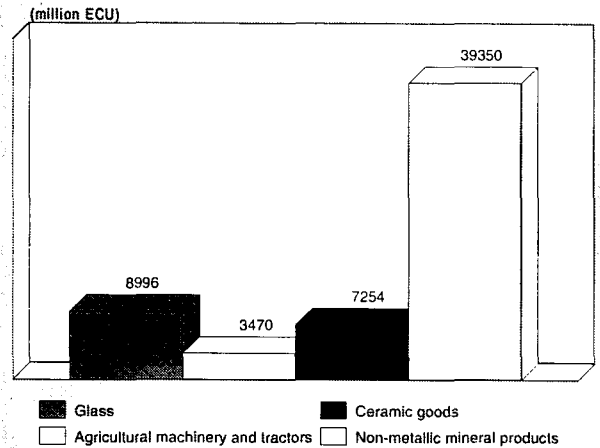
The principal raw materials for glass manufacture are mineral products such as silica sand, limestone, dolomite, soda ash, feldspathic materials, and borates as described in Chapter 2. The principal consuming industries are food and beverage processors (for container glass) and construction and motor vehicle industries (flat glass) although the full range of glass products find important applications across the whole spectrum of industry and construction as well as direct consumer items. By any reckoning the EU glass industry is a major sector, vital to the overall EU economy. The major producing countries are Germany, France, the UK, Italy, Spain, and Belgium.

#### Recent trends

The EU glass industry has displayed excellent growth - with production averaging 2.1 % and consumption averaging 2.7 % per annum in real terms - during the 1984-93 period. After falls in both production and consumption in 1993 there was strong growth of 4.3 % in 1994. The industry maintained a healthy trade balance with an annual average 12 % of production value being exported during 1984-93. However, imports have grown faster than exports, accounting for 8.7 % of consumption in 1993 compared to 6.8 % in 1984.

It should be noted, however, that different segments have behaved differently over the 1984-93 period. Average growth in production volume for the two major sectors - container glass and flat glass - was almost identical at around 2.5 % per annum but whereas flat glass growth was continuous (apart from a downward blip in 1991) the containers sector growth has been more irregular. Indeed 1993 container production at 14 932 000 tonnes represents a 3 % fall from the peak achieved in 1991. The best growth has been experienced in the speciality glass sector (including optical and industrial glasses) where growth has been continuous and has averaged over 4.5 % per annum. Growth in reinforcement fibres was strong (7.5 % per annum) during 1984-90 but has since declined. Meanwhile a recent decline in the tableware sector (9 % by volume between 1991 and 1993) has brought production down to levels only marginally above 1984-85 levels.

Figure 1: Glass  
Value added in comparison with related industries, 1993



Source: DEBA

#### International comparison

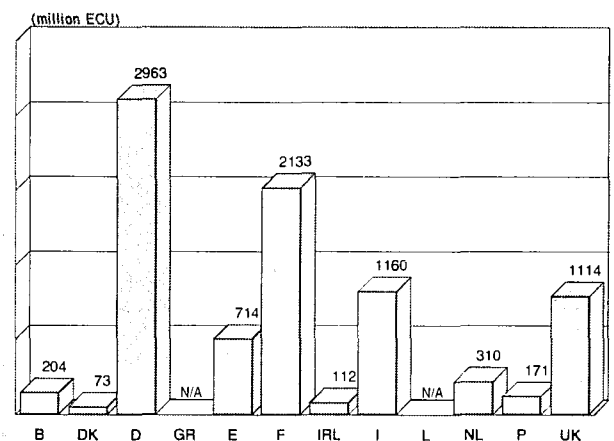
The EU is the world's largest glass producer with a total output of 22.9 million tonnes valued at 21.1 billion ECU in 1993. US glass production was just over under three-quarters and Japanese production just over two-thirds of the EU total in 1993. However, Japanese production has grown the fastest over the 1984-1993 period and the country now has a higher per capita output figure than either the EU or the USA.

#### Foreign trade

As suggested earlier, foreign trade plays an important though not dominant part in the EU glass market. Exports were of greatest importance to the tableware sector (where over 30 % of production was exported to non-EU destinations in 1993) and of least importance to containers (where the equivalent figure was less than 3 %). In between were the fibres and special glass sectors (20-25 %) and the flat glass sector (10 %).

Not surprisingly the tableware sector also records the strongest trade balance and export/import ratio - 131 000 tonnes and 1.9 respectively. Nor is it surprising that the trade balance

Figure 2: Glass  
Value added by Member State, 1993



Source: DEBA



**Table 1: Glass**  
Main indicators in volume broken down by sector, 1993

(thousand tonnes)	Apparent consumption	Production	Extra-EU exports
Container glass	14 898	14 932	421
Flat glass (unworked)	5 806	5 797	583
Tableware (1)	778	911	281
Fibres (reinforcement)	372	341	84
Other glass	957	928	203

(1) Excludes Spain  
Source: CPIV

**Table 2: Glass**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	13 667	17 953	19 590	20 121	20 950	21 112	20 187	20 983	22 330	23 930	25 530
Production	14 909	18 990	20 730	21 112	21 731	21 842	21 094	22 153	23 600	25 200	26 800
Extra-EU exports	2 178	2 265	2 566	2 475	2 490	2 488	2 670	3 122	3 480	3 780	4 080
Trade balance	1 242	1 037	1 140	991	781	731	906	1 170	1 270	1 270	1 270
Employment (thousands)	250.3	238.6	246.2	244.9	245.7	242.6	230.0	221.0	220.0	220.0	222.0

(1) Some country data for apparent consumption, production and employment have been estimated.  
(2) DEBA estimates.  
(3) Rounded DRI forecasts.  
Source: DEBA

**Table 3: Glass**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	5.25	-0.44	2.68	-2.88
Production	4.46	-0.76	2.10	-1.90
Extra-EU exports	-0.70	-0.78	-0.73	4.07
Extra-EU imports	4.60	3.60	4.15	-5.19

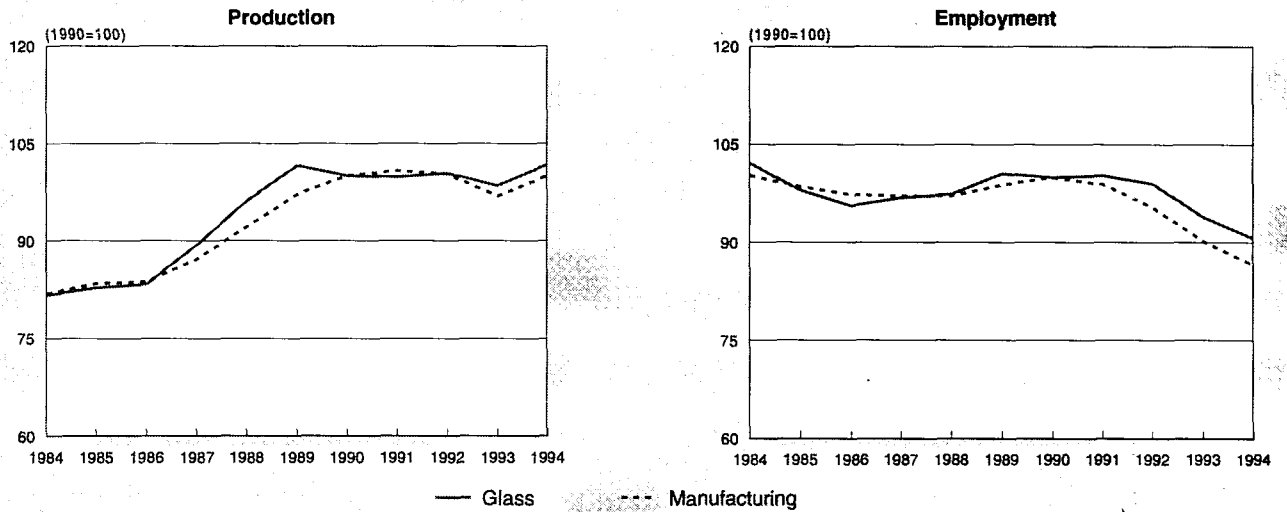
(1) Some country data for apparent consumption and production have been estimated.  
Source: DEBA

**Table 4: Glass**  
External trade in volume broken down by sector, 1993

(thousand tonnes)	Container glassware	Flat glass (unworked)	Flat glass (processed)	Tableware (1)	Fibres	Special glass	Other glass	Total
Extra-EU exports	419.4	582.5	158.5	280.8	102.7	50.5	152.1	1 746.5
Extra-EU imports	385.6	591.1	141.1	149.4	143.0	62.3	168.9	1641.4
Trade balance	33.7	-8.6	17.4	131.3	-40.3	-11.8	-16.8	-16.8
Ratio exports/imports	1.1	1.0	1.1	1.9	0.7	0.8	0.9	1.1

(1) Excludes Spain  
Source: CPIV

**Figure 3: Glass**  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
Source: DEBA

for containers and flat glass are both essentially neutral. However, negative trade balances and export/import ratios of 0.7 for fibres and 0.8 for special glass point to the influence of imports in these sectors.

The different unit value of glass in the different sub-sectors is responsible for the anomaly whereby the EU glass industry is a net exporter in value terms but a net importer in tonnage terms, albeit by a small margin. A major element of imports consists of large tonnages of cheap containers and unworked flat glass from eastern Europe whilst exports contain a major contribution from the domestic glassware sector with high value sales to the USA, Japan, and the EFTA countries.

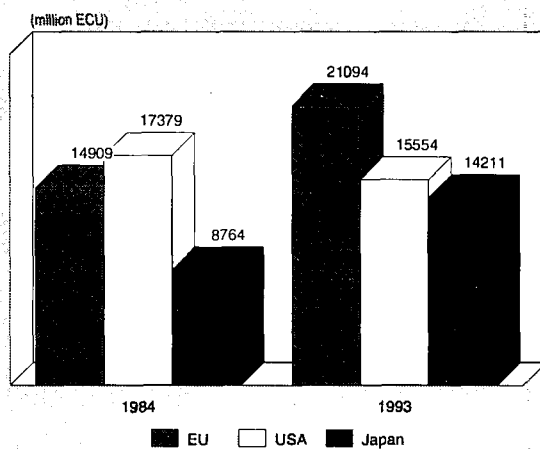
In recent years over 50 % of the total tonnage (but only 40 % of the value) imported was sourced from Poland, the former Czechoslovakia, Hungary, the former Yugoslavia, and Turkey. Meanwhile the EFTA countries represented only 24 % of the tonnage but 29 % of the value in 1993. The USA is also an

important source of imports, notably for flat glass and glass fibres.

The principal destinations for EU exports in recent years have been the EFTA countries with 35-40 % of the tonnage and around 25-30 % of the value and the USA with 10-15 % of the tonnage and 20-25 % of the value) but the remaining 45-50 % of total exports is spread across a wide range of countries.

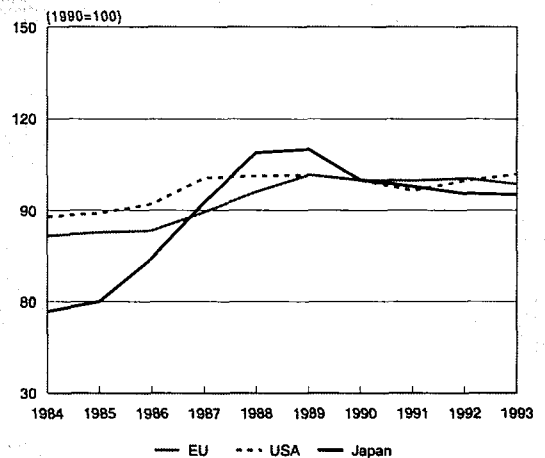
Intra-EU trade became an increasingly important element of the market during the 1980s and now accounts for about 25 % of total consumption. Belgium is notable as the principal net exporter of glass products in intra-EU trade.

**Figure 4: Glass**  
International comparison of production in current prices



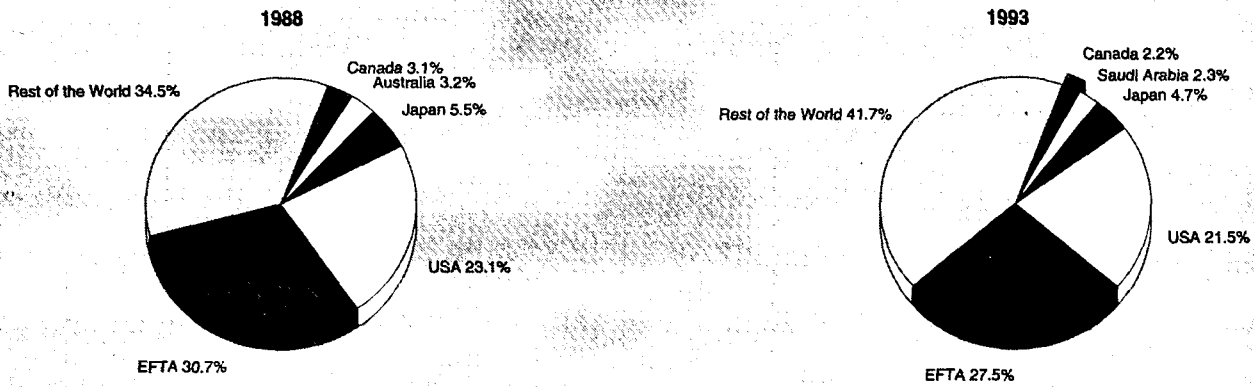
Source: DEBA

**Figure 5: Glass**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Glass  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

Glass is used by a very wide range of industries and furthermore up to 15 % of sales by value consists of private consumer products. At first sight, therefore, glass is not therefore tied too closely to a single or narrow range of consuming industries. However, the fortunes of the different sub-sectors are often strongly aligned to specific industries.

Glass containers, which account for around 65 % of total glass consumption by volume, are tied to developments in the food and beverages industry. Glass bottles and jars thus meet strong competition from other packaging materials but particularly from aluminium, plastics (mainly PET), and paper (aseptic cartons) in the beverages sector. After originally losing market share to these other materials glass has been performing strongly in recent years on grounds of performance, cost, and ecological advantages based on its recyclability.

Flat glass, which accounts for 25 % of total consumption, is heavily dependent on the construction and automotive industries for its sales. Insulating glass fibre is also very much a construction industry product.

Tableware and decorative glass products are widely used by the hotel, catering, and leisure industries as well as providing direct sales to private consumers.

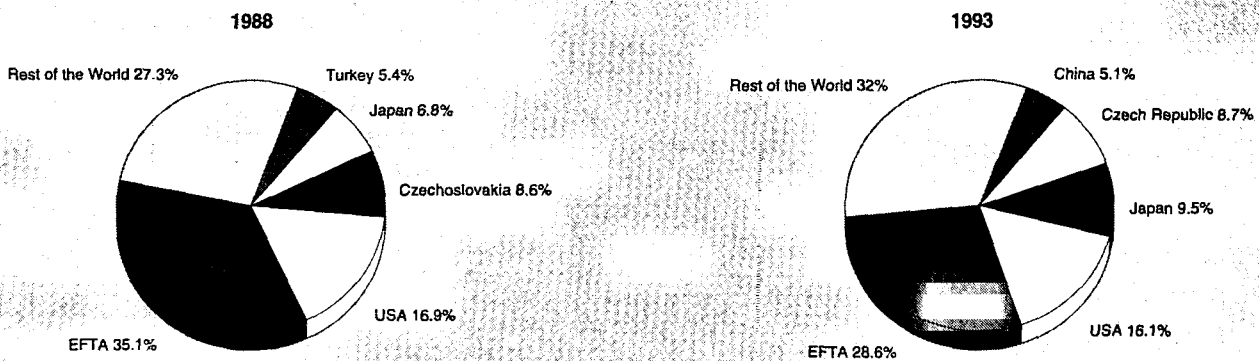
Meanwhile many of the remaining sub-sectors have "high-tech" associations - e.g. optical and electronic glassware, industrial and laboratory glassware, reinforcing glass fibre for engineering plastics, etc.

### Supply and competition

As the world's major consuming region for glass the EU is a natural target for foreign companies wishing to expand their sales. In the case of the eastern European countries it is clear that the low labour costs and close proximity to markets have provided the platform for the growing export trade described above. In other cases foreign companies have gained major access to the market by acquisition (e.g. Asahi Glass in Belgium) or by building new plants (e.g. Guardian in Luxembourg). Thus EU producers undoubtedly operate in a very competitive environment although different factors come into play in the different segments of the market.

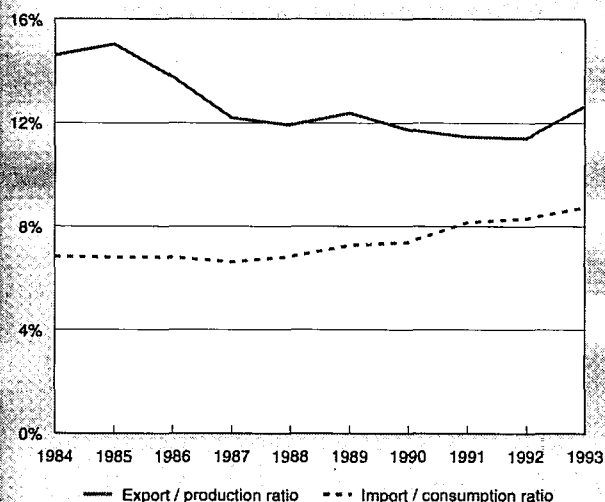
EU container glass producers meet some competition from the cheap European exports but would still see alternative packaging materials as the main threat. The rationalisation

**Figure 7: Glass  
Origin of EU imports**



Source: Eurostat

**Figure 8: Glass Trade Intensities**



Source: DEBA

programme which was carried out in the early 1980s to combat the twin ills of industrial recession and burgeoning demand for alternative products (e.g. PET bottles) has been highly successful.

Flat glass does not meet the same degree of competition from alternative materials but EU producers have had to meet competition from without (imports) and within (increasing foreign involvement in EU production). The industry has moved from high capacity utilisation in 1987 and 1988 to a situation of increasing surplus capacity which will become more acute as new float glass plants are brought on stream in Poland,

Spain, and France during the 1993-95 period. The stuttering recovery in car manufacturing and construction has not helped this situation but capacity utilisation may improve as the recovery picks up steam.

Glass fibre meets competition from a range of mineral and ceramic fibres (and flakes) for both reinforcing and insulating applications. Although there have been some closures of fibre glass plants in recent years, producers are now working at or near their operational capacity and companies are even starting to re-commission mothballed furnaces in order to avoid international shortage of fibre.

The more specialised industrial glasses meet competition from plastics in some applications although operating environments where products are subject to high temperature, reactive chemicals, or radiation tend to favour glass-based products.

### Production process

In the glass container sector the past 10 years have been marked by major advances to productivity, process monitoring and control systems, and quality, as well as recycling and lightweighting (the production of strong lightweight bottles). Major improvements have been made to furnace performance with regard to energy efficiency, high throughputs, and capability to take an increasing proportion of recycled glass (cullet) as feed material. The efficiency and throughput of automatic forming machines have also improved beyond recognition. Many of these factors also apply to other sectors of the glass industry including flat glass. The float glass process (originally launched over 30 years ago) continues to dominate flat glass production in Europe and has resulted in the closure of all but a handful of older technology sheet glass plants.

## INDUSTRY STRUCTURE

### Companies

The high degree of concentration in the EU glass industry is a reflection of the large scale and capital intensive nature of

**Table 5: Glass External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 178	2 352	2 210	2 116	2 265	2 566	2 475	2 490	2 488	2 670	3 122
Extra-EU imports	936	970	1 011	1 080	1 228	1 426	1 484	1 709	1 758	1 763	1 952
Trade balance	1 242	1 381	1 199	1 036	1 037	1 140	991	781	731	906	1 170
Ratio exports / imports	2.33	2.42	2.19	1.96	1.84	1.80	1.67	1.46	1.42	1.51	1.60
Terms of trade index	97.4	95.5	95.7	96.4	97.5	97.6	100.0	98.3	100.2	97.6	N/A

Source: DEBA

**Table 6: Glass Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.9	84.6	87.1	92.3	98.7	101.0	100.0	99.5	101.4	104.9
Unit labour costs index (3)	93.0	93.9	95.0	93.7	93.3	94.3	100.0	107.4	110.3	109.8
Total unit costs index (4)	89.3	91.2	90.0	89.7	89.8	94.5	100.0	104.0	106.3	104.6
Gross operating rate (%) (5)	10.8	11.6	13.7	14.6	16.2	14.9	12.9	12.4	10.5	10.0

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 7: Glass  
Recycling rates**

	Tonnage collected (thousand tonnes)		Percentage of national glass consumption (%)	
	1989	1993	1989	1993
Belgique/België	208	218	60	55
Danmark	58	103	36	64
BR Deutschland	1 538	2 390	53	65
Hellas	14	34	13	27
España	287	328	24	29
France	760	1 200	38	46
Ireland	11	21	13	29
Italia	670	836	42	52
Luxembourg	N/A	N/A	N/A	N/A
Nederland	279	385	57	76
Portugal	34	71	14	29
United Kingdom	310	501	17	29
Austria	115	187	54	68
Finland	18	24	36	46
Norway	11	33	24	67
Sweden	42	82	34	59
Switzerland	164	229	56	78
Turkey	47	56	27	23

Source: FEVE

modern glassmaking plant. The EU flat glass industry in particular is dominated by just five companies - Pilkington (UK), Saint Gobain (F), Glaverbel (B, a subsidiary of Asahi Glass of Japan), and the two US companies, PPG and Guardian - which together account for over 95 % of total output.

Saint Gobain is also a major factor in the container glass industry with major manufacturing operations in 6 EU countries. However, a large number of companies are involved in the container glass sector with smaller specialist companies coexisting alongside the larger groups. Other major producers include BSN (F), Gerresheimer Glas (D), Ruhrglas -- part of the VIAG group (D), Hermann Heye (D), Nienburger Glas (D), AVIR (I), PLM (S), Rockware (UK), and United Glass (UK).

The special glass sector is dominated by the German group, Schott Glas, which is a world leader in the manufacture of optical and industrial glassware. Other important companies in this sector include Corning of the USA (whose subsidiaries operate in France, Germany, and the UK) and Pilkington of

the UK. At the end of 1994 Corning sold out its European domestic glassware operations to another US company, Newell Co. Among a large number of decorative glass producers the largest would appear to be the Waterford Wedgwood group of Ireland although it should be noted that Venetian glass and the famous Murano producers are still highly influential in world markets.

#### Strategies

Although Saint Gobain and Pilkington are the principal companies operating on a European level a number of other such as BSN, PLM, Guardian, and Schott have important plants outside their home country. A number of companies operating in the EU have also formed alliances in Eastern Europe - notably Pilkington and Saint Gobain in Poland, Glaverbel (Asahi) in the Czech Republic (Glavunion and Obalunion), and Guardian Industries in Hungary (Hunguard).

**Table 8: Glass  
The thirteen largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Employment (units)
Saint Gobain	F	11 531	96 172
Pilkington	UK	4 285	41 100
Schott Glas	D	1 343	17 500
Glaverbel (Asahi)	B	839	9 084
Gerresheimer Glas	D	689	6 278
Rockwool	DK	650	5 227
Verre Souchon Neuvesel	F	470	2 978
Waterford Wedgwood	IRL	403	8 352
SIV	I	276	2 000
BSN Embellage	F	N/A	N/A
United Glass	UK	219	2 000
PPG France	F	219	1 436
Rockware Group	UK	206	2 501
Share in EU total (%)		93.3	84.6

Source: B.M. Coope and Partners, DEBA



**Table 9: Glass  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.68	1.46
Danmark	0.55	0.51
BR Deutschland	0.95	0.98
Hellas	0.39	0.32
España	1.08	1.01
France	1.26	1.28
Ireland	1.36	0.83
Italia	1.00	0.98
Luxembourg	N/A	N/A
Nederland	0.52	0.68
Portugal	1.11	1.31
United Kingdom	0.80	0.77

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

### Impact of the Single Market

The impact of the creation of the Single Market on the European glass industry is described as "positive but mild". The mildness is because the programme is seen as the confirmation of an existing situation. Thus the free movement of goods, services, and capital are seen as of fundamental importance to the industry. Internal movement of glassware within Europe is a well-established activity and virtually free from all barriers. External trade with third countries is also a vital part of modern day trade and a number of barriers to European exports remain, either through high tariffs -- Brazil, Turkey, Israel, and the USA (luxury products) -- or through distribution "arrangements" -- flat glass to Japan.

As one of industry's largest consumers of energy, the glass industry not surprisingly sees energy deregulation as the main priority for future Single Market implementation. Other issues of importance include competition policy and small and medium sized enterprises policies concerned with the lowering of administrative burdens and improving access to finance.

### REGIONAL DISTRIBUTION

The location of glass manufacturing facilities may be governed by proximity to raw material sources (e.g. Belgium with its abundant supplies of high quality silica sand, limestone, and soda ash) or proximity to consuming industries (e.g. where bottle factories are located in wine-growing districts or close to major breweries) or even a combination of these factors tied to good communications.

### ENVIRONMENT

The glass industry is a major user of fossil fuels and is therefore subject to controls on gaseous and dust emissions. EU glass producers have a good record in dealing with the problems and operate within the limits of current legislation. The industry continues to work to improve existing practice, not only with reducing emissions but also to further improve energy efficiency. On another environmental front, recycling, glass is probably at the forefront of all major industries in its ability to use both process waste and use of waste glass. In countries such as the Netherlands, Germany, Belgium, Italy and Denmark the recycling rate exceeded 50 % in 1993 and great strides are being made by more recent converts such as the UK and Ireland.

### REGULATIONS

The industry is directly affected by EU Directive 85/360 concerning air pollution and provides an ideal example of how caution and foresight must be applied when introducing pollution control measures. New measures will add substantially to costs and put EU producers at a considerable disadvantage to competitors in countries with lower environmental standards. Through products such as double-glazed windows and glass fibre insulation, glass presents major energy saving opportunities and it would be ironic if a possible carbon tax were to penalise an industry making a positive contribution to the overall carbon dioxide equation.

### OUTLOOK

The EU glass industry is in good health and likely to benefit from improved industrial performance in the years ahead. Some concern is expressed concerning rising costs of complying with environmental regulations and the flat glass industry may be due for a period of oversupply due to capacity expansions in Europe as a whole. Nevertheless the potential for high growth, particularly in Eastern Europe, would soon minimise such fears. The inclusion of three new members to the EU in 1995 will increase the internal market, and although cheap imports from Eastern Europe may be seen by some as a threat in the short term, the longer term outlook is for greatly expanded markets as these countries develop.

Written by: B M Coope & Partners

The industry is represented at the EU level by: Standing Committee of the Glass Industries in the European Union (CPIV). Address: Avenue Louise 89, B-1050 Brussels; tel: (32 2) 538 4446; fax: (32 2) 537 8469.

# Ceramic goods

## NACE 248

The ceramic goods industry covers a range of products from tiles, plates, and toilets to refractories and advanced ceramics. It is difficult to think of another EU industry in which the type of company and state of technology covers such a broad spectrum - from small family companies producing clay-based products according to methods developed several millennia ago to important materials groups at the forefront of developments in advanced ceramics. Modernisation and restructuring will be necessary in some segments to maintain the EU's position as the world's leading producer of this group of products.

### INDUSTRY PROFILE

#### Description of the sector

The principal ceramic products covered under this heading are floor and wall tiles (NACE 248.3); sanitary ware (NACE 248.5); tableware and ornamental ware (NACE 248.6 & 248.7); industrial ceramics (NACE 248.8); and refractory products (NACE 248.1). Other ceramic materials covered in chapter 5 include bricks and roof tiles, cement, and concrete products. Products described are based on industrial mineral raw materials covered in Chapter 2, but in particular, on clays and other silicates (feldspar, talc, sillimanite, wollastonite, and zircon), silica (silica sand, quartz, and quartzite), and mineral oxides derived from such minerals as magnesite, dolomite, limestone, and bauxite.

Ceramic goods are consumed across a wide range of industries. Principal markets are building and construction (tiles, pipes, sanitary ware), domestic and leisure industries (tableware, hotelware, ornamental ware, etc.), electrical and electronic engineering (insulators); and metallurgy (refractories). The new breed of advanced ceramics (also known as technical ceramics or engineering ceramics) are also becoming of increasing importance to the mechanical engineering sector. Thus, ceramic products are not only consumer items but are also vital to a whole range of industrial processes.

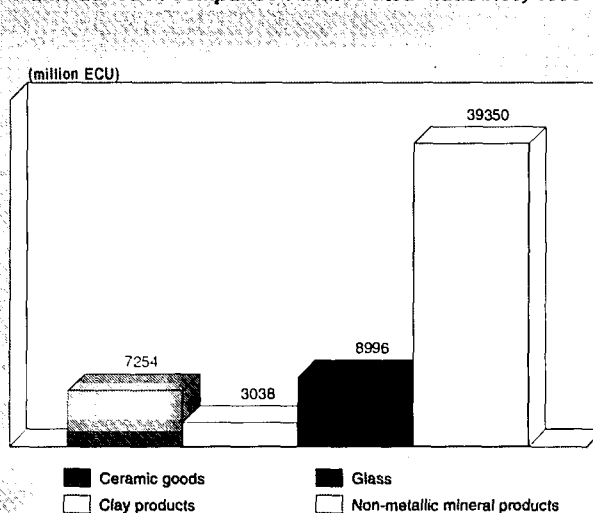
#### Recent trends

EU production and consumption of ceramic goods showed steady growth between 1984 and 1991, followed by declines in 1992 and 1993. However, a recovery in production of 7.5 % is anticipated for 1994. In real value terms, production grew by an average 0.9 % per annum and consumption by 1.18 % over the 1984-1993 period. As this suggests, imports grew faster than exports, but the EU is still a major net exporter with sales to foreign countries consistently making up about 20 % of total production. Exports in 1993 grew by 10.4 % compared with import growth of only 1 %, reflecting a large drop in consumption. The contribution of imports to total consumption has grown from 7 % in 1984 to 10 % in 1993. The 1991/92 downturn in consumption was most severe in the construction-oriented ceramics and refractories segments.

#### International comparison

The EU is the world's largest ceramic producing region. But in the whiteware (wall & floortiles, sanitaryware and table & ornamentalware) segments the fastest growth recently has been recorded in the Far East, where China, Taiwan and the ASEAN countries have been displaying considerable growth during the past decade. The USA saw its whiteware production decrease in this period; in fact it is a major net importer of these products, and it is the main third market for European ceramic tiles and tableware producers.

Figure 1: Ceramic goods  
Value added in comparison with related industries, 1993



Source: DEBA

In industrial ceramics Japan is the most important producer, followed by the USA, with the EU industry in the third position.

Here competition on what basically is a world market, is very fierce.

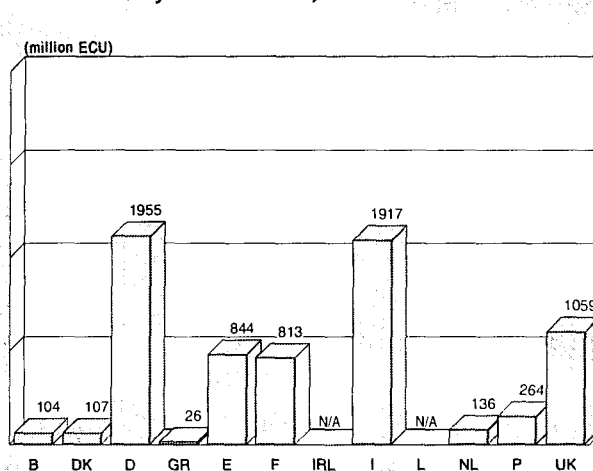
The refractories industry is closely linked to a few basic industries which have a strong production basis in Europe. The EU refractories industry is the most important worldwide, but trade in this segment is rather limited.

#### Foreign trade

The EU industry is an important exporter of ceramic goods: in 1993 total exports to third countries amounted to nearly 4 billion ECU. Imports were considerably below this level with 1.5 billion ECU, but they are increasing more rapidly.

In the table- & ornamentalware segment the main export markets for the EU industry are the USA, Japan and Switzerland; imports mainly stem from the Far East (China, Taiwan, Japan and Hong Kong). For tableware exports to third markets in

Figure 2: Ceramic goods  
Value added by Member State, 1993



Source: DEBA

**Table 1: Ceramic goods**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	9 819	11 919	13 286	14 294	14 851	14 298	13 220	13 752	14 460	15 370	16 180
Production	11 575	13 881	15 580	16 536	16 893	16 322	15 575	16 562	17 600	18 800	19 900
Extra-EU exports	2 439	2 793	3 216	3 218	3 207	3 316	3 662	4 232	4 680	5 180	5 580
Trade balance	1 756	1 962	2 294	2 243	2 042	2 024	2 354	2 810	3 140	3 430	3 720
Employment (thousands)	266.9	252.0	256.0	263.9	257.6	242.2	224.1	213.3	212.0	212.0	213.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DFI forecasts.

Source: DEBA

**Table 2: Ceramic goods**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.35	-1.46	1.18	-3.65
Production	2.88	-1.56	0.88	-0.95
Extra-EU exports	1.01	0.49	0.78	9.30
Extra-EU imports	2.70	6.69	4.46	-4.36

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Ceramic goods**  
**Breakdown by Member States, 1993**

(thousand ECU)	Consumption (1)	Ceramic tiles		Tableware and ornamental ceramic	
		Sales	Employment (thousands)	Production (2)	Employment (thousands)
BR Deutschland	1 159.1	759.0	8.1	1 099.5	28.7
Hellas	N/A	N/A	0.5	N/A	N/A
España	772.9	1 416.0	15.0	N/A	0.7
France	642.3	362.0	N/A	276.2	4.9
Italia	1 079.4	2130.0	29.8	N/A	N/A
Nederland	169.8	145.0	1.3	N/A	0.8
Portugal	N/A	N/A	4.2	N/A	12.5
United Kingdom	130.4	N/A	2.3	811.8	22.6

(1) France, porcelain tableware sales and ornamental tableware; United Kingdom, tableware and ornamentalware sales

(2) Does not include domestic sales of ornamentalware and other tableware for Germany

Source: Cerame-Unie

**Table 4: Ceramic goods**  
**Trade in table and ornamentalware ceramics, 1993**

(million ECU)	Imports	Exports
B/L	108.95	100.32
DK	18.15	30.81
D	357.02	403.97
GR	16.96	4.41
E	87.86	108.02
F	220.14	152.11
IRL	2.62	10.85
NL	151.04	97.39
P	37.15	193.30
UK	161.64	387.34
Total	1 161.5	1 488.5

Source: Eurostat

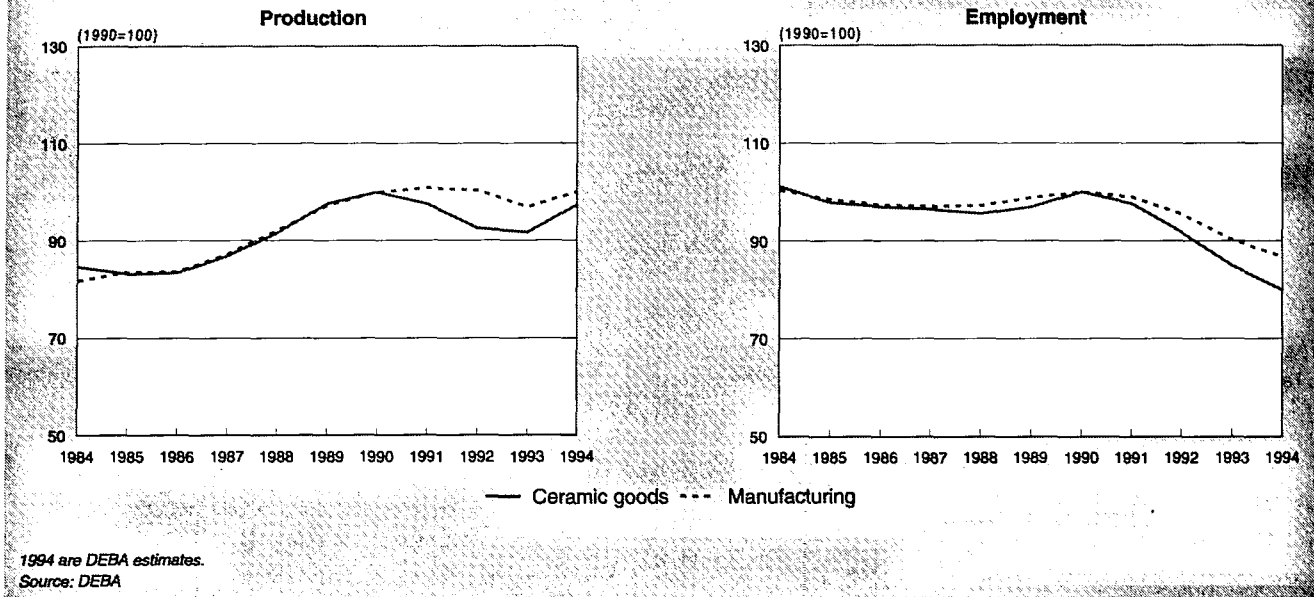
1993 amounted to 502 million ECU, while imports reached a level of 321 million ECU. For ornamentalware the situation was less positive with exports of 246 million ECU against imports of 308 million ECU. This reflects the problem of high labour costs with which the highly labour-intensive EU industry has to cope.

In the wall & floor tiles segment the data show a healthy trade balance surplus, with EU exports of 1 457 million ECU against imports of 165 million ECU. Main export markets are here the USA, Switzerland and Saudi-Arabia; Turkey and the Czech Republic are the most important suppliers from outside the EU.

However, as some Eastern Asian countries are building up a big production capacity, there is no reason for the EU industry to be complacent.



**Figure 3: Ceramic goods**  
Production and employment compared to EU total manufacturing industry



The refractories segment accuses an important intra-community trade, with comparatively strong exports from the traditional steel producing countries.

**MARKET FORCES**

**Demand**

Building and construction is by far the most influential industry with regard to demand for ceramic wall and floor tiles and sanitary ware. Demand for these products is spread across a full range of structures and buildings from private dwellings to public buildings and industrial structures, and is not just limited by new building.

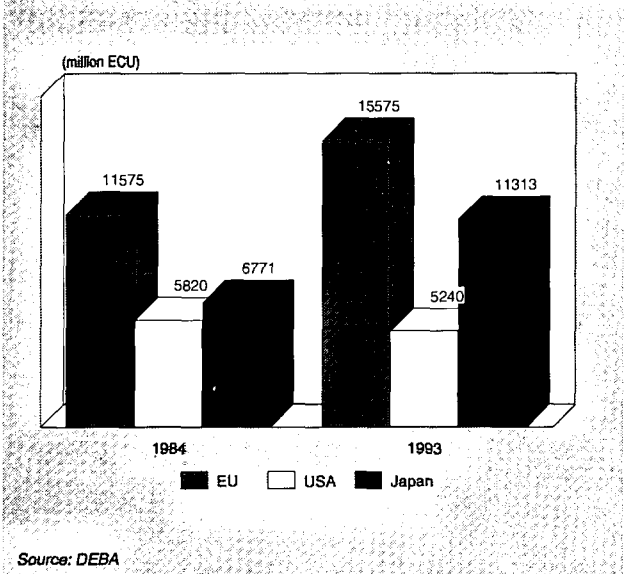
The maintenance and renovation market for tiles and sanitary ware provides an extremely important secondary market. The fact that both form a central element to interior design means that replacement takes place on aesthetic grounds, in addition to the more normal reasons of wear and tear. Sales of wall

tiles, in particular, take place on several levels, from large construction companies to the individual DIY (do-it-yourself) enthusiast. The latter may even buy from a shop devoted to selling tiles, tiles, and tiles.

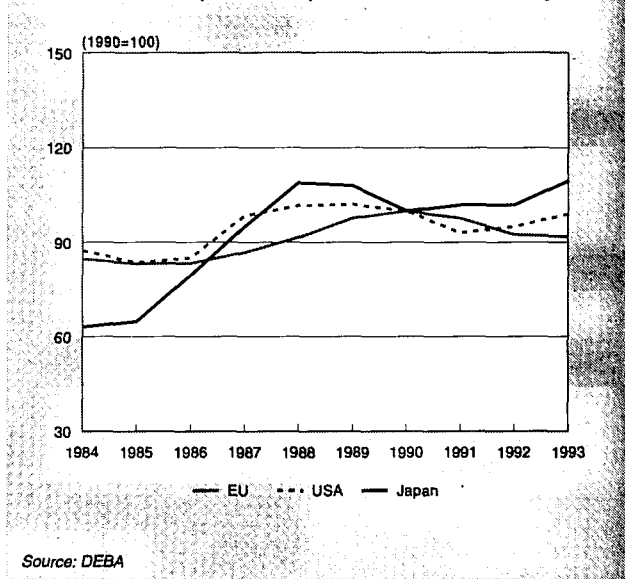
The tableware and ornamental ware segment also takes more than a passing interest in new public building and renovation schemes since hotels, restaurants, hospitals, and the like are all major buyers of plates, dishes, bowls, cups, etc. Indeed, special requirements of the hotel and catering trade have given rise to the "hotelware" sub-sector with specially designed hard-wearing ceramics. Private buyers in this segment tend towards some of the more upmarket products designed by artists, made of prime raw materials such as porcelain and bone china.

The refractories segment is a fascinating industry in which technical advances continuously reduce the size of the market. Refractories are vital to high temperature processes required to produce metals, glass, cement, ceramics, and a range of other products. However, the tonnage growth of these products

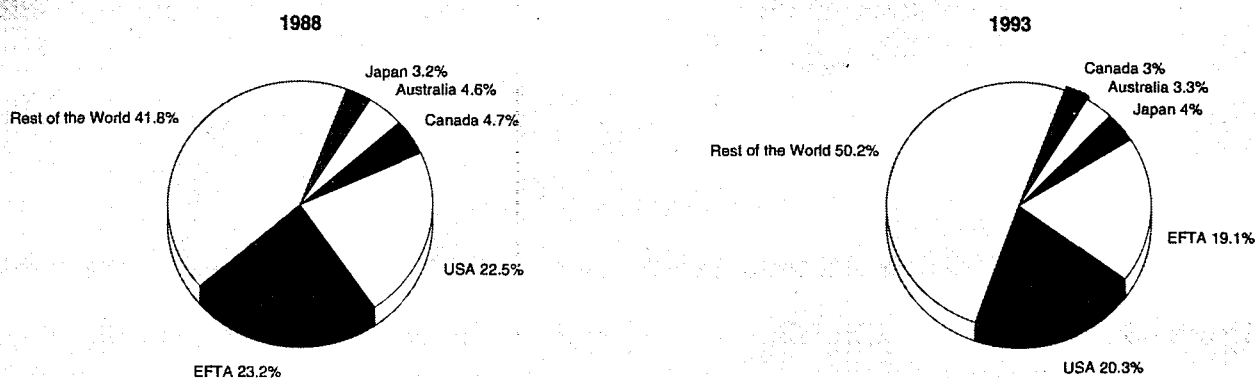
**Figure 4: Ceramic goods**  
International comparison of production in current prices



**Figure 5: Ceramic goods**  
International comparison of production in constant prices



**Figure 6: Ceramic goods  
Destination of EU exports**



Source: Eurostat

has never been enough to counter the decrease in unit consumption brought about by technical advances to processes and materials.

The technical ceramics segment is based, to some extent, on materials and techniques developed by the refractories industry and adapted towards engineering applications. Certain products, such as electrical insulators made of alumina or steatite, have actually been around for some time. But, some of the "newer" ceramics are becoming of increasing importance in electronics, chemical, mechanical, biological, and nuclear engineering applications. Very high growth rates are predicted for materials such as silicon carbide, silicon nitride, sialons, and partially stabilised zirconia, albeit from an initially low volume base.

### Supply and competition

The EU ceramics industry has centuries of tradition to draw on, ample supplies of high quality raw materials, a strong and continuously evolving technical base, and an enormous home market. Yet, it has proved to be vulnerable to competition from the geographically distant sources of the Far East. This has been due to a combination of the low operating costs of some of these countries (noticeably for labour and for meeting low environmental standards), and the fact that producers have embraced European processing technology to boost their own production. Many have also embraced European designs. This has exposed the high production costs and overcapacity which exist in much of the EU tableware sector. The impact has

been greatest at the lower quality end of the market, causing some EU producers to concentrate on more upmarket products, others to take major cost-cutting measures to remain competitive, and yet others to get out of the market.

The current downturn in demand has certainly reduced operating margins for even the most efficient producers. Yet, further efficiencies will no doubt be required to survive the worst in order to take advantage of the projected recovery.

### Production process

Although traditional ceramic industry symbols, such as the potter's wheel and the skilful hands of dedicated craftsmen still retain a niche in the "arts and crafts" end of the market spectrum, the modern ceramics industry is actually one of large scale, automated processes, close technical and quality controls, and a technically trained workforce. Among the new techniques introduced over the past 20 years are dry pressing, pressure casting, isostatic pressing, fast firing, roller kiln firing, plus the use of robotics in glazing and decorating.

## INDUSTRY STRUCTURE

### Companies

The EU ceramic goods sector has total production approaching 17 billion ECU and employs around 210 000 people involving over 2 500 companies. The figures bear out the predominance of small and medium-sized companies in the overall picture.

**Table 5: Ceramic goods  
Trade in wall and floor tiles**

(million ECU)	Imports		Exports	
	1993	1994	1993	1994
B/L	163.62	N/A	12.39	N/A
D	660.25	1 050.9	260.67	243.53
GR	2.70	N/A	3.48	4.46
E	14.90	N/A	780.85	901.60
F	463.77	514.75	153.27	155.84
I	70.05	67.93	2 187.0	2 597.6
NL	103.63	159.27	81.79	71.07
P	40.43	58.07	79.33	90.96
UK	134.88	160.55	28.29	16.72
Total	1 654.2	N/A	3 587.0	N/A

Source: Eurostat

**Table 6: Ceramic goods  
Trade in refractories**

(million ECU)	Imports		Exports	
	1993	1994	1993	1994
A (1)	23.12	N/A	72.68	112.00
B/L	105.94	N/A	86.51	33.00
D	143.41	N/A	505.39	466.00
GR	3.91	N/A	1.87	N/A
E	37.39	N/A	55.28	N/A
F	108.74	N/A	174.28	217.00
IRL	0.42	N/A	0.03	N/A
I	95.25	N/A	107.32	105.00
UK	36.35	N/A	196.71	192.00
Total	531.41	N/A	1127.39	N/A

(1) Only from/to the EU  
Source: Eurostat

**Table 7: Ceramic goods  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 439	2 569	2 458	2 467	2 793	3 216	3 218	3 207	3 316	3 662	4 232
Extra-EU imports	683	672	707	746	831	922	975	1 165	1 292	1 307	1 422
Trade balance	1 756	1 898	1 751	1 722	1 962	2 294	2 243	2 042	2 024	2 354	2 810
Ratio exports / imports	3.57	3.82	3.48	3.31	3.36	3.49	3.30	2.75	2.57	2.80	2.98
Terms of trade index	88.1	86.9	91.4	93.3	94.9	93.5	100.0	99.4	99.9	95.4	N/A

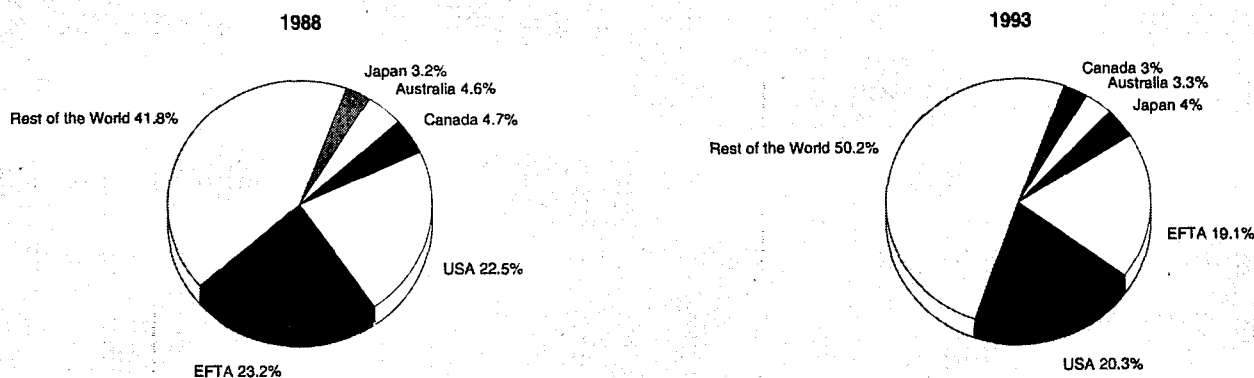
Source: DEBA

Some of the largest companies operate in the refractories sector where a high degree of concentration now exists. Five companies account for about 65 % of total European (EU plus EFTA) production: Didier-Werke (D) and Radex Heraklith (A) (which have recently announced that they are to join forces through a transfer of shares); Hepworth Refractories (UK); Sanac (I); and, SEPR (F). Other important mainstream refractory producers include: Refratechnik (D); the Wulfrath Group (D); Baker Refractories (UK); Dyson Refractories (UK); AMR Refratarios (E); Dr C Otto Feuerfest (D); and, VGT-Dyko (D). Significant specialist producers include: Ve-

suvius International (part of the Cookson group of the UK and a major manufacturer of concast refractories and crucibles); Lafarge Refractaire (part of Lafarge Coppee and a major producer of monolithic refractories); and, the Morgan group of the UK (crucibles, monolithics, and technical ceramics).

The tableware and ornamental ware sector contains a handful of large companies amongst a myriad of small ones. Major groups include three German companies, Villeroy & Boch, Rosenthal, and Hutschenreuther and two UK companies, Wedgwood and Royal Doulton, which all together account for around 40 % of total EU output.

**Figure 7: Ceramic goods  
Origin of EU imports**



Source: Eurostat

In the sanitary ware sector the two major groups operating on a European level are Ideal Standard (I) of the American Standard group of the USA, and the Sanitec group of Finland, whose interests now include Allia (F), Keramag (D), Pozzi-Ginori (I), and Eurocer (P), in addition to its Scandinavian activities. Other European companies of note include: Blue Circle Industries (UK) through subsidiaries Armitage Shanks and Ceramica Dolomite; the Roca group (E); Keramik Laufen (CH); and Sphinx (NL) which now operates plants in the Netherlands, Belgium, and France.

The EU wall and floor tile industry is dominated by medium-sized producers in Italy and Spain with annual turnovers in the 40-80 million ECU range. The small number of larger groups includes: Gruppo Ceramiche Marazzi, Iris Ceramica, and Cerim Ceramiche in Italy and Porcelanosa and Fabreza in Spain. Companies in other countries include: Villeroy & Boch in Germany and H & R Johnson (part of the Norcros group) in the UK.

Companies active in the technical ceramics segment include: Hoechst CeramTec, Hutschenreuther, Cerasiv, Wacker, and Didier of Germany; Saint Gobain (through its SEPR, Norton, and Stettner

**Table 8: Ceramic goods**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	83.7	85.1	86.0	90.0	95.9	100.6	100.0	99.9	100.8	107.9
Unit labour costs index (3)	85.9	89.1	92.4	93.2	91.8	94.7	100.0	107.8	110.9	103.0
Total unit costs index (4)	83.9	87.0	86.9	87.5	89.3	95.7	100.0	105.8	109.1	104.1
Gross operating rate (%) (5)	11.6	11.3	12.9	13.6	14.5	13.4	12.3	11.4	10.1	11.6

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 9: Ceramic goods**  
**The largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Employment (units)
Hepworth	UK	1 077	9 047
Villeroy & Boch	D	887	12 974
Didier Werke	D	752	6 853
Norcros	UK	485	6 692
Keramische Ind Laufen	CH	453	7 465
Sphinx Gustavsberg	NL/S	390	3 969
Wedgwood	UK	372	6 124
Royal Doulton	UK	285	7 168
Veitsch-Radex	A	274	1 369
Hutschenreuther	D	240	4 896
Rosenthal	D	193	3 051
Ideal Standard	I	186	1 780
ABK	D	174	1 900
Iris Ceramica	I	169	1 610

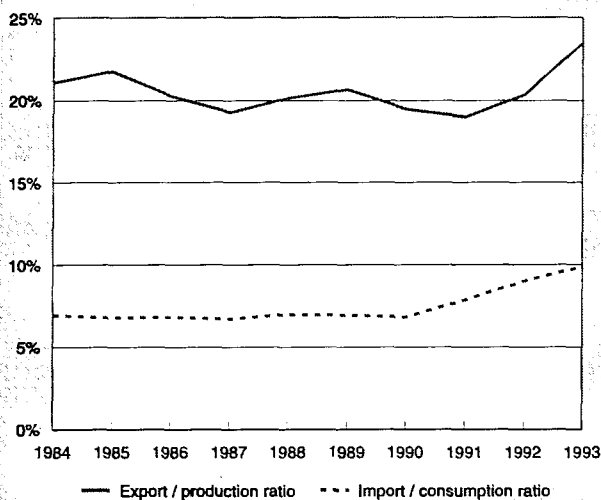
Source: B.M. Coopers and Partners

**Table 10: Ceramic goods**  
**Employment**

(units)	Table & ornamentalware		Wall and floor tiles		Refractories	
	1993	1994	1993	1994	1993	1994
B/L	N/A	N/A	N/A	N/A	795	N/A
D	28 700	N/A	8 100	8 650	9 521	9 004
GR	N/A	N/A	500	460	N/A	N/A
E	700	N/A	15 000	N/A	1 500	1 300
F	4 900	N/A	N/A	3 680	3 548	3 467
I	N/A	N/A	29 800	30 780	2 600	2 600
NL	800	N/A	1 300	1 160	N/A	N/A
P	12 500	N/A	4 200	N/A	N/A	N/A
UK	22 500	N/A	2 300	1 940	4 495	N/A

Source: Eurostat

**Figure 8: Ceramic goods  
Trade intensities**



Source: DEBA

subsidiaries), Pechiney, and Corning of France; Cookson, T&N, and Morgan of the UK; and Samatec of Italy.

### Strategies

The segment that has been most active on the mergers and acquisitions front is sanitary ware, particularly through the Sanitec group of Finland, followed by Sphinx (NL) and BCI (UK). It should be noted that Sanitec's expanding empire also includes plants in Poland and former East Germany. The continuous restructuring process of the refractories industry has been strongly in evidence through the amalgamation of the two Austrian producers, Radex and Veitscher, and the planned merger with Didier-Werke of Germany, which will create by far the world's largest refractory manufacturing group.

Nevertheless, it is clear from the foregoing that the process of restructuring has a long way to go in the tiles and tableware segments of the EU ceramics industry. It seems likely that further amalgamation, allied with investment in new equipment, will be necessary to improve competitiveness in parts of the industry. However, it should be noted that such streamlining will take place without sidelining the artistic element.

**Table 11: Ceramic goods  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.35	0.42
Danmark	0.45	0.77
BR Deutschland	0.90	0.75
Hellas	1.52	0.88
España	1.53	2.10
France	0.56	0.61
Ireland	0.37	0.17
Italia	2.05	2.01
Luxembourg	N/A	N/A
Nederland	N/A	0.36
Portugal	1.51	2.73
United Kingdom	0.85	0.84

(1) Ratio of production in the sector compared to manufacturing industry for each country, divide by the same ratio for the EU. Estimates.

Source: DEBA

Flair and design play an important role in European competitiveness on both mass production and craft pottery levels.

### Impact of the Single Market

The impact of the single Market of Europe's ceramic goods industry has been significant and primarily positive. Though the industry maintains a strong, localised tradition it has always been very international in its outlook and intra-EU trade has long been a feature of the industry. Thus the free movement of goods, recognition of intellectual property (trademarks), and the liberalisation of energy supply are all seen as factors of fundamental importance to the industry. Much attention is also addressed to policies concerning competition rules, small and medium-size companies, and environmental protection.

Remaining internal barriers include national standards and certification schemes and environmental legislation is not applied equally across the EU countries. External barriers affecting EU exports include certification in central Europe, high import tariffs into the USA, and the problem of counterfeit designs being used on ceramic products in South East Asia.

Future priority should be given to common environmental standards and legislation, social flexibility, energy deregulation, checks on standards and technical requirements at external boundaries, increased access to third markets (USA, Japan), and, last but not least, improved internal trade statistics.

### REGIONAL DISTRIBUTION

A large number of ceramics manufacturing companies continue to operate in regions whose traditional location was based on the availability of raw materials and fuel. Thus, despite changing circumstances, areas such as Stoke-on-Trent in the UK, Bavaria and the Rhineland in Germany, Sassuolo in Italy, Valencia in Spain, and Limoges in France have maintained their status as major whiteware manufacturing centres. Although the raw materials availability argument also applied to the location of many refractories plants, more modern plants have tended to be built close to major metallurgical centres, such as the Ruhr region of Germany and Sheffield in the UK.

### ENVIRONMENT

The ceramics industry is a major user of fossil fuels and thus shares the same problems as other non-metallic mineral product manufacturers with regard to gaseous and dust emissions. The larger modern units are well equipped to deal with existing compliance levels, but further restrictions and the imposition of a carbon tax would have a major impact on the whole industry.

### OUTLOOK

Consumption of ceramic goods is expected to resume former levels of growth as EU industry, in general, moves out of recession. Those companies that have already modernised and restructured can be expected to perform well during the latter part of the 1990s. However, some of the smaller, high cost concerns will need to invest in new technology to remain competitive against imports. The technical ceramics segment will continue to grow and certain products may develop from "low volume, high value" to "medium volume, medium value" status by the year 2000. The addition of three new members to the EU will serve to reinforce the pan-European nature of the industry, as will growing ties with producers in Eastern Europe.

Written by: B M Coope & Partners and Cerame-Unie

The industry is represented at the EU level by: Liaison Office of the European Ceramic Industry (Cerame-Unie). Address: Rue des Colonies 18-24, Bte 17, B-1000 Brussels; tel: (32 2) 511 3012; fax: (32 2) 511 5174.



## Overview NACE 25, 26

The EU is a leading producer of chemical products. After several years of solid growth in the mid to late 1980s, depressed prices and overcapacity have characterised the performance of the industry since 1990, as the world's economies slowed down and additional production capacity came on stream. Despite an improvement in profitability in 1994, a high cost structure may undermine European profitability in the medium term. The strategy of major chemicals companies hinges on the creation of strategic alliances and joint-ventures to achieve rationalisation in research, production and access to markets.

### INDUSTRY PROFILE

#### Description of the sector

The chemical industry is an industrial branch of very heterogeneous character in which the main activities consist of chemically transforming materials into diverse substances, giving them new physical and chemical properties. For these activities, the chemical industry employs raw materials from the petroleum, mining and extractive industries such as oil, minerals, metals and certain agricultural products. The main activities of the chemical industry correspond to the following product groups: basic chemicals, which include basic organic and inorganic chemical products; fertilisers and nitrogen compounds; plastic in primary form and synthetic rubber; pharmaceutical and medical products; and specialty chemicals, which include pesticides and other agrochemical products, paints, varnishes, and other similar coating products, soaps and detergents, cleaning and polishing preparations, perfumes, toilet preparations, and man-made fibres.

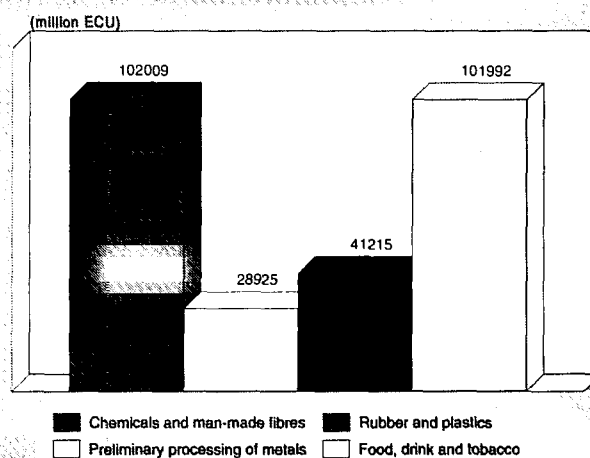
The industry includes two upstream branches constituting basic chemicals (basic inorganic chemicals and basic organic or petrochemicals) and a series of downstream branches such as pharmaceutical products, agrochemicals, detergents, etc. The upstream sectors' outlets are almost exclusively the downstream sectors, which themselves supply either other industries (agriculture for agrochemicals, the plastics transformation industry for plastics in primary form), or end-users (soaps and detergents, for example).

In terms of value added, Germany is by far the largest EU producer of chemicals. With almost 34 billion ECU, the German chemical industry accounts for almost one third of EU value added in this sector. France and the United Kingdom almost tie for second place, with a value added of about 18 billion ECU. Other large EU producers are Italy (10 billion ECU), Spain (7 billion ECU), the Netherlands (5 billion ECU) and Belgium (5 billion ECU).

#### Recent trends

After a rapid expansion over the 1960s and 1970s, the first half of the 1980s was rather grim for the chemical industry. Stagnant production and overcapacity led to a drastic restructuring of the industry. The restructuring, accompanied by huge redundancies and cutbacks in capacity, enabled the chemical sector to start off from a much stronger base when the economic environment improved from 1983 onwards. The years from 1986 to 1989 were associated with high profits and strong expansion.

**Figure 1: Chemicals and man-made fibres  
Value added in comparison with related industries, 1993**

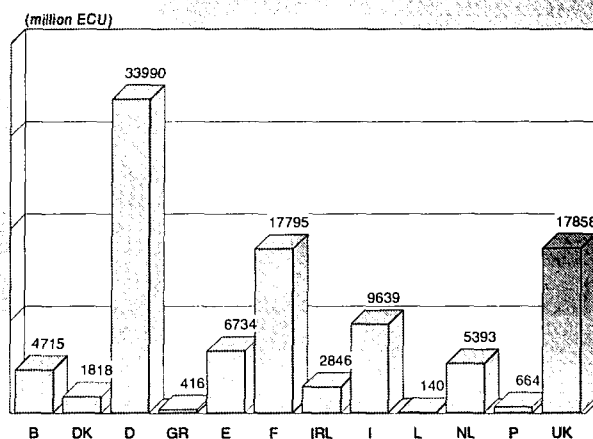


Source: DEBA

Prospects changed in 1990 with the economic slowdown in Europe and North America. Demand from the main clients weakened both at home and abroad. European industries were further hit by losses in market share on export markets, a trend that started with the fall of the dollar in 1985, which gave US companies a strong price advantage. The situation on the trade front improved significantly in 1993. The gains in the extra-EU trade balance (about 10 billion ECU) was however not sufficient to balance the fall of domestic demand (-15 billion ECU) in 1993.

Except for the pharmaceutical industry, profits started weakening in the first half of 1990. From 1990 to 1993, the profitability of the chemical industry has been poor in Europe, as witnessed by the low value of the gross operating rate in Table 5: it fell from 15.5 % in 1988 to about 11.5 % between 1991 and 1993.

**Figure 2: Chemicals and man-made fibres  
Value added by Member State, 1993**



Source: DEBA

**Table 1: Chemicals and man-made fibres  
Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Basic industrial chemicals	96 601	103 039	25 282
Pharmaceuticals	62 635	68 867	12 536
Soaps, detergents and toileteries	33 698	37 413	4 645
Paints, varnishes and other chemical products	52 607	62 366	11 906
Man-made fibres	7 098	6 989	1 171

(1) Some country data for apparent consumption, production and employment have been estimated.  
Source: DEBA

**Table 2: Chemicals and man-made fibres  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	210 206	246 620	273 569	277 800	280 060	279 999	264 525	284 232	298 820	313 980	329 230
Production	227 709	261 903	287 211	288 959	292 287	293 222	287 573	309 658	326 900	344 000	361 000
Extra-EU exports	39 690	42 853	46 309	45 029	47 795	50 077	59 228	66 736	72 990	78 150	83 020
Trade balance	17 503	15 283	13 643	11 158	12 227	13 223	23 049	25 426	28 080	30 020	31 770
Employment (thousands)	1 751	1 760	1 781	1 781	1 759	1 712	1 654	1 584	1 600	1 600	1 600

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Chemicals and man-made fibres  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.63	0.76	2.35	0.20
Production	3.48	0.70	2.24	0.01
Extra-EU exports	-0.03	-0.06	-0.04	-1.28
Extra-EU imports	-0.10	0.24	0.05	-0.11

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 4: Chemicals and man-made fibres  
External trade in current prices**

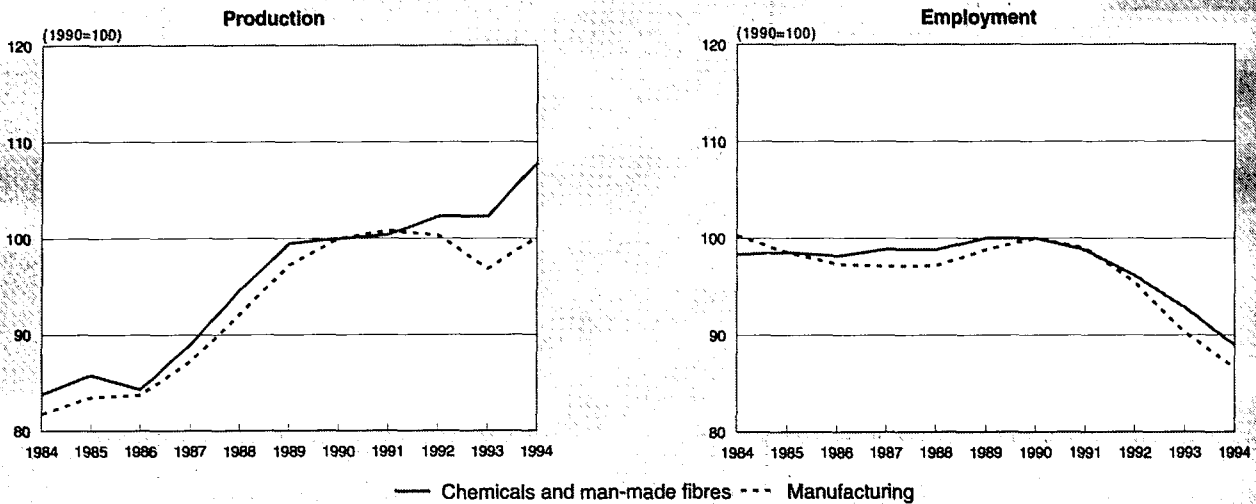
(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	39 690	43 596	39 042	38 968	42 853	46 309	45 029	47 795	50 077	59 228	66 736
Extra-EU imports	22 187	24 918	23 577	23 919	27 571	32 666	33 870	35 569	36 855	36 179	41 311
Trade balance	17 503	18 678	15 466	15 049	15 283	13 643	11 158	12 227	13 223	23 049	25 426
Ratio exports / imports	1.79	1.75	1.66	1.63	1.55	1.42	1.33	1.34	1.36	1.64	1.62
Terms of trade index (1)	134.3	131.7	123.9	121.2	115.8	106.0	100.0	100.2	101.6	123.9	N/A

(1) NACE 25.

Source: DEBA



**Figure 3: Chemicals and man-made fibres  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

In 1994, as the European economy started to recover, so did the chemical sector. In volume terms, production increased by 6.4%. This came as a surprise, as many analysts have very pessimistic expectations for 1994, even as late as at mid-year. This good result has been achieved thanks to an 8% increase of extra European exports, and a swing in the inventory cycle, with strong stock-building along the supply chain in 1994. Domestic demand remained weak, which brings some worries for 1995. As stock-building should rapidly stop, and exports are expected to subside, only a recovery in domestic demand could strengthen the current upturn in the chemical sector.

Employment in the European chemical sector shrank from 1 781 000 jobs in 1990 to 1 583 000 in 1994, an average fall of 2.9% per year. In 1994, employment fell by about 70 000 units. These job cuts are the results of an ongoing restructuring process in the chemical industry, aimed at reducing costs and improving productivity and efficiency, in order to maintain international competitiveness. As a result,

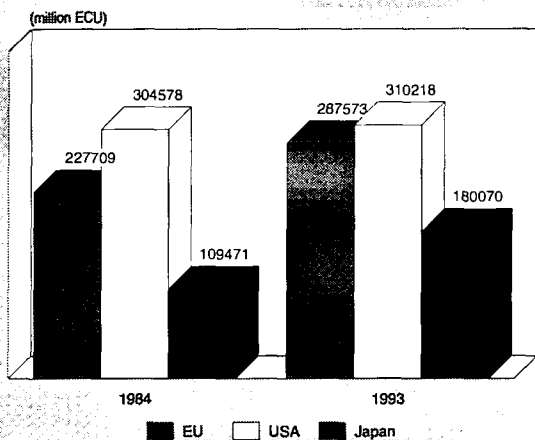
productivity has improved by an average of 2.9% per year between 1984 and 1993 (see table 5).

**International comparison**

The development of the US chemical industry differs slightly from that of the EU. American companies have experienced high growth rates during the second half of the 1980s, not only thanks to an increase in domestic demand, but also due to increased exports, as their competitiveness was boosted by a low dollar. Consequently, American companies did not experience the same incentives as their EU counterparts to develop downstream in sectors less sensitive to business cycles and exchange rate movements, especially as concentration is much higher in the USA than in the EU in many segments of the chemical industry.

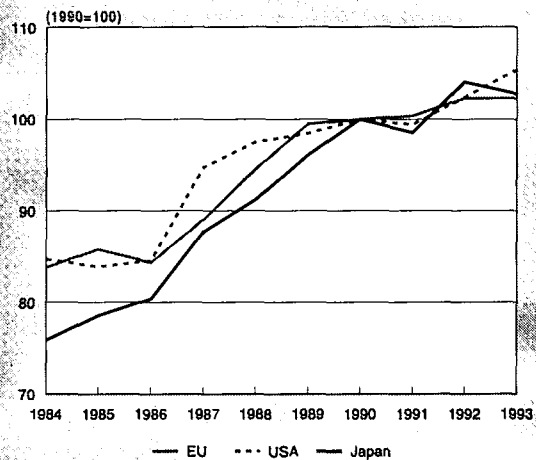
In 1993, US production stood at 108% of EU production, and Japanese production represented some 63% of EU production.

**Figure 4: Chemicals and man-made fibres  
International comparison of production in current prices**



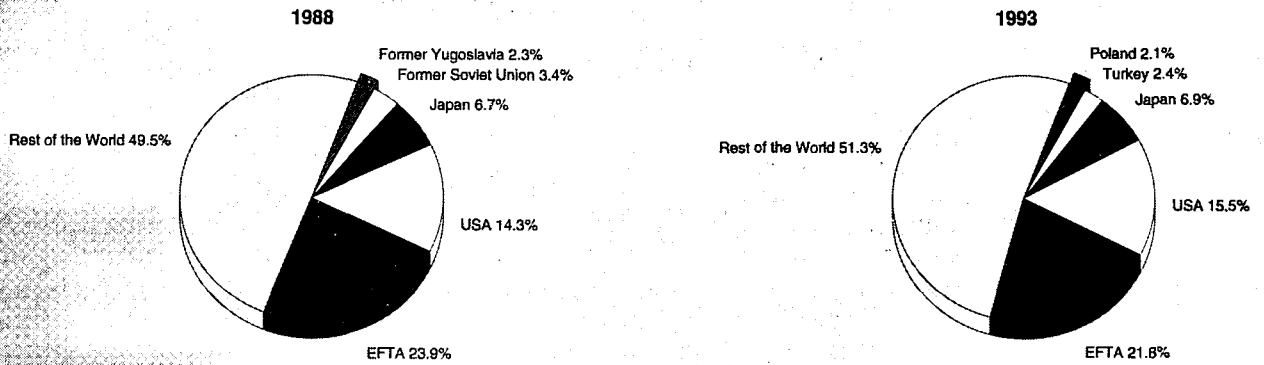
Source: DEBA

**Figure 5: Chemicals and man-made fibres  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Chemicals and man-made fibres  
Destination of EU exports**



Source: Eurostat

In the USA, production of chemical products fell by 0.6 % in volume in 1991. Just as in Europe, the core of the problem was the overcapacity and the consequent falling prices of commodity chemicals, along with the specialities experiencing sliding demand, linked to the recession. The US chemical industry enjoyed a recovery since 1992, when production increased by 3.2 %. The industry kept its momentum in 1993 and 1994, with a 3.8 % growth rate in both years.

Markets for chemical products have developed fast, particularly in East Asia, but also in Brazil and the Middle East. New producers have rapidly appeared in these regions. The major share of world production, however, remains by far in the hands of European and American groups, which have developed their activities in these emerging markets.

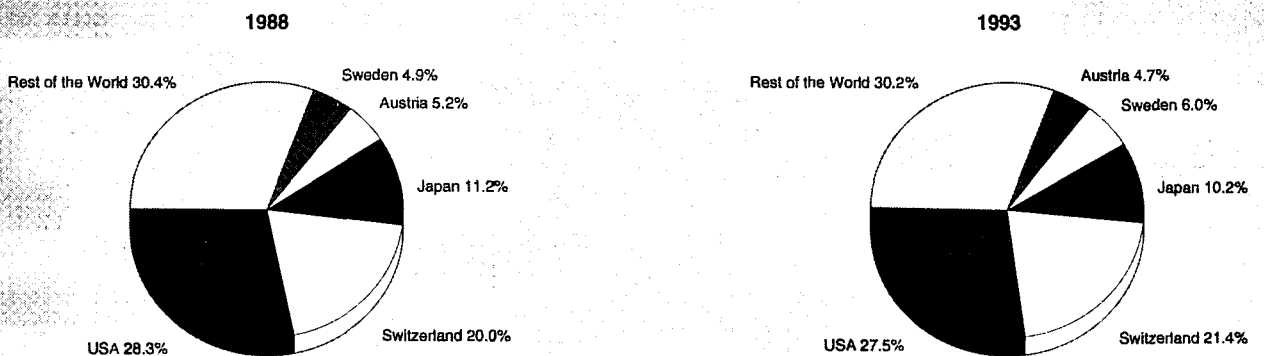
Increased competition from new chemical producers (in Asia, Latin America or the Middle-East, for example) risks eroding the competitive position of European producers whose structural and feedstock costs remain higher than in major competing regions in the longer term. A new opportunity exists, however, for west European manufacturers to gain new markets in eastern Europe. However, west European companies have until now shown only limited interest in acquiring production facilities in the east. The issues at stake are well known:

environmental cleanup has to be undertaken, obsolete equipment needs to be replaced, and the industry has lost the FSU markets, its main traditional export destination. Thus, even if some products, such as plastics, should show attractive growth rates, profits perspectives are mostly long term. West European companies are thus taking a wait-and-see policy, increasing their exports to eastern Europe before deciding on investment.

**Foreign trade**

The EU is the world's leading exporter of chemicals. In 1993, according to Table 2, EU companies exported 21 % of their production outside of the EU. Traditionally, the EU has a trade balance surplus (along with the EFTA countries). The surplus has been deteriorating since 1985, following the fall in the US dollar, the development of local capacity in many countries and the increasing market presence of export-oriented production capacity, notably in the Arab Gulf region. In 1993, however, following the depreciation of several European currencies and an overall improvement of the economy in foreign markets, exports have increased by 18 % in current prices. In the same year, the EU trade surplus against the rest of the world increased to 23 billion ECU. Figure 8 illustrates the dramatic growth of exports in 1993.

**Figure 7: Chemicals and man-made fibres  
Origin of EU imports**



Source: Eurostat



**Table 5: Chemicals and man-made fibres  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	85.2	87.1	85.9	90.1	95.7	99.5	100.0	101.6	106.4	110.1
Unit labour costs index (3)	82.8	87.0	91.9	93.1	92.6	94.6	100.0	105.2	105.3	104.6
Total unit costs index (4)	95.6	100.0	91.7	90.9	92.5	97.9	100.0	102.0	100.8	98.4
Gross operating rate (%) (5)	11.6	11.4	12.9	13.5	15.5	14.2	12.4	11.5	11.4	11.7

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

Overall, EU exports are specialised in refined chemicals, while imports are in basic chemicals. To a certain extent, the EU imports basic chemicals in order to export refined chemicals. Competitive discipline created by imports is therefore higher for basic chemicals than for refined chemicals.

The main destination for EU chemicals exports are the EFTA countries, the USA, the developing countries, eastern Europe. Compared to the average EU trend, it appears that Germany and Denmark are more oriented towards Western Europe. The United Kingdom and Ireland export more towards North America, while the proportion of exports towards developing countries is higher in France, Spain and Portugal than in the other EU countries.

On the other side, imports mostly come from the USA, EFTA countries, and Japan. With 21.4 % of extra-EU imports, Switzerland is the second largest exporter to the EU, because of its geographical proximity and the importance of the chemical industry in this country.

## MARKET FORCES

### Demand

About 65 % of chemical product demand stems from industry in the form of intermediate consumption. Apart from the chemical industry itself, which represents 36 % of its own demand, the principal client sectors of the chemical industry are (in

decreasing order) the rubber and plastics processing industry, agriculture, metals, mechanical and electrical engineering (the last three together), textiles and clothing, wood and derivatives and construction. This considerable self-consumption is explained by the high degree of industrial vertical integration in which the downstream elements, refined chemicals or specialty chemicals, are the almost exclusive outlets for components situated upstream, i.e. the basic chemicals.

The strong expansion of the chemicals sector over the last two decades can be explained in part by factors such as innovation and the replacement of traditional materials such as steel, wood, paper and glass by new materials derived from chemical processes. This substitution factor has enabled the chemical industry to experience premium growth rates, at a level much higher than the average manufacturing growth rates (10 % compared to 2 % over the period 1970-90). More recently, the contribution of this factor in the growth rate of the chemical industry has diminished, marking the industry's progressive evolution towards maturity.

An important factor in the creation of demand is the continuous effort towards product innovation. On average, European companies spend around 5 % of their turnover on R&D, although this number can be close to 20 % in some specific sectors, such as pharmaceuticals. In 1993, Hoechst, for example, the German chemical major, spent 6.6 % of its sales in R&D. In the same year, Swiss Ciba spent 9.2 % of turnover in research, and Bayer, which has important interests in pharmaceuticals, 15.3 %.

The most innovative fields of R&D include bio-technology and new materials (advanced composite materials, polymers, plastics and ceramics). As a general tendency, R&D efforts are more and more focusing on transformations of existing products rather than on true discoveries.

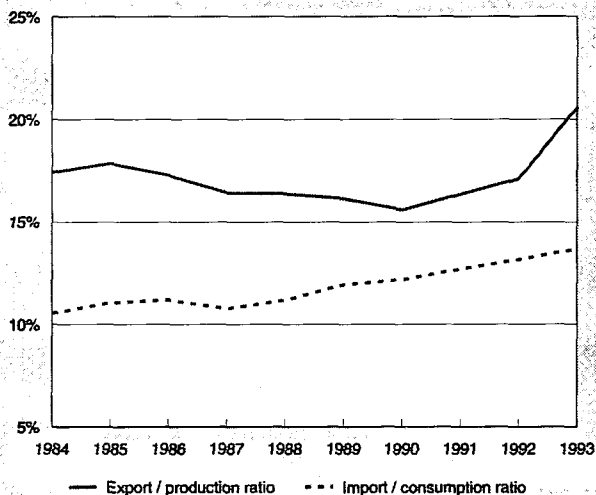
In some segments of the chemical industry, demand has declined steadily in the past few years. This is for example the case for fertilisers, for which demand is directly proportional to agricultural output. As production declined because of the reform of the Common Agricultural Policy (CAP), so did demand for fertilisers. Fertiliser demand is expected to decline further in the coming years.

Another example is the man-made fibres industry, of which many customers have moved to countries with cheaper production costs, especially in the Far East. Following their customers, fibre producers have reduced their capacities in Europe and invested in the emerging markets.

### Supply and competition

Global competition is increasing both in the bulk and specialty chemical industries. Producers located in South America, in the Middle East or in Asia have built a strong chemical industry in these countries. Export markets for European-based companies have shrunk as local industry developed. Furthermore,

**Figure 8: Chemicals and man-made fibres  
Trade intensities**



Source: DEBA

import competition has mounted in Europe, as these countries have cost structure that compares favourably to European producers cost. As far as European producers are concerned, they will increasingly have to focus on higher value-added and more specialised market segments in order to maintain margins.

Competition has been particularly strong in the early nineties, as the chemical industry (and especially the petrochemicals and plastic segments) were plagued by worldwide over capacity. This situation will subside in the coming years as demand grows. However, the European overcapacity situation will not recede as rapidly, as the industry did not achieve any significant cut in petrochemicals capacity in 1993/94. A number of old and uncompetitive plants are still operating, which makes average production costs higher in Europe than in other regions. Competition from imports is a determinant factor in the future evolution of the European basic chemical sector, as it is strongly export-oriented: export intensities amount to 50 % in Germany and the United Kingdom, and around 60 % in France.

Not all sectors of the chemical industry have such a poor outlook. The pharmaceutical industry, for example, will continue to benefit from rising standards of living and growing concerns for health on the demand side, and, on the supply side, from the high quality of European products and research in this sector. At the same time, the industry will suffer from government programmes aiming at checking social security costs and especially health care costs.

### Production process

While investment in nominal terms expanded by about 10 % between 1985 and 1989, investments have declined since 1990. As the industry suffered from over-capacity, especially in the basic products segment, European chemical companies refrain from building new capacity. Therefore, the greatest proportion of investment expenditure is at present directed towards rationalisation rather than towards capacity expansion.

The sector is an intensive energy user. The energy use is concentrated in the upstream basic chemical subsector. The biggest energy user is the petrochemical sector, with electricity and hydrocarbon (used both as energy source and as raw material) consumption of 35 % to 40 % of production costs. Other sectors with high energy contents are plastics (20 % to 25 %), inorganic chemicals and fertilisers (each about 15 %). The refined chemical sector is a relatively small energy consumer, but since the basic industry is its main supplier, it is bound to be affected indirectly by energy price rises. Profitability of basic chemicals is more vulnerable to oil price increases than that of specialty chemicals: as the basic chemical market is a very competitive one, it is difficult to pass price rises to purchasers.

## INDUSTRY STRUCTURE

### Companies

Six of the world's top ten chemical companies are EU based. With about 32 700 enterprises (including small enterprises, with less than 20 employees) in 1990, the chemical industry remains a concentrated sector, with 7.9 % of the enterprises representing 79 % of turnover. The top ten leading EU companies accounted for 48.6 % of total turnover of the industry in 1990, with the top five companies taking 32.6 % of turnover.

Economies of scale are particularly important in the basic chemicals subsector. It is a highly capital intensive sector that places commodity products on very competitive markets. Marketing large quantities is thus a necessity to generate sufficient margins. These economies of scale explains the existence of very large companies in the basic chemical segments, which have then expanded their activities towards downstream specialty chemicals.

Economies of scale are also important in the pharmaceutical sector. Fixed costs are important, in terms of research to find and develop new drugs, and then in terms of marketing. As the cost of producing a new drug is such that it has to be marketed on as large a market as possible in order to maximise revenue, pharmaceutical companies should therefore be present in all the large markets (EU, USA and Japan).

### Strategies

During the 1980s, larger companies were moving into specialty chemicals in order to improve margins and profitability. Mergers and acquisitions (M&A) activity leading up to the Single Market was intense, concentrating almost exclusively on downstream chemicals (plastic containers and film, specialty chemicals, pharmaceuticals, cosmetics, fertilisers) with the objective of strengthening and expanding market share. Also, the fall in the dollar exchange rate encouraged EU companies to undertake major investments in the USA during the second half of the eighties.

In 1994, after a significant slow-down of since 1990, M&A activity has been intense. In the chemical industry, it is the pharmaceutical subsector that has made the headlines. The main factors behind this are pressure on prices from governments, which try to control their health budgets, and the concentration of buying power in the United States. Among the most important deals were the purchase of US company Syntex by Roche of Switzerland, for 5.3 billion USD, the purchase of American Cyanamid by American Home Products for 9.7 billion USD, and the two purchases by SmithKline Beecham (UK/US): Sterling Health and Diversified Pharmaceutical Services, both companies from the USA. In January 1995, another important bid had just been launched, as Glaxo (UK) proposed to take over Wellcome (UK) for 9.2 billion pounds.

In other segments of the chemical industry, M&A activity has also been intense in 1994. While in the early nineties, many companies tried to disinvest from non-core businesses they had acquired in the eighties, in 1994, a number of com-

**Table 6: Chemicals and man-made fibres  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	25 366	77.6	7.2	11.4
20-99 employees	4 748	14.5	10.6	9.6
100 or more employees	2 594	7.9	82.2	79.0

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

**Table 7: Chemicals and man-made fibres  
The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Hoechst	D	23 809	1 942	170.2
Bayer	D	21 203	1 996	151.9
BASF	D	20 976	1 186	112.0
Rhône-Poulenc	F	12 168	1 718	81.7
Imperial Chemical Industries	UK	10 817	783	87.1
Smithline Beechem	UK	7 910	1 770	52.7
Akzo Nobel	NL	7 600	900	60.7
Glaxo Holdings	UK	7 251	2 678	47.2
Henkel	D	7 170	764	40.5
L'Oréal	F	6 066	910	32.3

Source: DABLE

panies which had finished with their disinvestment program (although this has been less the case in France and Germany) were looking for ways to strengthen their core businesses, through acquisitions and joint ventures. Joint ventures are popular, as many companies do not want to sell out entirely, as they cannot yet obtain reasonable prices for outright take-overs.

### Impact of the Single Market

The European Single Market programme had a globally positive impact on the chemical industry. This is especially true for chemical industries which are closest to consumer markets, such as maintenance products, soaps, detergents, or paints, and where national regulations were still quite different before the programme was launched. In those sectors, the harmonisation has allowed the industry to restructure its activities, to target a larger market and benefit from economies of scale. On the other side, European harmonisation had less impact on the basic chemical industries (such as petrochemicals, fertilisers or basic chemicals) as most of these markets were already internationalised in 1985.

Much remains to be done before the Internal Market becomes reality, however. A number of Directives that would directly impact the chemical industry still have to be finalised. For example, the completion of the Internal Energy Market is an important step for the energy intensive chemical industry.

Where Directives exist, implementation is sometimes slow, or varies across Member States. This is especially the case of environmental regulations. The chemical industry is concerned that, under the principle of subsidiarity, some Member States would adopt more or less stringent regulations, re-installing de facto some barriers to intra-EU trade. The sector favours a harmonised business environment within the EU, and therefore believes that the principle of subsidiarity should be implemented with care. The chemical industry is also concerned about the persistence of State aids often to State owned companies, which help maintain uncompetitive capacities and distort competition.

### REGIONAL DISTRIBUTION

Proportionally to GDP, Spain, Belgium, Luxembourg, the Netherlands and Ireland have chemical industries bigger than that of other EU countries. With regard to product segmentation, the German, Dutch and French industries are more oriented towards basic chemicals and plastic materials, while the United Kingdom and Italy have a greater share of pharmaceutical and a few other every day consumer products.

### ENVIRONMENT

Environmental problems are particularly noteworthy in the case of the chemical industry. Environmental costs represent some 3.5 % of turnover for major European chemical companies, and 15 % of new investments. This latter percentage will increase to 20 % or more in the decade to come.

The problems raised by the chemical industry with regard to the environment can be separated into the pollution caused during the production process, and the downstream pollution occurring during consumption and disposal of the industry's final products. In the first area the industry is emitting harmful substances into water bodies and into the air, for example NOx and SO2, causing acid rain. The industry is also confronted with the scarcity of tipping sites to deposit solid waste. With respect to global environmental pollution, as a big energy user, the industry is a big emitter of CO2, one of the gases contributing to the greenhouse effect. The industry has opposed a tax on energy use or on the carbon contents of the fuels used, proposed by the EU Commission as a means to achieve stabilisation of CO2 emissions at the turn of the century, on the ground that energy taxes would undermine its competitiveness. However, the industry has supported an industry energy efficiency programme.

According to CEFIC, the observation of long term trends since 1960 reveals no correlation between oil prices and energy

**Table 8: Chemicals and man-made fibres  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.46	1.36
Danmark	0.71	0.76
BR Deutschland	1.03	0.93
Hellas	0.72	0.80
España	0.81	0.97
France	0.95	1.11
Ireland	1.02	1.52
Italia	0.95	0.85
Luxembourg	0.23	0.76
Nederland	1.48	1.31
Portugal	1.13	0.55
United Kingdom	0.94	1.03

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

efficiency. In other words, fuel and power energy consumption by the European chemical industry is not responsive to energy prices. International competitive pressure has been the real driving force behind the permanent and dramatic progress in its energy efficiency over the last 30 years. It follows that, according to CEFIC, energy taxes would further impair the international competitiveness of the EU chemical industry without bringing any progress in energy efficiency.

On the other hand, in the area of the environmental auditing of industrial installations, the industry has largely accepted the core principles of an EU Commission proposal on eco-audit, according to which industry would voluntarily allow such audits, checked by accredited auditors. The European Chemical industry has developed its own environmental programs, called Responsible Care.

Pollution linked to the use of chemical products can happen either at the time of actual use or at the time of disposal of waste. In the first case, examples relate to the use of solvents in paints and adhesives, and to the contamination of water tables by nitrates in fertilisers. In the area of solid waste disposal, the industry is faced with the successful implementation of plastics recycling infrastructure within 10 years, according to the EU proposal on packaging waste. This will stretch the plastic industry, as the recycling of plastics is generally less advanced than that of other materials used for packaging, such as paper and board, glass or aluminium.

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## OUTLOOK

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Investments should start increasing again in 1995, under the impulse of high and increasing operating rates. However, the structural problem faced by the European chemical industry is still present, especially in the basic chemical sector: an excess of capacity, and high production costs, which pushes companies to continuously press for productivity gains. In this regard, activity in mergers and acquisitions will remain important, especially in the pharmaceutical and basic chemical businesses, but also in a number of specialty chemical segments.

Written by: DRI Europe

The industry is represented at the EU level by: European Chemical Industry Council (CEFIC). Address: Avenue E. Van Nieuwenhuysse 4, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

# Basic industrial chemicals

NACE 251, 252, 253

Despite good performances in 1994, the European basic chemical industry still faces structural problems. In addition, demand is declining in some segments, such as fertilisers. It is thus vital for the basic chemical sector to continue its restructuring process and to invest in new, modern productive capacity.

## INDUSTRY PROFILE

### Description of the sector

The data presented in this monograph correspond to NACE classes 251, 252 and 253, which cover basic organic and inorganic chemicals. The basic industrial chemicals sector includes units exclusively or primarily engaged in the manufacture of inorganic chemicals (including simple and complex fertilisers), electrochemical products, organic chemicals (including those obtained from petroleum and coal), synthetic rubber and plastics materials, mineral pigments and organic dyestuffs, etc., and in the distillation of tar and benzole. In this classification are considered not only the units producing such basic chemicals but also those units which both produce them and process them into finished products.

The petrochemical industry includes activities such as the cracking of ethylene and other olefins such as propylene and butadiene; the manufacturing of aromatic products such as benzene, toluene and xylenes; the manufacture of other products such as ammonia, methanol and carbon black. Petrochemicals also include the manufacturing of the intermediates products such as ethylene oxide or ethylene glycol, vinyl chloride, acrylonitrile, etc.

Taking the United Kingdom in 1991 as an example, petrochemicals accounted for 50.6 % of the production of the basic chemical industry. Petrochemicals are based on the processing on first derivatives of oil (such as naphtha) and natural gas.

The synthetic resins and plastics industry accounted for 21.1 % of production of basic chemicals. This segment of basic chemicals transform petrochemicals intermediates into synthetic resins, such as polyethylene, polystyrene, or polypropylene. The synthetic rubber industry transforms petrochemical intermediates into synthetic rubber, such as polybutadiene. It accounted for 2 % of basic chemical output.

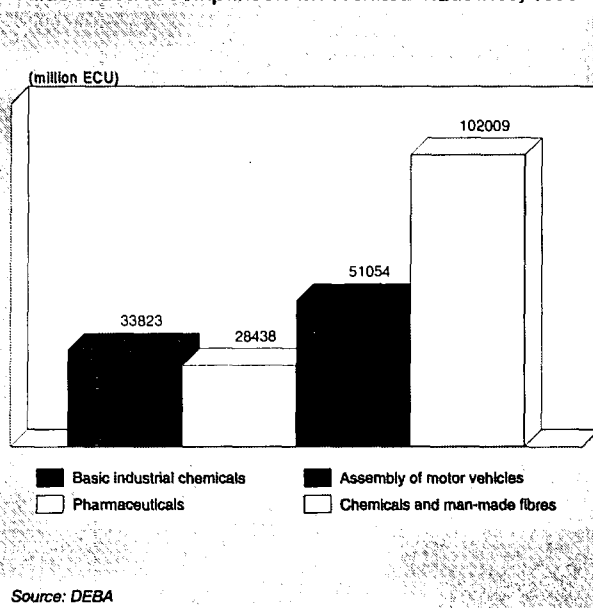
Inorganic chemical industry is based on the processing of mineral products, and includes, among other, the production of acids, such as sulphuric or nitric acids, or the production of metal oxides, such as titanium oxides. Inorganic chemicals account for 10.3 % of basic chemical output.

Fertilisers accounted for 6.8 % of basic chemical production. Fertilisers produced in Europe are almost exclusively nitrous (N) fertilisers. Other fertilisers, either phosphates (P<sub>2</sub>O<sub>5</sub>) or potash (K<sub>2</sub>O), are imported.

Pigments and dyestuffs accounted for 9.2 % of basic chemical production.

Because of the relative importance of the petrochemical sector, which accounts for more than half of basic chemicals sales, development specific to that segment are covered in a specific monograph which follows. Another monograph is also dedicated to fertilisers.

Figure 1: Basic industrial chemicals  
Value added in comparison with related industries, 1993



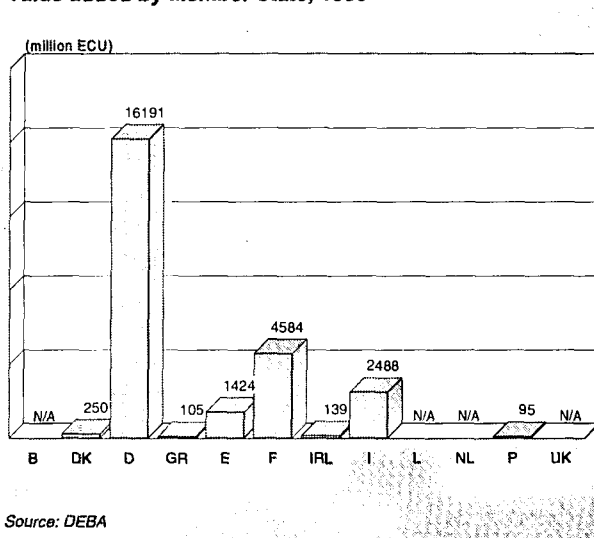
### Recent trends

Two external events had a major influence on the fate of the basic chemical industry in the mid eighties: the depreciation of the dollar, which fell by 46 % against the ECU between 1985 and 1987, and the fall of the price of crude oil, which, in dollar terms, fell by 46 % since 1986.

One has to be careful, however, at reading the trade data published here. As trade data are published only in value terms, changes can be due to a change in volume actually traded, but can also be due to a change in prices. And indeed, in 1986, basic chemical producer prices fell by 10 % to 15 % in European countries. To understand what happened, we must thus consider figures in constant prices, or in volumes.

In 1986, European price competitiveness was directly hit by the fall of the dollar, and EU trade balance declined by about one third, with exports (in value) down 15.9 % and imports down 9.9 % in value. As a consequence, European production in the basic chemical sector fell by 3.4 % in volume (Figure 3), mostly because of this fall of exports. In the following years, strong domestic demand, as the European economy

Figure 2: Basic industrial chemicals  
Value added by Member State, 1993



**Table 1: Basic industrial chemicals**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	104 673	110 995	124 036	118 776	111 400	106 476	96 601	108 322	115 120	122 010	129 000
Production	111 375	115 833	126 581	119 345	112 808	107 797	103 039	114 657	121 700	128 500	135 400
Extra-EU exports	19 807	20 627	21 597	19 889	20 966	20 944	25 282	28 101	30 200	31 900	33 500
Trade balance	6 703	4 839	2 545	568	1 408	1 322	6 438	6 335	6 580	6 490	6 400
Employment (thousands)	660.9	646.5	646.0	635.0	609.6	583.3	560.6	530.5	500.0	500.0	500.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Basic industrial chemicals**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.11	-1.27	1.14	-0.69
Production	2.85	-1.24	1.02	-0.22
Extra-EU exports	-1.38	-2.24	-1.76	0.76
Extra-EU imports	-0.36	-2.56	-1.34	-2.28

(1) Some country data for apparent consumption and production have been estimate

Source: DEBA

**Table 3: Basic industrial chemicals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	19 807	21 468	18 055	18 027	20 627	21 597	19 889	20 966	20 944	25 282	28 101
Extra-EU imports	13 104	14 915	13 437	13 591	15 789	19 052	19 320	19 559	19 623	18 844	21 767
Trade balance	6 703	6 553	4 618	4 436	4 839	2 545	568	1 408	1 322	6 438	6 335
Ratio exports / imports	1.51	1.44	1.34	1.33	1.31	1.13	1.03	1.07	1.07	1.34	1.29
Terms of trade index (1)	81.9	83.9	86.7	92.5	95.6	94.2	100.0	102.1	103.4	106.5	N/A

(1) NACE 253; Basic industrial chemicals, not including petrochemicals.

Source: DEBA

**Table 4: Basic industrial chemicals**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	86.0	86.6	84.4	91.2	97.1	101.3	100.0	101.0	107.0	111.1
Unit labour costs index (3)	82.4	87.8	93.4	92.5	91.6	93.6	100.0	106.2	105.5	105.7
Total unit costs index (4)	105.2	110.0	92.8	90.6	91.8	98.0	100.0	100.7	96.1	92.7
Gross operating rate (%) (5)	10.7	10.1	12.4	13.6	16.4	15.0	11.0	8.8	8.4	7.8

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

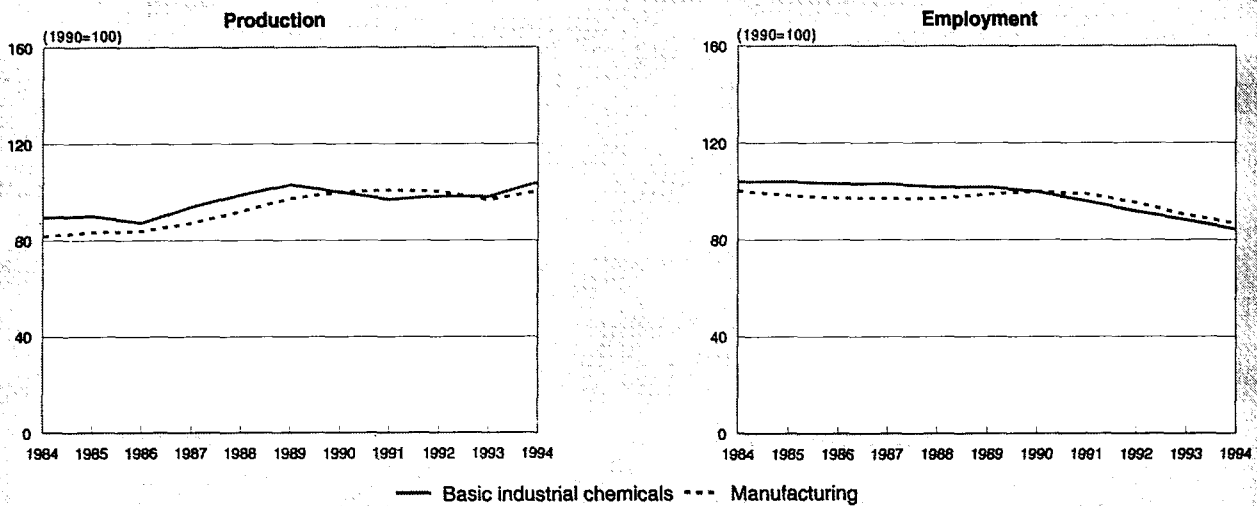
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3: Basic industrial chemicals  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

enjoyed one of its strongest booms, and a progressive recovery of exports allowed production to recover rapidly, at 7.9 % in 1987, 5.1 % in 1988, and 4.3 % in 1989.

The fall in the price of crude oil, on the other side, decreased dramatically the cost of producing basic chemicals. As selling prices remained relatively high, thanks to a fast growing demand, profitability was at its highest from 1987 to 1989 (on table 4, gross operating rate reaches a maximum of 16.4 % in 1988). The restructuring measures taken in the early eighties also helped enhance profitability in this period.

The situation changed after 1989. European economies entered a slow growth period, with an actual recession in 1993. Between 1989 and 1993, production of basic chemicals fell by 1.2 % per year on average in the EU.

Following the 1993 depreciation of several European currencies, the EU basic chemicals trade significantly improved in 1993 and 1994. In 1993, domestic demand of basic chemicals

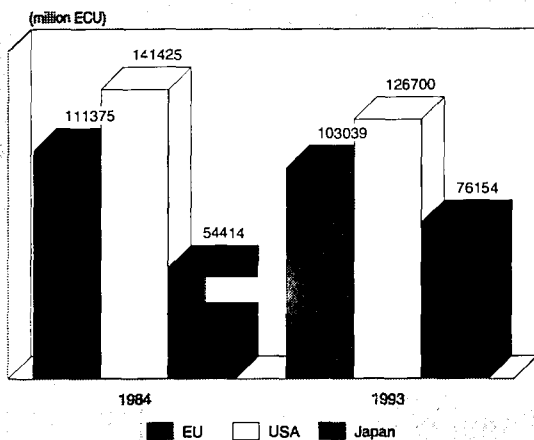
remained weak, and offset the benefits of improving trade. However, in 1994, a swing in the inventory cycle allowed domestic demand to grow. Combined with good results on the trade front, this helped basic chemical production to increase by 6 % in volume terms.

Since 1985, employment has declined in the European basic chemical industry. Almost stable until 1989, employment fell by 3.5 % per year in 1989-93, as companies were launching restructuring plans and cost cutting measures to fight declining production and profitability.

**International comparison**

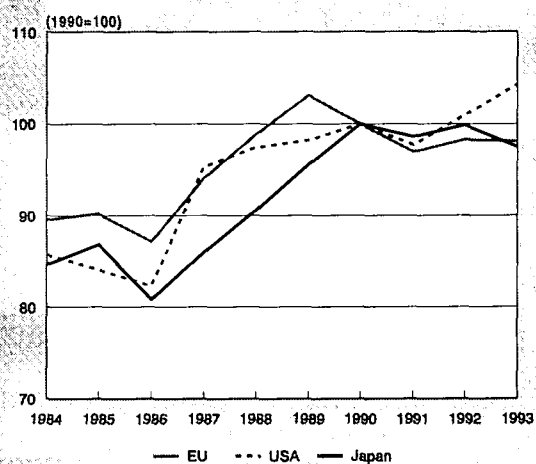
In 1993, the EU basic chemical output was worth about 100 billion ECU, about four fifths of US production in the same year. Japan is the third largest basic chemical producer, with an output worth 76 billion ECU in 1993. The importance of the Asian newly industrialised countries (NICs) is steadily growing, and their competition is affecting the position of the EU industry on the world market. Other countries, such

**Figure 4: Basic industrial chemicals  
International comparison of production in current prices**



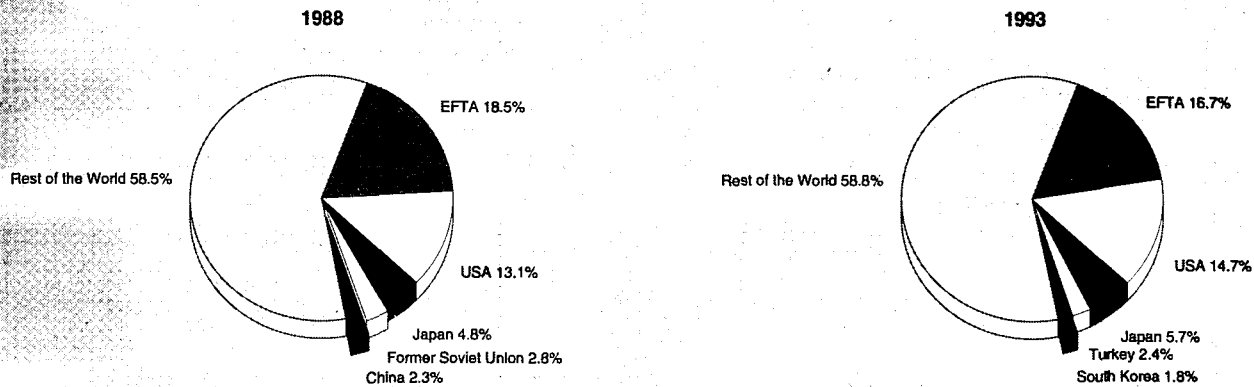
Source: DEBA

**Figure 5: Basic industrial chemicals  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Basic industrial chemicals  
Destination of EU exports**



Source: Eurostat

as Saudi Arabia and Brazil also have developed important production capacities in petrochemicals.

Over the last ten years, from 1984 to 1993, it is in Europe that production of basic chemicals has grown the least, with an average annual growth rate of 1 %. In the US, average growth was 2.2 %, and in Japan 1.6 %.

#### Foreign trade

The European trade position in the basic chemical sector is on declining trend. Export performance by European companies are hindered by an uncompetitive cost structure and the development of new production capacity around the world. Previous export markets thus tend to become self sufficient, or served by other producers, at the cost of European export performances. On the other side, import penetration regularly increases in Europe. The ratio of exports to imports fell from 1.51 in 1984 to 1.03 in 1992. European markets are also under fierce competition from eastern European imports. Western Europe is indeed a prime target for eastern producers, whose domestic markets have shrunk rapidly in the last five years.

The export surge in 1993 and 1994 temporarily halted this trend. However, as they were mostly due to currency movements, we expect the deterioration of basic chemicals trade balance to continue in the future.

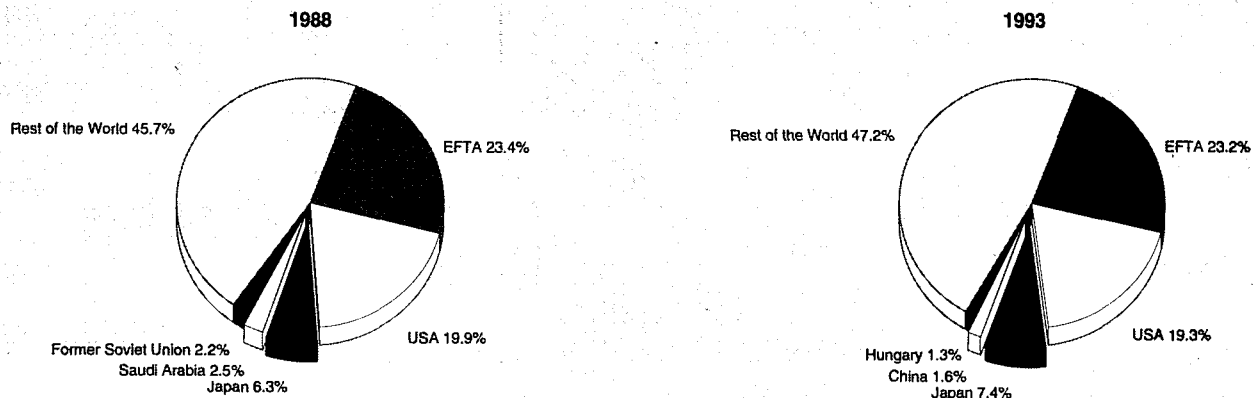
In 1993, the main export markets for the EU basic chemicals industry were EFTA countries and the USA. Together, they account for about 37 % of total exports. Japan accounted for 7.3 % of EU exports of basic chemicals. Imports mostly come from the USA (24 %), EFTA countries (more than 30 %), and Japan (9.1 %).

#### MARKET FORCES

##### Demand

The basic chemical sector is an intermediate goods producing sector, i.e. its products are mostly use as inputs by other industries. Only 4 % of basic chemicals output is sold directly to consumers and other final users. In Europe, more than 40 % of basic chemical products are sold directly to other chemical industries: pigments and dyestuffs are used by paint manufacturers, petrochemicals are used to make synthetic rubber and plastic resins, etc.

**Figure 7: Basic industrial chemicals  
Origin of EU imports**



Source: Eurostat

Another important client of the basic chemical sector is the rubber and plastic processing sector, that processes synthetic rubber and plastic resins into finished products, such as tyres, car components, pipes, packaging, houseware, equipment casing, etc. Demand for synthetic rubber and plastic resins was relatively low in 1991-93, as end-markets for plastic applications were shrinking: automotive sales were declining, thus tyres and auto components sales were low; activity in the construction sector declined. Retail sales increased only slowly in the last two years. Thus, despite an increasing use of plastics in packaging application, demand growth has been only moderate for plastic packaging. In the coming years, economic recovery and expected growth in plastic use should boost demand for plastic materials.

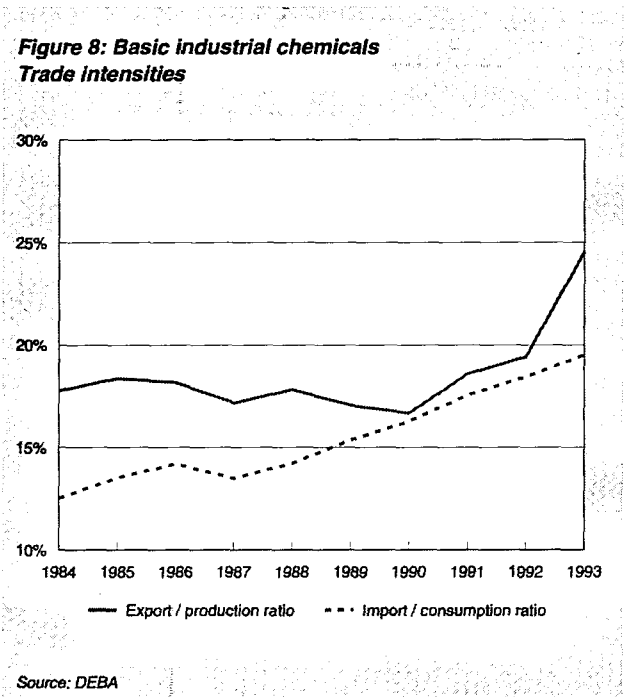
Agriculture accounts for about 7 % of basic chemicals sales, in this case fertilisers. The recent reform of the Common Agricultural Policy, for example the 15 % set aside measure, has reduced agriculture activities, thus demand for fertilisers. Fertilisers demand will continue to decline in the future. The Nitrate Directive, for example, will have a substantial impact on demand. Industry sources mention a 10 % fall in European fertiliser demand in the next five years.

The man-made fibres industry is another client of the basic chemical sector. However, as textile producers are moving their production base to countries in South-East Asia, the man-made fibres industry follows. Thus, very few capacity expansions are expected in Europe in the man-made fibres industry. Demand from this sector to the basic chemical sector will remain stagnant at best in the coming years.

### Supply and competition

The European basic chemicals industry has a strong technological base, and it compares favourably with the US and Japanese industry from the point of view of research and development. This represents an important strategic condition for a modern industry which depends on the use of more and more sophisticated materials and technologies.

A major problem for the European petrochemicals industry is its situation of outdated capacity (this situation is described in details in the monograph on petrochemicals). The situation improved in 1994, in part due to the coinciding maintenance and accidental shutdown, which reduced supply on a worldwide basis, and surge in demand, which was caused by some stock building activity and a rebound in economic activity



in Europe. European petrochemical operations were profitable in 1994.

The fertiliser industry is also under fierce competition from foreign producers, in this case eastern European companies. EU producers of fertilisers have a cost disadvantage: their main input is natural gas, which costs more in Western Europe than in other regions of the world, such as Eastern Europe.

Thus, the increasing market share and competitiveness of foreign producers previews a long term deterioration in the EU basic chemical competitive position.

### Production process

Petroleum products and first oil derivatives are used both as raw materials and as an energy source by the basic chemical sector. Fuel and power products represent the major input costs for the basic chemical industry. Therefore, profits in the industry depend to a large extent on oil prices. Other important raw materials are various mineral ores, that supplies the chemical substances needed by the industry.

High capital investments in machinery and technology are essential in this industry and represent, along with the availability of raw materials, a significant entry barrier. High competition, low product differentiation and heavy environmental constraints also increase the difficulties of the basic chemicals activity.

## INDUSTRY STRUCTURE

### Companies

The basic chemical industry is mainly composed of large companies. In the EU, the most important are : BASF, Hoechst and Bayer (D), ICI (UK) and Rhône-Poulenc (F). Other large European basic chemicals companies are the Swiss Ciba, Sandoz and Roche, the Finnish Neste (with Borealis, a joint venture with Statoil), the Norwegians Norsk Hydro and Statoil, Italian Enichem, or Dutch Akzo-Nobel.

Economies of scale are particularly important in the basic chemicals industry. It is a highly capital intensive sector that produces commodity products, thus with very few possibilities of product differentiation. Besides, markets are very competitive, especially because of import competition. Prices usually remain low, and profits margins meagre. It is thus necessary to market large quantities to generate sufficient earnings. It is because of the existence of economies of scale that concentration is high in basic chemicals.

### Strategies

The strategies of basic chemical industries follow four main axes.

First, rationalisation of production, in an effort to continuously improve productivity and cut costs. Together with a in-depth restructuring of activities, old and less efficient production units are closed, and employment reduced. The rapid fall of employment since 1990 (-3.5 % per year on average) is a consequence of this policy.

Second, restructuring of the portfolio of activities: the restructuring of activities also implies a restructuring of the king of businesses in which the various companies want to be active. Companies have focused on core businesses, while getting rid of peripheral activities in which they had no competitive advantage or where they were too small a player. This is achieved through assets sales and swaps, and mergers and acquisitions. The European petrochemical industry, through its association APPE, has tried to contribute to this restructuring, by promoting an industry-wide plan to cut petrochemical capacities in Europe, but it failed to attract sufficient interest. As targets for capacity reduction were not achieved, the plan was dropped in December 1993.

**Table 5: Basic Industrial chemicals  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	0.53	0.36
BR Deutschland	1.25	1.21
Hellas	0.73	0.51
España	0.57	0.71
France	0.75	0.89
Irland	0.53	0.40
Italia	0.99	0.76
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.69	0.16
United Kingdom	N/A	N/A

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
© SOURCE = Source: DEBA

Third, extension to pharmaceuticals and specialty chemicals, sectors which generate more value added, higher profit margins, and for which demand is less sensitive to the variation of the business cycle.

And fourth, establishment of joint-ventures in the rapidly growing Asian markets. South-East Asia is and will be the fastest growing region in the world, and opportunities are numerous in this region.

### Impact of the Single Market

The basic chemical industry was already a global industry when the Single Market programme was launched. The direct impact of 1992 has thus been minimum on this sector. However, there are a number of issues which still need to be addressed, and which the European basic chemical industry sees as major tools to enhance its competitiveness. In particular, state aids and other uncompetitive behaviour should be closely monitored, as they often contribute to maintain uncompetitive plants, in a sector where capacities are in excess.

Transport is another issue where progress could be made, especially in rail transport. Rail transport is almost not used by the European basic chemical industry, because of the perceived excessive administrative burden and delays in international rail transport. In the US, in comparison, a majority of products is moved by rail.

The completion of the Internal Energy Market, which would introduce a higher degree of liberalisation of the sector, is also a priority for the future as it would help to keep energy prices down and would likely result in greater price harmonisation across the EU, an important issue for a very energy intensive industry.

### ENVIRONMENT

The chemical industry has launched its own voluntary program, Responsible Care, to improve its health, safety and environmental performances and the public perception of it. Within this framework, several actions has been developed, such as: the VEEP programme, to reduce specific energy consumption; the ICE programme to improve safety in distribution of chemicals; the publication of annual Environment Reports to meet the European requirement on Environmental Reporting (EMAS).

The publication of environmental reports and audits, certified by independent agents recognised by the authorities, is seen by the chemical industry as a major step to gain greater trust from the public. The chemical industry, under the coordination of CEFIC, has already organised environmental reporting on a voluntary basis, within the Responsible Care program. Various countries has also published National standards (for example BS7750 in the UK, the Netherlands and Finland, or NFX30-200 in France).

The EU regulation on eco-management and auditing (EMAS) comes into force by Spring 1995. The EMAS regulation requires the publication of an environmental statement after any environmental audit, which should be done at least every three years. CEN, the European standards body, is working on an environmental management standard for auditing and reporting under the EMAS regulation, and should come up with a European standard by April 1996. This standard is likely to be ISO14001, from the International Standard Organisation. However, EMAS include elements, such as an initial review and environment statement, which are not part of ISO14001. CEN might thus need to write additional standards to complement ISO14001.

Initiatives from the chemical industry and from various countries should be consistent with European standards, which hopefully will remove the burden of applying for several certifications. In the long run, it is likely that only the European standard will remain.

Other environmental issues at the European level are: the setting up of a polluting emission register from industrial sites; the revision of the Seveso Directive on major accidents hazards, the proposed Air and Water Quality Directive; a Volatile Organic Compounds Directive.

The role of the environment in international trade is now recognised as a major potential issue, although no concrete case of trade-related environmental problem has actually been recorded in the chemical industry. A committee on Trade and Environment has been set up by the World Trade Organisation (WTO). The issues at stake are to avoid the creation of trade distortions from environmental issues; and prevent relocation of polluting production to countries where environmental legislations are less restrictive.

### OUTLOOK

The future of the basic chemicals industry is clouded by rising competition from producers in other parts of the world, particularly in developing countries. Outdated capacity will remain in the industry for several years to come. EU companies will continue to focus on cost cutting leading to a further reduction in employment. The boost in demand registered in 1994 (+6 % in volume) should subside in 1995, as export demand slow down and inventory build up stops, while domestic demand is not expected to take over as the engine for growth.

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# Petrochemicals

## NACE 252

The petrochemicals industry represents more than two-thirds of the basic chemicals sector and a quarter of the total chemicals industry turnover. Petrochemical market conditions improved significantly in 1994, with a return to profitability for European companies. However, long-term structural problems of the European petrochemicals industry, such as uncompetitive plants, remain largely unresolved.

### INDUSTRY PROFILE

#### Description of the sector

The petrochemicals industry is defined as the industry that uses raw materials derived from oil or natural gas to manufacture the following products:

- primary petrochemicals: olefins (i.e. ethylene, propylene, butylene, butadiene, acetylene), aromatics (i.e. benzene, toluene, xylenes, naphthalene) and methanol;
- petrochemical intermediates: vinyl chloride, acrylonitrile, cyclohexane, ethyl benzene, styrene, phenol, etc.;
- petrochemical products: plastics, synthetic fibres, solvents, surface active agents, additives, synthetic rubber, fertilisers and agricultural chemicals.

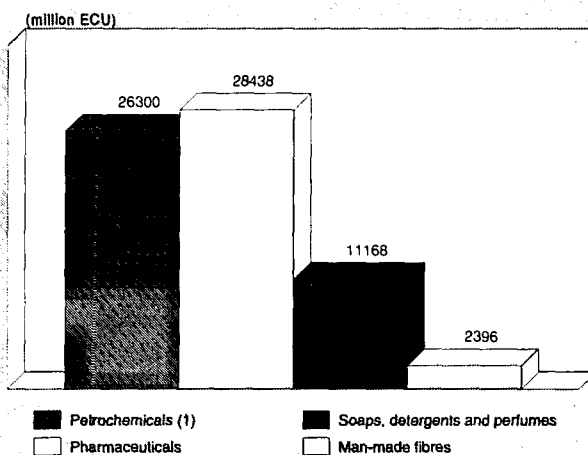
This monograph does not deal with the last categories, which are the subject of separate monographs in these and other sectoral chapters. The lack of a common data base for petrochemical products is the main reason for the absence of complete statistical data.

The petrochemicals industry is concentrated in Germany and the Benelux countries, which hold 27 % and 25 % of the Community's olefin cracker capacity of ethylene production respectively, followed by France, the United Kingdom and Italy, with 18 %, 15 % and 12 %.

#### Recent trends

Over the last ten years, the production of basic petrochemical products has increased steadily, as shown on Table 2. On average, ethylene production and consumption in volume terms

Figure 1: Petrochemicals  
Value added in comparison with related industries, 1993



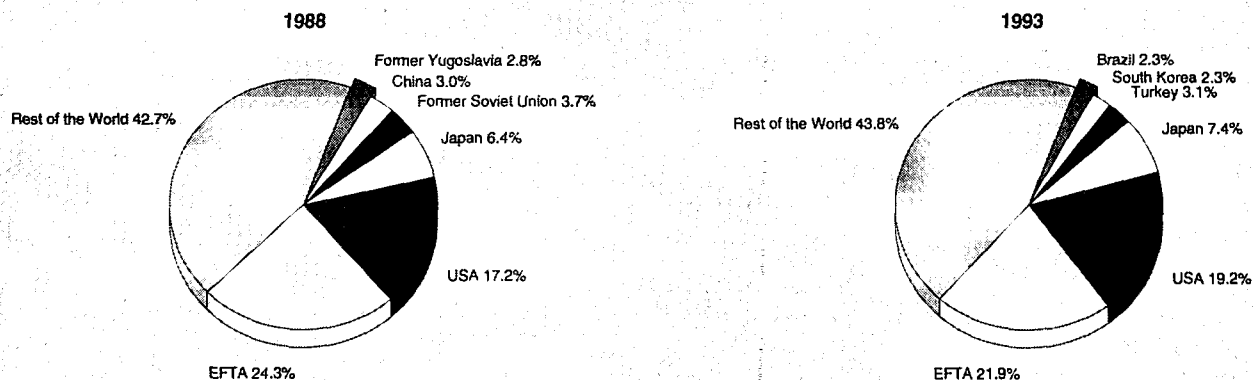
(1) DRI Europe estimate.  
Source: DEBA

has increased by about 3 % per year, propylene by about 4 % per year and benzene by about 1 % per year. Butadiene is the exception, with a 0.1 % annual decline of production, while consumption increased by an average of 2 % per year.

Despite the poor economic environment in the last two to three years, production and consumption of basic petrochemical products in the EU increased in 1992 and 1993. Ethylene production increased by 5.3 % in 1992 and 1.7 % in 1993, to reach a total production in 1993 of 14.5 million tonnes. Propylene production increased by 7.3 % in 1992 and 3.8 % in 1993, to reach a total production of 9.5 million tonnes in 1993. Production of butadiene and benzene, however, declined in 1993.

The prospects for 1994 look much brighter. According to the Association of Petrochemical Producers in Europe (APPE), the production of all major petrochemical products increased significantly in the first half of 1994. For example, output

Figure 2: Petrochemicals  
Destination of EU exports



Source: Eurostat

**Table 1: Petrochemicals**  
**EU supply of and demand for the primary petrochemical products**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>ETHYLENE</b>										
Actual capacity	13 443	13 074	12 878	13 230	13 830	13 925	14 350	15 895	16 659	17 384
Production	11 194	11 161	11 636	12 375	13 338	13 050	12 820	13 507	14 225	14 468
Consumption	11 421	11 393	11 813	12 572	13 377	13 122	13 022	13 527	14 296	14 632
<b>PROPYLENE (1)</b>										
Actual capacity	7 751	7 400	7 536	7 885	8 363	8 838	7 255	7 963	8 453	8 681
Production	6 617	6 243	6 632	7 097	7 755	7 734	8 005	8 518	9 143	9 492
Consumption	6 821	6 801	7 151	7 374	7 993	8 057	8 320	8 574	9 390	9 505
<b>BUTADIENE</b>										
Actual capacity	2 051	2 083	1 905	1 983	2 015	2 129	2 159	2 189	2 222	2 110
Production	1 710	1 623	1 552	1 679	1 819	1 815	1 847	1 753	1 786	1 693
Consumption	1 227	1 238	1 208	1 286	1 411	1 405	1 455	1 440	1 488	1 458
<b>BENZENE</b>										
Actual capacity	6 559	6 381	6 611	6 750	6 481	6 861	6 885	6 949	7 108	7 184
Production	4 834	4 796	4 740	5 150	5 475	5 446	5 400	5 439	5 356	5 383
Consumption	5 124	5 077	5 083	5 356	5 956	5 769	5 840	5 636	5 629	5 629

(1) Capacity from 1990 onwards is based on non-refinery production (i.e. steam cracking), whereas production figures cover the whole industry.  
Source: CEFIC, Eurostat

**Table 2: Petrochemicals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 063	16 114	19 352
Extra-EU imports	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 058	13 911	13 321
Trade balance	5 917	5 797	4 552	4 469	4 811	3 286	1 520	2 005	2 203	6 031
Ratio exports/imports	1.68	1.58	1.50	1.49	1.44	1.25	1.11	1.14	1.16	1.45
Terms of trade index	90.3	89.4	95.1	97.0	95.8	97.5	100.0	102.2	103.1	105.9

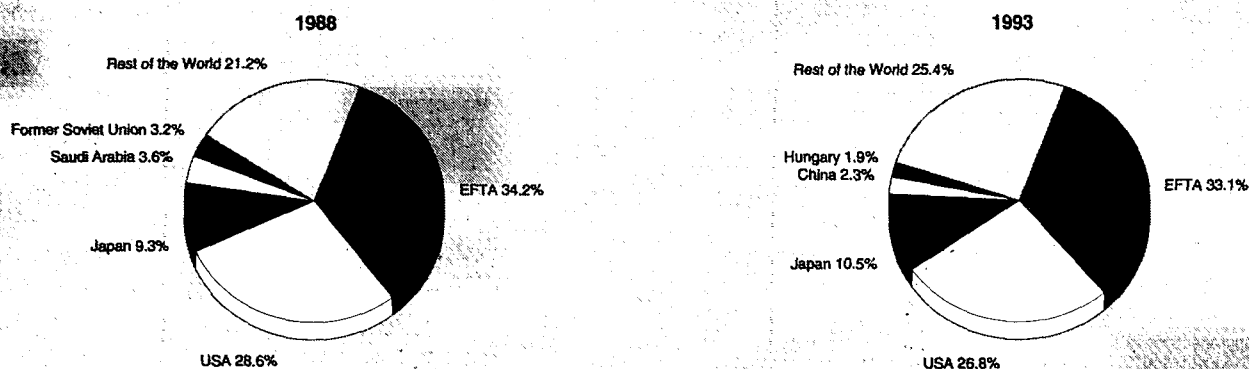
Source: Eurostat

**Table 3: Petrochemicals & carbo-chemicals (1)**  
**Extra-EU exports**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 063	16 114	19 352
Belgique/België, Luxembourg	859	808	692	643	911	1 051	955	1 042	1 035	1 398
Danmark	74	82	81	78	135	97	92	72	76	170
BR Deutschland	6 154	6 485	6 055	6 142	6 566	6 921	6 417	6 662	6 624	7 947
Hellas	19	21	21	33	24	38	37	40	40	57
España	614	683	537	538	626	592	606	613	569	614
France	1 588	2 084	1 426	1 389	1 618	1 739	1 618	1 718	1 770	2 018
Ireland	426	421	338	304	374	485	455	592	618	901
Italia	1 535	1 619	1 375	1 399	1 755	1 770	1 504	1 587	1 522	1 727
Nederland	1 885	1 835	1 499	1 581	1 839	1 967	1 834	1 867	1 852	2 007
Portugal	44	65	49	60	93	73	103	70	57	73
United Kingdom	1 468	1 669	1 507	1 482	1 808	1 911	1 757	1 800	1 950	2 439

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.  
Source: Eurostat

**Figure 3: Petrochemicals  
Origin of EU Imports**



Source: Eurostat

of ethylene increased by 10.4 % over the first half of 1993. Activity remained buoyant in the summer, as temporary capacity shortages abroad, caused by maintenance shutdowns and accidents, boosted export demand.

In terms of basic and intermediate products, the petrochemicals sector accounts for approximately one-quarter of the total value added of the chemical industry, i.e. 26 billion ECU in 1992. Eurostat figures show that total employment in the basic chemical sector (including NACE 251 and 253) reached a level of 607 000 in 1992, with a decrease of more than 8 % from the 1985 peak.

#### International comparison

The EU is a major player in the world market for primary petrochemicals, being the largest producer of butadiene and benzene and the runner-up to the USA, for the production of ethylene and propylene. EU production, in volume terms, is about twice that of Japan. Recently, new producers have emerged on the world scene, particularly in south-east Asia (e.g. Korea), Brazil and the Middle East.

#### Foreign trade

The EU's trade balance with the rest of the world is positive and increased sharply in 1993 because of favourable currency

movements in Spain, Italy and the UK. From 2.2 billion ECU in 1992, it rose to more than 6 billion ECU in 1993, attributed mostly to a rise in extra-EU exports, from 16 billion ECU in 1992 to 19.3 billion ECU in 1993. This is a reversal of the trend observed in the recent past. From 1984 to 1992, the EU trade surplus in petrochemicals declined from 5.9 billion ECU to 2.2 billion ECU.

In the medium to long term, however, the EU trade surplus should resume its downward trend, as European-based production cannot completely overcome its cost disadvantage in global markets relative to US, Middle East and Far Eastern producers.

A breakdown by Member States shows the predominance of Germany, which is both the major exporter and importer in the EU, accounting for 41 % of extra-EU exports and 23 % of extra-EU imports. In this respect, other significant countries within the EU are the United Kingdom, whose figures are respectively 13 % and 14 %, France (10 % and 14 %), the Netherlands (10 % and 12 %), Italy (9 % and 15 %) and Belgium (7 % and 10 %).

Before the recent enlargement of the EU, the EFTA countries and the USA were the main end markets for extra-EU exports as well as the primary source of EU imports. In fact, together

**Table 4: Petrochemicals & carbo-chemicals (1)  
Extra-EU imports**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 058	13 911	13 321
Belgique/België, Luxembourg	585	747	683	716	1 181	1 481	1 593	1 661	1 641	1 325
Danmark	245	252	243	247	283	286	273	261	260	312
BR Deutschland	1 917	2 224	2 066	2 086	2 349	2 905	3 060	3 276	3 241	3 096
Hellas	73	82	97	102	107	142	151	175	162	169
España	497	515	571	576	691	787	809	883	827	633
France	1 280	1 409	1 362	1 369	1 634	1 839	1 951	1 794	1 769	1 850
Irland	133	158	96	120	144	191	224	258	250	256
Italia	1 420	1 652	1 450	1 438	1 642	2 115	2 072	2 004	2 021	2 045
Nederland	1 267	1 625	1 301	1 370	1 453	1 885	1 832	1 812	1 852	1 601
Portugal	114	105	91	108	145	128	139	156	159	153
United Kingdom	1 217	1 205	1 066	1 047	1 310	1 598	1 757	1 778	1 730	1 881

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals.  
Source: Eurostat



they made up 41 % of total extra-EU exports and 60 % of extra-EU imports. Non-OECD countries, which account for most of the "Rest of the World" category in Figure 2 (44 % of exports), also represent an important market for the EU.

## MARKET FORCES

### Demand

The products of the petrochemicals industry are used mainly by other branches of the chemicals sector, especially specialty chemicals, synthetic resins, plastics and synthetic rubber, used in virtually all segments of our industrialised economies (such as packaging, construction, electronics, or transport); pharmaceuticals; paints varnishes and inks; and man-made fibres.

The industry is traditionally very cyclical. Based on Table 2, the two most recent low points of the cycle occurred in 1986/87 and 1990-92. Surprisingly, despite the overall poor economic environment (GDP fell by 0.6 % in the EU in 1993), demand for ethylene and propylene grew in 1993, although more slowly than in 1992.

The demand for primary and intermediate petrochemicals depends mostly on the growth in end markets, which in turn relies on several factors. First, the economic environment; second, inter-product competition (i.e. among plastics and other materials like steel); third, the emergence of new products; fourth, the influence of environmental restrictions; and finally, changing trends in the global petrochemicals industry.

### Supply and competition

The European petrochemicals industry is currently suffering from a combination of problems which contribute to a lack of competitiveness in a global context. An important feature of this is structural overcapacity.

During the period 1986-1991, lower feedstock prices and strong economic growth motivated the industry to invest heavily in increasing both capacity and flexibility of choice of feedstocks. However, new capacity only came in 1991 and after, when the demand growth rate started slowing down. In the last three years, ethylene production capacity in the EU has increased by 21 %. Three new olefin crackers became operational recently. Furthermore, the removal of bottlenecks added the equivalent of another three olefin crackers. Consequently, the capacity utilisation rate fell to 83 % in 1993.

At the same time, capacity of production has increased rapidly worldwide, especially in south-east Asia and the newly industrialised countries, such as Korea and Taiwan. Between 1990 and 1993, world ethylene capacity increased by 10.1 billion tonnes, against an increase of demand of 6.3 billion tonnes.

This has posed problems for European-based producers, who operate at a competitive disadvantage. A ton of ethylene produced in Europe can cost up to twice as much as a ton produced in the Middle East, because the latter uses ethane whereas in Europe naphtha is typically used. However, while European ethane-based producers have higher raw material and labour costs, in the Middle East distribution costs are higher. Additionally, new producers in the Middle East increasingly will have to use naphtha or liquefied petroleum gases, where they will lose their raw material cost advantage.

This, unless they introduce raw material discounts. The practice of "dual pricing" in Saudi Arabia, for instance, has caused concern within the industry, as it threatens to distort the world market.

Already, the increasing market share and competitiveness of foreign investors has had long-term consequences for European petrochemical producers. Thus, while a brief increase in the trade surplus of European producers was experienced in 1993 (due mostly to exchange rate fluctuations), a longer

term decline in the level of trade surplus is clearly shown in Table 2.

Market prices for petrochemical products have remained low in the recent years, as the situation of excess capacity forced producers to lower prices to keep their market share and to keep their factory running at as high a utilisation rate as possible, in order to lower the influence of important fixed costs. As a result, margins and profits have been under serious pressure, and the petrochemical operations of many European companies lost money in 1993.

The situation improved in 1994, in part due to the coinciding maintenance and accidental shutdown, which reduced supply on a worldwide basis, and surge in demand, which was caused by some stock building activity and a rebound in economic activity in Europe. European petrochemical operations were profitable in 1994.

### Production process

Most of the petrochemical crackers being built around the world today are based on naphtha, or mixed streams. In this context, Europe is not at a technological or structural disadvantage, as long as manufacturing costs are competitive. Unfortunately, in many cases they are not. Nowadays, naphtha-based ethylene cracking can be as much as 20 % more expensive than LPG or natural gas-based cracking.

In recent years, there has been considerable investment in Europe to allow cracker operators to select the feed most appropriate for their particular circumstances. For instance, major European petrochemical companies have sought to take advantage of rapid growth in the industrial gases' market, by setting up pipelines to feed petrochemical sites. A case in point is the BP cracker at Grangemouth in Scotland.

However, in the medium term, there is no real alternative to naphtha as principal feedstock for ethylene production in Europe. In any case, the investment to improve operating costs and efficiency has improved the overall competitiveness of the European industry.

## INDUSTRY STRUCTURE

### Companies

Activity in the petrochemicals field is performed by large-scale European and international groups, which have undergone extensive restructuring following the oil crises and the slowdown in economic growth that characterised the end of the 1970s and the beginning of the 1980s. The restructuring has prompted a reduction in the number of producers and sites as well as a shift in emphasis with regard to certain products. For example, during the 1980-1986 period, eight EU producers of ethylene disappeared through the closure of 30 sites representing a capacity of 4.7 Mt. At the end of 1993 there were 52 olefin crackers operating in western Europe, owned by 27 companies.

Among the five leading EU chemical firms (BASF (D), Bayer (D), Hoechst (D), ICI (UK) and Rhône-Poulenc (F)), three are involved in the production of basic and intermediate petrochemicals (Rhône-Poulenc and Bayer are the exceptions). The proportion of activities involving basic chemicals varies among these three: according to 1991 data, Hoechst can ascribe a share of 12 % of its turnover to petrochemicals, BASF 20 % and ICI 19 %. Among the ten non-EU leaders, Dow Chemical (USA) and Exxon (USA) are firmly installed in the European petrochemicals sector.

The petrochemicals sector is closely related to the oil refining industry for its supply of raw materials. This has engendered the development of petrochemical activities on their own from the refining industry, as part of a strategy of downstream integration. It is worthwhile to note that among the top 15 chemical groups at the world level, four of them are petro-



chemical subsidiaries of larger oil companies: Shell Chemical (NL/UK), Enichem (I), Elf Atochem (F) and Exxon Chemical (USA). Traditionally these companies focus their production more on basic chemicals than on refined chemicals.

### Strategies

Faced with a situation of excess, costly, capacity in Europe and the world, European companies have accelerated the concentration of the petrochemicals sector. The European market is still characterised by a large number of producers. In the ethylene market for example, there are 27 producers in Europe, much more than in the USA.

The existence of structural excess capacity should encourage European-based producers to press ahead with the restructuring process. This would allow the shut-down of the oldest facilities, which are now uneconomical to operate, and which contribute to the European petrochemicals sector's uncompetitiveness. However, companies seem reluctant to take initiatives in this regard.

In 1993, given the dimension of the inefficient capacity problem, the APPE developed a plan - later aborted - for the closure of uneconomic plants. The idea was to create a fund, financed by all ethylene producers in Europe, to help companies closing cracker capacity. However, it appeared that the target of 1.5 million tonnes of capacity to shut down would not be achieved, and the plan was abandoned.

Since then, one cracker, with a capacity of 335 thousand tonnes per year, has been closed, by BP (UK/NL) at Baglan Bay, South Wales. This followed the expansion of a BP ethylene cracker in 1992, at Grangemouth in Scotland, thus increasing Europe's global ethylene capacity. A cracker at Leuna also has been closed.

In 1994, the ethylene and petrochemical markets have improved, as explained above. As a result, the incentives for companies to close some capacities have faded.

However, the primary structural problems remain largely unchanged: a great number of uncompetitive plants and high operating costs. Other factors, not directly linked to market fluctuations, also affect the petrochemicals sector in the EU: i.e. the presence of too many players with too many manufacturing sites; a lack of integrated pipelines; the need to complete the integration of the European market, and a poor pricing mechanism.

Competition from East European producers has declined recently. As they now have to buy their feedstock in hard currencies, their operating costs have increased dramatically. They must improve their cost structure before exporting again on European markets. Although this should not influence the West European market in the short run, in the medium term, imports from Eastern Europe may add to the existing overcapacity problem in Western Europe.

### Impact of the Single Market

The petrochemical industry was already a global industry before the Internal Market programme was launched. The impact of the 1992 programme on this sector has thus been relatively limited. Nevertheless, there remain a number of issues which should be addressed and which the European petrochemical industry considers to be important to enhance its competitiveness.

One of these is a closer monitoring of state aids and other regulatory measures taken in some Member States. These aids often contribute to the maintenance of uncompetitive plants, in a sector where there is already excess capacity.

Improving transport networks is another area in which progress could be made, especially for rail transport. At present, road transport dominates in the European petrochemical industry, because of excessive administrative burden and delays in in-

ternational rail transport. This contrasts with the situation in the US where a majority of petrochemical products are moved by rail.

On the other hand, the harmonisation of European energy markets and a higher degree of liberalisation in this sector could have a beneficial effect on energy prices, reducing them and ensuring greater price convergence across the European Union. This would remove national (input) price distortions for a very energy intensive industry.

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### ENVIRONMENT

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Four main factors have helped to greatly diminish the level of pollution produced by the petrochemicals industry over the past two decades. First, the closure of plants whose environmental performance was not satisfactory and their replacement with units using clean technologies; second, modifications to the production processes to make them less contaminating; third, the set-up of effluent processing plants downstream of the polluting units; and fourth, the Responsible Care programme, launched by the chemical industry, aimed at progressive improvement in environmental performance for the entire chemical industry.

Another main concern for the industry is the proposed energy/carbon tax. The industry already faces higher prices for energy and feed-stocks than do its main competitors (the USA and the Middle East) and is afraid it would be taxed more heavily than other regions in the world.

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### REGULATIONS

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The industry's trade association (APPE) fully supported the proposal made by the European chemicals industry at the Uruguay Round of the GATT negotiations to lower tariffs on chemical goods at a level of 5.5 to 6.5 %.

Other trade agreements include the Community's Generalised System of Preferences (GSP) as well as Association Agreements with East and Central European states. The former was originally designed to help developing countries by granting them duty-free access to the EU. The industry now complains that some of these countries have reached a stage of economic development that does not justify that privilege anymore.

The Association Agreements concluded with most East European neighbours aim to create a free trade area within ten years and will grant free access for their products as of January 1, 1995. The industry is particularly worried about the Community institutions that might not apply trade measures whenever justified. These fears arose from a few cases where dumped Eastern European imports have made spectacular progress on the Western market (e.g. PVC, melamine). However, the EU saw its chemicals trade surplus with this region grow from 708 to 1 012 million ECU between 1991 and 1992.

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### OUTLOOK

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The factor that will influence the petrochemicals industry the most in future is a lack of competitiveness within the global market. The causes of this situation are structural rather than cyclical. An immediate problem which must be addressed is the existence of a number of production units in the EU with a cost structure which is no longer competitive in the global market.

The situation of lack of competitiveness will be alleviated by the following remedies: first, an improvement in the European cost structure; second, a reduction in the number and ownership of crackers through joint ventures and alliances; and third, the rise of flexible crackers able to receive propane, butane or ethane. However, without significant further re-

structuring of the industry, this problem is unlikely to be solved until the late 1990s.

Another influence will be that investment in environmental protection is steadily increasing, and is expected to have risen by about 15 % between 1991 and 1994. Legislative requirements, such as the Integrated Prevention Pollution Control, are the main driving force behind this increase.

Finally, during the next decade naphtha is forecast to remain the bulk feed stock, with LPG at best playing a major role only after 2010.

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# Paints, varnishes and printing inks

NACE 255

The market for paints, varnishes and printing inks is not recession-proof, as the industry's 1993 drop in production demonstrated. In any case, prospects for 1994 and 1995 are positive, as the EU economy shows signs of recovery. Like other industries, the industry for paints, varnishes and printing inks is, to an increasing extent, governed by the growing concern for environmental issues. Although EU legislation is still sparse, country-specific regulations have forced the industry to search for environmentally friendly materials to replace hazardous substances, reduce damaging emissions and minimise the use of raw materials. The more efficient use of raw materials is also stimulated by increasing prices for these materials. In order to meet these requirements and attain a competitive advantage, companies are spending more on R&D. As a result, new technological developments are expected in the next years.

## INDUSTRY PROFILE

### Description of the sector

NACE 255 includes the production of paints, paint fillers, varnishes and printing inks. Within this wide range of products with various applications, four main categories can be distinguished:

- architectural coatings, including exterior and interior house paint, primers, finishing coats, pore fillers, varnish and dyes;
- coatings used for a whole series of industrial products and consumer products (e.g. wood or metal furnishing, automotive industry, aircraft industry, machinery and equipment, household appliances, electrical insulation, film, paper and foil, toys and sporting goods);
- special coatings designed for specific applications or for use in special conditions, including products for the re-

painting of cars and machines, high-performance maintenance, road markings, bridge maintenance and metallic coatings; and, finally,

- printing inks used for a series of printing processes (e.g. letter pressing, offset/litho, engraving, flexography, screen printing, etc.).

Paints and varnishes account for around 90 % of production measured in volume and 83 % of production measured in value of the sector. In 1993, production reached a level of nearly 15 billion ECU, which is expected to be surpassed in 1994. Germany is the largest producer accounting for an estimated 31 % of total production value. The United Kingdom, France and Italy follow at a distance with shares of 20.3, 19.5 and 13.7 %, respectively.

### Recent trends

Over the period 1983-1992, the industry recorded average production growth rates of more than 7 % per annum. 1993 also showed an overall growth of 6 %, but the recession caused a drop in the production of some Member States. There have been sizeable falls in the output of France, Italy, Spain and the Netherlands. Germany has managed to increase its production, mainly because of the new demand from the former East Germany, while the United Kingdom maintained output as the result of an upturn in demand by the automobile industry, particularly the Japanese companies located in the United Kingdom. In most other EU-countries, the production of coatings has been virtually static.

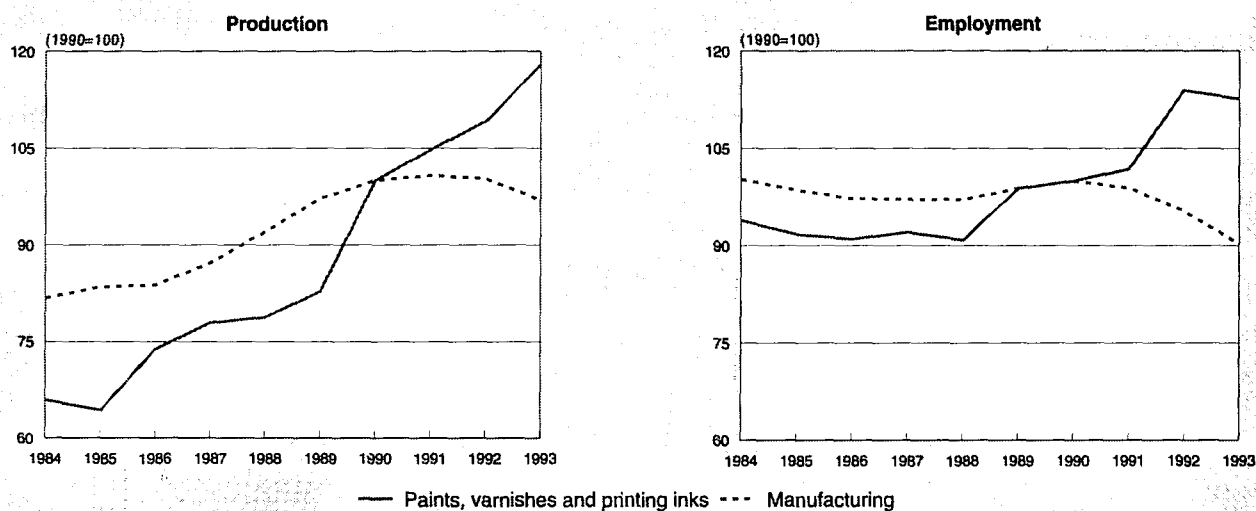
### International comparison

The EU is the largest producer of paint, varnishes and printing inks if compared with the USA and Japan. In the latter countries, production levels reached 12.5 billion and 10.1 billion ECU respectively. On a global scale EU-based multinational companies have the highest market shares. The top six European paint producers hold a total 25 % share of the global market, with the overall European share of world demand approaching 45 %.

### Foreign trade

The EU is a net exporter of paint, varnishes and printing inks. The recession and the resulting slow growth in EU-demand is reflected in the zero growth of extra-EU imports in

Figure 1: Paints, varnishes and printing inks  
Production (1) and employment (1) compared to EU total manufacturing industry



(1) Excluding Greece, Ireland and Luxembourg.  
Source: CEPE, Eurostat, DEBA



**Table 1: Paints, varnishes and printing inks**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	6 780	8 466	9 272	11 399	12 136	12 376	13 052	13 442	14 380	15 100	15 860
Production	7 822	9 540	10 450	12 647	13 378	13 741	14 601	15 185	15 940	16 740	17 580
Extra-EU exports	1 306	1 460	1 651	1 734	1 803	2 015	2 174	2 494	2 570	2 650	2 730
Trade balance	1 042	1 074	1 178	1 248	1 242	1 365	1 549	1 743	1 560	1 640	1 720
Employment (thousands)	90.9	88.0	95.7	96.8	98.6	110.3	109.0	108.0	107.0	106.0	105.0

(1) Some country data for apparent consumption, production and employment have been estimated; Excluding Greece, Ireland and Luxembourg.

(2) NEI forecasts

Source: CEPE, DEBA

1993. Extra-EU exports, however, still recorded a growth of 8 %. These developments together caused the trade surplus to increase by more than 13 %, equalling an amount of 1 555 million ECU.

In 1993, 29 % of EU production was exported to EFTA countries, with Austria, Switzerland and Sweden being the major clients. Exports to the USA totalled 129.5 million ECU or 5.9 % of EU exports. This relatively low export amount is caused by the fact that some European companies have their own production facilities in America. Remarkable are the growing export markets in Eastern Europe. Together, Poland, the Czech Republic, Russia and Hungary accounted for more than 12 % of total EU exports in 1993. Similarly, extra-EU imports originated mainly in Austria, Sweden and Switzerland (accounting for 59 % of extra-EU imports combined). The USA and Japan make up 23 % and 12 %, respectively.

## MARKET FORCES

### Demand

Market demand for paints and coatings is very complex. Paint products are used in numerous situations and applications. They prevent the corrosion and deterioration of various materials, such as wood used in buildings, metal used in cars and concrete used in construction. Paints fulfil the more common function (for both professionals and average consumers) of colouring walls, buildings, etc., constituting 50 % of demand. Other market sectors follow at a distance with shares ranging from can coatings and wood finishes (7 %), to car refinishes (4 %) and anti-corrosion materials (3 %).

Some clear trends in buyer preferences have emerged in recent years. Wood care products are taking an increasing share of the decorative market, at the expense of paints. Powder coating is estimated to be the fastest growing paint market in the world; as powders contain no solvents and therefore tend to be less toxic. In 1994, an overall 13 % increase in the use of powder coatings was induced by the conversion to powder technology in metal office furniture and other markets. Finally, demand for high-solid paints has grown, causing a corresponding reduction in the use of non-water-based solvents.

A breakdown of market demand for printing inks can be made according to the applied graphical processes and the material to be printed. As such, the following categories can be distinguished: offset printing (brochures, posters, magazines); flexoprinting (packaging, wallpaper); book printing (magazines, periodicals, promotions); newspaper printing (newspapers, weekly and other paper editions) and other printing techniques. As the relative importance of these printing processes may differ drastically between countries, demand cannot be translated into separate market shares.

As demand for paints and printing inks, tailor-made solutions are increasingly needed. Manufacturers respond to this trend by demonstrating a problem-solving attitude and continuously searching for product improvements. The growing environmental concern has stimulated the industry to develop new formulas for their products in order to reduce the potential harmful environmental effects.

**Table 2: Paints, varnishes and printing inks**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 310	1 377	1 339	1 392	1 476	1 671	1 755	1 824	2 035	2 195	2 494
Extra-EU imports	272	291	308	329	395	484	497	574	664	640	750
Trade balance	1 038	1 086	1 031	1 063	1 081	1 187	1 258	1 250	1 372	1 555	1 743
Ratio exports / imports	4.82	4.74	4.34	4.23	3.74	3.45	3.53	3.18	3.07	3.43	3.32
Terms of trade index	104.2	104.2	110.7	108.1	110.5	104.6	100.0	98.9	99.4	97.9	N/A

Source: DEBA

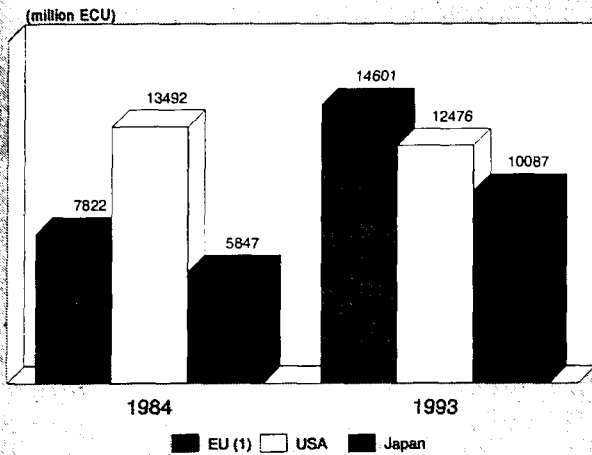
**Table 3: Paints, varnishes and printing inks**  
Labour productivity (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index	70.3	70.1	81.1	84.7	86.7	83.7	100.0	102.9	95.8	104.8

(1) Based on index of production / index of employment.

Source: CEPE, Eurostat

**Figure 2: Paints, varnishes and printing inks**  
International comparison of production in current prices



(1) Excluding Greece, Ireland and Luxembourg.  
Source: CEPE, Eurostat, DEBA

### Supply and competition

A relatively small number of large multinational companies operate worldwide. The intensifying global competition between them concentrates on new product development (the application of safer and environmentally friendly materials) accompanied by large expenditures on R&D and promotion (especially for consumer products). Manufacturers try to improve their market positions by finding and/or creating new trends in market demand, which has led to a flood of new products.

These developments lead to further price reductions, higher concentration of supply, a growing number of product varieties and large R&D-expenditures on new product development and promotional activities.

The large manufacturers also try to establish growth by exploring new geographical markets and taking over small and medium-sized companies. Increasingly in recent years, the domestic markets also have been affected by the trend among chains of do-it-yourself stores (DIY) towards own-brands and generic brands, resulting in an intensification of price competition.

### Production process

During the 1980s, the paints and varnishes industry developed new products and adopted new applications driven by rationalisation in its client industries and environmental problems.

High raw material prices, which applied to titanium dioxide in the late 1980s, have led to the development of new raw materials technology, which aims for products designed not only to perform better, but also to comply with environmental regulations. In this market, where price competition is so important, raw material prices have become a crucial factor. Therefore, manufacturers are aiming for better and more efficient raw material performance and for improved product quality.

## INDUSTRY STRUCTURE

### Companies

The top ten EU coating companies account for an estimated 40 % of total world supply. The top six European manufacturers account for 25 % of world supply. They tend to operate on an international basis, in contrast with most major US-based producers.

Akzo Nobel is by far the largest manufacturer of paints worldwide, accounting for more than 7 % of global sales, with a turnover of 2.4 billion ECU. Another European-based manufacturer ICI (UK) ranks second in the world, with a market share of 6.8 % and sales totalling 2.2 billion ECU. Other major EU-paint producers are BASF (D), Herberts (D) and Courtaulds (UK).

The European paint manufacturers operate on a broad country base, which is demonstrated by the market shares of these companies in other parts of the world. The five leading EU manufacturers have strong footholds in North America, with company-specific turnover shares varying from 20 to 49 %. In addition, a European presence has been established in the Asia and Pacific regions, where ICI and Courtaulds record more than 20 % of their sales.

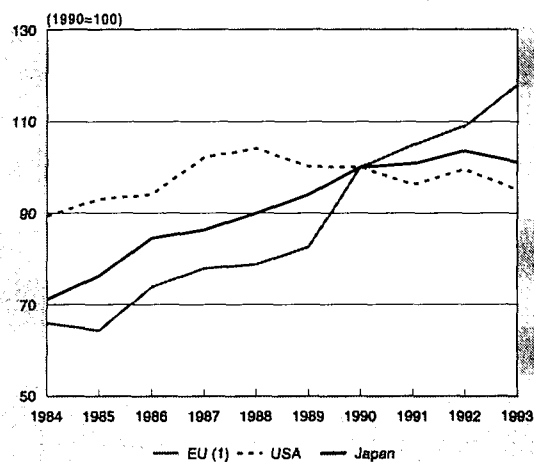
### Strategies

The large multinationals try to establish growth either by developing new markets for existing products (the exploration of the East European markets for instance), developing new products or product varieties for existing or new markets and performing mergers and take-overs.

The smaller companies, active in one or two market niches, are often limited to local markets. Only if they possess a patent for a certain product are they able to operate on a larger scale. The backward integration tendency towards own-brands and generic brands is a retail strategy that directly affects market forces at the production level.

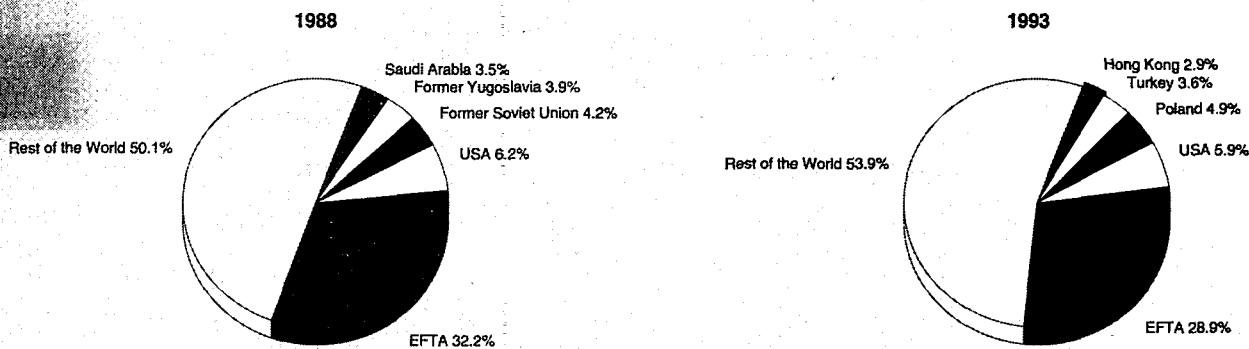
The industry has now entered a period of rationalisation and consolidation, with an increasing number of paint companies identifying their core business sectors. As a result, there has been a considerable number of divestments in the recent past, the most notable being the withdrawal from the automotive OEM market of Akzo Coatings and ICI. The Akzo business has been acquired by PPG Industries (USA), while DuPont (USA) has bought the 50 % holding of ICI in their joint venture, IDAC, headquartered in Bonn. As a consequence of these moves, the automotive OEM market in Europe is now held by only four companies - PPG and DuPont (USA), and BASF and Herberts (D). There are also a few smaller specialised companies operating in limited geographical areas. Among other recent major divestments are the sale by Manders (UK) of its architectural coatings business to the French Group Total, which enables Manders to concentrate on inks. Similarly, Courtaulds sold its general industrial coatings division to

**Figure 3: Paints, varnishes and printing inks**  
International comparison of production in constant prices



(1) Excluding Greece, Ireland and Luxembourg.  
Source: CEPE, DEBA

**Figure 4: Paints, varnishes and printing inks  
Destination of EU exports**



Source: Eurostat

Croda (UK). Divestments by some companies have been offset by the acquisitions of others. The most far-reaching of the recent acquisitions in Europe is that by Akzo Coatings of the Swedish-owned Casco operations of the Nobel Group.

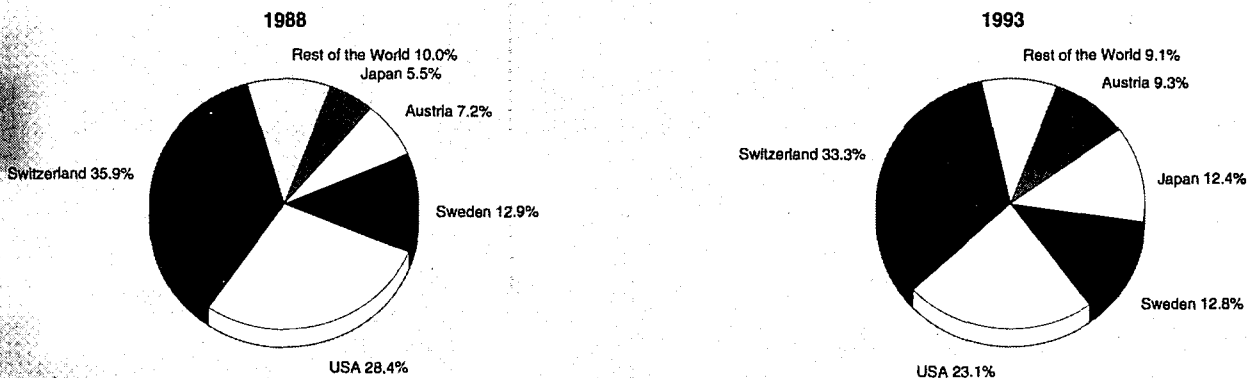
The search for new geographical markets for European companies is seen from the plethora of new plants, that have been established recently in Asia and the Pacific. Courtaulds Coatings is one of the leaders in this region and established new paint production units in China, South Korea, Malaysia and Indonesia in 1993. A joint venture was recently set up in Vietnam and more units are currently being built in China and India. Similarly, ICI has become heavily involved in China, Thailand and Malaysia. Other EU-based firms looking to Asia and the Pacific are Total in Vietnam, where a joint venture with a local producer has been set up. Herberts (D) has formed a joint venture with a Hong Kong-based firm.

The involvement of EU paint companies also has increased in Eastern Europe. Akzo Nobel and Total already have joint ventures in Hungary. Akzo has further established a joint venture in Russia with the largest local paint producer. Herberts has set up a joint venture with Nobilias for automobile coatings in Poland.

### Impact of the Single Market

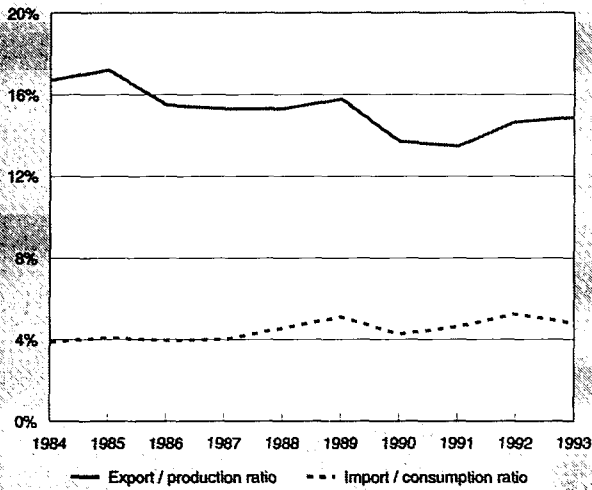
Paints, varnishes and printing inks are not subject to any significant restraint to trade within the EU, nor to trade with non-EU countries. Free movement of goods is an accomplished fact. Among the set of measures which constituted the so-called "Internal Market" programme, those which had most impact on the industry were those related to environmental protection. The products of this sector are indeed subject to European directives on the marketing, use, classification, packaging and labelling of dangerous substances. Emissions and hazards during the production process are also partly regulated by EU directives (for instance the regulation of hazardous waste shipments), though most of these aspects are still covered by national regulations (for instance related to the emissions of solvents). The sector favours a harmonised business environment within the EU, and therefore believes that the principle of subsidiarity should be implemented with care. In particular, it is important to avoid that subsidiarity would result in a reversal of harmonisation. The packaging and packaging waste directive for instance is considered to be leaving too many issues to be determined by the Member States. This could result in the emergence of new internal barriers if Member

**Figure 5: Paints, varnishes and printing inks  
Origin of EU imports**



Source: Eurostat

**Figure 6: Paints, varnishes and printing inks  
Trade intensities (1)**



(1) Excluding Greece, Ireland and Luxembourg.  
Source: CEPE, Eurostat

States choose different approaches to implement the objectives of the directive.

## ENVIRONMENT

As stated earlier, the growing environmental concern among clients, the general public and policy makers - in some cases resulting in regulatory pressures - has stimulated the industry to develop new formulas for their products in order to reduce harmful environmental effects. High solids, water-based products, powder coatings and UV-technologies are all innovations which offer solutions for the environmental problems. Volatile organic compounds (VOCs) are being reduced to an increasing extent. The industry is devoting a considerable share of its R&D expenditure to solve this problem and already has had some success, e.g. water-based coatings. Other examples of less hazardous techniques are the electrostatic application of powder coatings, which - like most radiation curing-systems - does not contain any solvents. Although these techniques have advantages and are a good alternative, they also have some disadvantages. For example, water-based products are still more expensive and less durable than solvent-based varieties.

Printing inks are almost entirely used by professional clients. For industrial appliances it is possible to limit or even prevent emissions of solvents, especially where solvents are used in order to increase the speed of printing the industry succeeded in stopping emissions. The printing industry also uses less hazardous systems, such as water-based products and UV-systems.

## REGULATIONS

The EU Commission has put forward several directives on environmental pollution which concern the paint and varnish industry, most of them concerning titanium dioxide. However, solvents are not yet subject to any directives, although country-specific regulations do apply to their use. Legislation in this area varies widely across the EU. German legislation calls for limits of 150 mg/cubic metre of carbon emissions, while in the United Kingdom the limit is set at 50 mg/cubic metre.

Country-specific regulatory pressures and the involvement of the association which represents the European industry (CEPE) have contributed to the current debate on solvents, which likely will be the starting point for a new directive. The issue of solvents, however, is only one of the subjects which are being discussed. Other proposals and directives deal with the control of hazardous waste shipments, the control of major accident hazard preparation and the provision of information on emissions and waste to the public.

## OUTLOOK

In the recent past, the industry has demonstrated cyclical movements. The recession in 1992 and 1993 seems to have come to an end. For 1994, there are signs of global economic recovery. Within the EU the upward movement during 1994 is likely to carry on well into 1995. For both years an average annual production growth of 4 % is expected. For the years until 1998 even higher growth rates are forecast. Regulatory pressures will further encourage R&D expenditure for the search for new formulas to reduce negative environmental effects together with a more efficient application of raw materials.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Confederation of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE).

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# Other specialty chemicals

NACE 256.1-256.7

The market for other specialty chemicals is to an increasing extent controlled by the growing awareness of environmental issues. The manufacturers who succeed to develop environmentally friendly products, which are good alternatives for existing products in terms of quality and price, can create substantial competitive advantages. Proper commercial exploitation of these advantages can lead to higher profits. In order to achieve these advantages, R&D expenditures are increased, in some cases forcing companies to cooperate or to merge. In the coming years relatively high growth rates and new technological developments are expected.

## INDUSTRY PROFILE

### Description of the sector

The manufacture of other specialty chemicals includes a number of products, mainly for industrial purposes. A subdivision can be made into the:

- manufacture of compressed gases (NACE 256.1);
- manufacture of glues and gelatine (NACE 256.2);
- chemical treatment of oils and fats (NACE 256.3);
- manufacture of essential oils and of natural and artificial flavouring and perfume materials (NACE 256.4);
- manufacture of explosives, pyrotechnic articles and matches (NACE 256.5);
- manufacture of auxiliary products for the treatment of leather and textiles; manufacture of tanning agents (NACE 256.6).

### Compressed gases

Compressed gases are mainly destined for the engineering industry. They include air gases, acetylene, propane, carbon dioxide, gas mixtures and various specialty gases. Liquid nitrogen finds its destination in the medical sector and is used

for the conservation of blood and organ transplants. Compressed gases are mainly supplied in small steel cylinders. Gasworks and the distribution of gaseous fuels via mains destined for the steel, chemical and glass industries are excluded (NACE 162). Gases in liquid form are also excluded (NACE 256.5). In 1993, worldwide compressed gases sales accounted for 34 % of total gases sales, corresponding with an amount of 5.2 billion ECU.

### Glues and adhesives

This subsector includes gelatine, modified starches, peptone and glues. The glues can be subdivided into liquid glues and solid glues. Liquid glues consist of a glue-based material liquefied with a solvent, that evaporates after gluing. Solid glues have to be activated by water, solvent or air before they can be used. Within Europe, 60 % of glue production is concentrated in Germany, France and the United Kingdom. In 1992, the total world market for glues and gelatine was estimated at 12 billion ECU. The manufacture of glues for office and household uses is excluded (NACE 259).

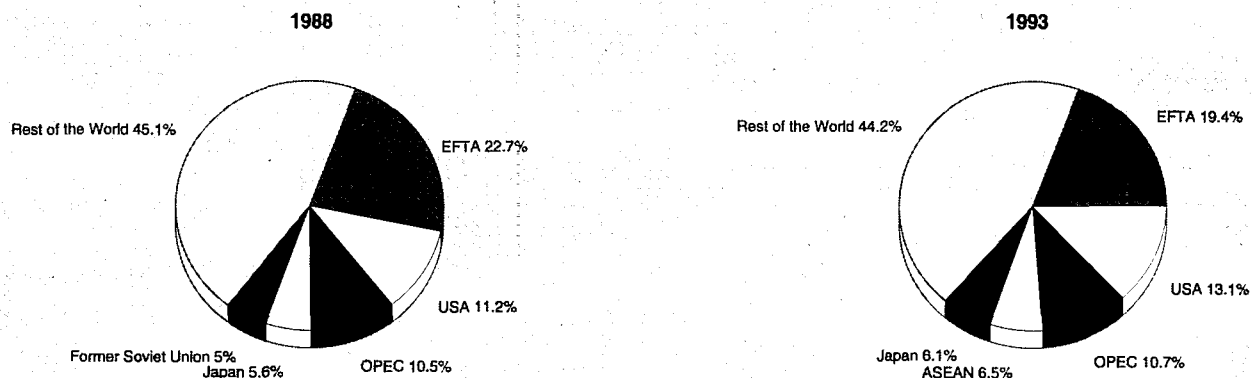
### Chemical treatment of oils and fats

Oleochemicals are mainly made from beef tallow, fish oils and from vegetable oils extracted from palm fruits, coconuts, rape seeds, sunflower seeds, soya beans and from the seeds or fruits of other oil-bearing plants. Some oleochemicals are also made from tall oil, a paper industry by-product. These oils and fats are chemically converted into a wide range of chemical products for use in eco-friendly lubricants, soaps and detergents, cosmetics, medicines, food additives, leather, paints and coatings, printing inks, rubber, plastics, metalworking and many other industries. Worldwide production of basic oleochemicals is estimated to be over 3.5 million tonnes, out of which more than one-third is produced in Western Europe. The oleochemicals industry uses about 5 % of the worldwide production of natural oils and fats, the major share of which is recovered material.

### Essential oils, natural and artificial flavouring and perfume materials

These materials include essential natural oils such as lemon, orange, lime, geranium, jasmine and lavender; flavourings, anti-oxidants, colourings, emulsifiers, stabilisers, and enzymes; all to be used as food additives. The worldwide production of these materials was estimated at 7.7 billion ECU in 1993.

Figure 1: Other specialty chemicals  
Destination of EU exports



Source: Eurostat



**Table 1: Other specialty chemicals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 615	6 899	8 182
Extra-EU imports	2 662	2 835	2 788	2 733	3 074	3 407	3 587	4 058	4 296	4 388
Trade balance	2 640	2 932	2 609	2 709	2 748	3 055	2 893	2 556	2 603	3 794
Ratio exports / imports	1.99	2.03	1.94	1.99	1.89	1.90	1.81	1.63	1.61	1.86

Source: Eurostat

### Explosives

The manufacture of these products includes propellant powders, detonators, fuses, matches, flares and liquid gas fuels.

### Auxiliary products for the treatment of leather and textiles

These products include surface agents, lubricants, leather and skin treatments. Tanning and dressing of leather, however, is excluded (NACE 441).

### Miscellaneous chemical products for industrial purposes

These products include abrasive compounds, auxiliary products for use in mechanical engineering and metallurgy, natural resins and their derivatives, etc. All these products deal with the production of activated carbon and earth.

This chapter includes a wide variety of heterogeneous products, for application in a tremendous number of industrial and household uses. Each substance finds its application in distinctively different market niches. While the substances themselves are not necessarily complex, the applications can be. R&D activities mainly focus on finding new applications and markets.

In contrast with commodity chemical markets, the market for specialty chemicals is highly fragmented. To a growing extent, manufacturers have to meet the specifications of particular clients in a niche. This requires a service-oriented market approach and an excellent understanding of the clients' products or production process. This custom-tailored approach also provides the opportunity for higher profit margins.

### Recent trends

The growing interest in environmental issues will cause shifts in production and demand. Changing consumer re-

quirements are met by new or modified products which in turn lead to a shift in industrial demand for raw materials, such as specialty chemicals. The resulting trend towards more environmentally-friendly products leads to an increasing willingness and effort to apply natural-based products instead of synthetic products.

The economic recession in recent years has resulted in pressures on product volumes and prices in commodity chemicals. As a consequence, many chemical companies have cut costs and sold their non-strategic businesses. Conversely, despite the recession, most subsectors of the specialty chemicals industry have demonstrated economic growth, keeping up the level of employment.

### International comparison

In 1993, 33 % of all gases (including compressed gases) was sold in Europe. North America accounted for 35 % and Japan ranked third with 14 % of all sales of gases worldwide. In sales of flavourings, Europe accounted for 45 % against North and South America (25 %) and the Asia-Pacific region (26 %). Demand for glues and adhesives mainly originates from the USA (38 %), Europe and Japan (together 32 %).

### Foreign trade

Extra-EU exports have demonstrated an average annual growth of 4.9 % over the 1984-1993 period, while extra-EU imports increased by an average annual rate of 5.7 %. In 1993, a growth of exports of nearly 19 % was recorded, while imports increased by only 2 %. Thanks to a buoyant growth on its export markets, the specialty chemicals industry has been able to counter-balance the weakening domestic demand, thus avoiding the consequences of the recession.

Germany, France and the United Kingdom are the main exporting Member States. In 1993 they accounted for 71 % of

**Table 2: Other specialty chemicals**  
**Extra-EU exports**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 615	6 899	8 182
Belgique/België, Luxembourg	313	347	320	308	321	359	379	364	408	445
Danmark	98	98	99	106	74	129	88	82	95	132
BR Deutschland	1 959	2 102	2 142	2 236	2 439	2 675	2 668	2 706	2 755	3 272
Hellas	35	41	16	9	6	9	7	9	11	13
España	132	151	105	96	107	111	112	125	149	190
France	821	965	864	851	864	958	964	1 008	1 058	1 216
Ireland	64	72	72	64	75	91	105	116	162	241
Italia	523	479	413	418	482	537	559	559	665	744
Nederland	437	503	485	459	462	556	512	521	423	562
Portugal	43	19	11	11	12	17	14	13	13	12
United Kingdom	876	990	868	882	980	1 018	1 073	1 112	1 160	1 354

Source: Eurostat

**Table 3: Other specialty chemicals  
Extra-EU imports**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	2 662	2 835	2 788	2 733	3 074	3 407	3 587	4 058	4 296	4 388
Belgique/België, Luxembourg	190	186	177	181	196	224	249	307	329	318
Danmark	82	78	78	74	74	76	79	73	82	93
BR Deutschland	661	815	766	797	873	957	992	1 157	1 257	1 325
Hellas	21	22	28	22	26	30	31	38	41	44
España	126	135	141	142	171	203	213	245	258	216
France	465	516	465	475	500	572	574	580	639	648
Irland	34	55	63	47	45	72	68	101	96	189
Italia	237	268	267	319	423	434	439	537	560	576
Nederland	349	329	436	324	326	324	339	386	429	383
Portugal	22	20	21	27	30	31	34	39	43	39
United Kingdom	474	412	345	324	409	483	569	596	564	558

Source: Eurostat

total Extra-EU exports. Germany is by far the largest market for Extra-EU imports. The USA and Switzerland are the main suppliers of the EU market for specialty chemical products with respective shares of 42 % and 17.5 % in 1993.

## MARKET FORCES

### Demand

#### Compressed gases

The market for compressed gas is highly fragmented, and less sensitive to cyclical downturns than the market for liquefied gases such as oxygen and nitrogen, whose markets are concentrated in the chemical and refining industries. Weak demand in total industrial gases negatively influenced sales and profits in this sector in 1992 and 1993. An upturn is expected for 1994 and after. European manufacturers expect major opportunities for expansion into the Eastern European markets.

#### Glues and adhesives

World demand for glues and adhesives is expected to grow by an annual rate of 2.5 to 3 % in the future. This growth will stem chiefly from growing demand in Latin America and the Far East. The major applications for glues and adhesives can be found in the construction industry, the paper and packaging industry, the woodworking and furniture industry, and others e.g. the electronic, shoe, cigarette, aeroplane and automotive industries. Demand for glues and adhesives in the automotive industry is increasing rapidly, as steel is replaced by plastics and aluminium. Consequently, the ongoing upturn of the European automotive industry will have a strong positive influence on the market for glues and adhesives.

In recent years, environmentally-friendly products such as melting glues, dispersions and water-based systems have been introduced. Despite the fact that the application of these products often requires new investments, these products are expected to account for the highest growth figures in the next few years.

#### Chemical treatment of oils and fats

Coupled with a general upturn in economic market conditions, demand for chemicals derived from natural oils and fats has improved considerably. It is expected this trend will progress as long as the recession continues to recede.

Other factors also have contributed to the improvement in the market for oleochemicals. For instance, formulation changes in powder detergents, has increased demand for fatty alcohols steeply. Similarly, new products have had a positive

affect on fatty acids, where new demand has subsequently been created. Refined glycerine has made gains from other polyglycols stemming from reformulation.

An encouraging upturn in volume has been moderated to some extent by a rapid and sustained increase in the cost of raw materials, which is not always recoverable. This trend is almost without exception: coconut, palm kernel, tallow and oilseed rape are among the most prominent of the world commodities to have undergone such price increases. A better utilisation of indigenously produced natural oils derived from the cropping of set-aside land is quickly becoming an economic necessity.

#### Essential oils, natural and artificial flavouring and perfume materials

The industry's performance has been much better than that of the chemical industry overall. For instance, in the Far East double-digit growth rates are common. Demand for flavours and fragrance is highly fragmented, reflecting the large variety of flavour products.

With respect to fragrances a rough subdivision can be made between applications. Household products are the biggest users of fragrances (30 %) with sales amounting up to 1 billion ECU, followed by cosmetics, toiletries (23 %), fine fragrances (19 %), soaps (18 %) and oral hygiene products (10 %).

#### Explosives

The development of the explosives industry is strongly linked to mining activity. In Europe the mining sector is in a situation of long-term decline, hence the outlook for this EU market is poor.

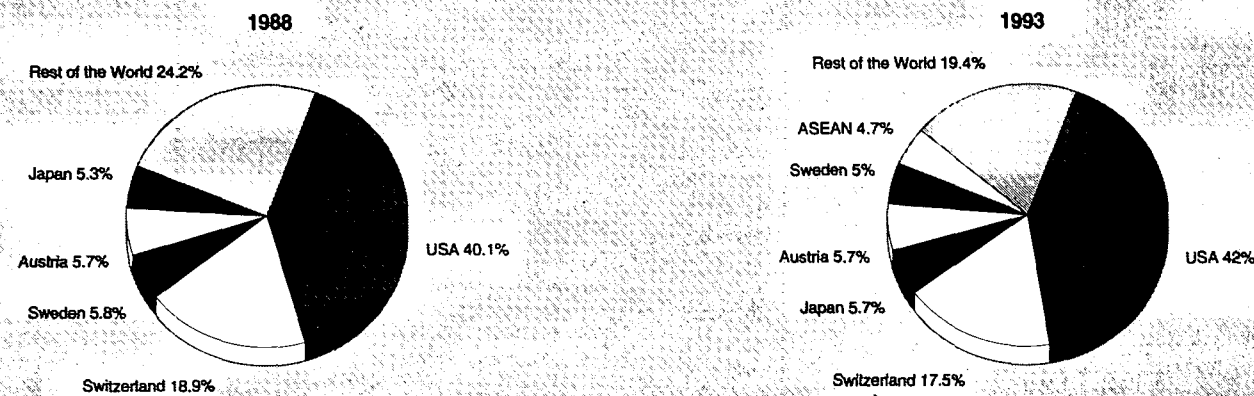
#### Auxiliary products for the treatment of leather and textiles

The European textiles and clothing industry is suffering from a further increase in import penetration, as treatment activities are now mainly executed in low labour cost countries. As a result, sales of auxiliary products for the treatment of leather and textiles are declining in Europe.

#### Supply and competition

As the market for specialty chemicals is highly fragmented, the service and quality aspects are the most important competitive factors. The higher margins in the specialty markets have drawn the attention of the large chemical companies, which used to focus only on commodity chemicals. Following a wave of mergers and acquisitions in the past few years, many small and medium-sized specialty chemical producers have been integrated into larger companies, with varying de-

**Figure 2: Other specialty chemicals  
Origin of EU Imports**



Source: Eurostat

gress of success. As a consequence, R&D has intensified and has become a crucial instrument, not only to develop but also to protect existing positions in market niches. R&D expenditures were also stimulated by new demands from the market, especially because of growing environmental concerns.

## INDUSTRY STRUCTURE

### Companies

Investments by European industrial gas companies have been particularly important in the recent years. The two major European manufacturers of compressed gases, Air Liquide (F) and BOC (UK) invested in the Far East by taking over three plants in China, India and Australia and by starting up a new plant in Thailand. In Europe, capital expenses of these companies, together with AGA (S) and the Messer Griesheim (D), were mainly directed to Eastern Europe, where the European manufacturers of industrial gases invested in 12 new plants, take-overs or joint ventures. The expansions in Eastern Europe are now in a consolidation mode, with the most recent investments being used to modernise the factories.

In the market for flavours and fragrances, some large companies (either subsidiaries or large multinationals) are operating, such as Quest of Anglo-Dutch Unilever, German Haarmann & Reimer (Bayer), Swiss Givaudan (Roche). There is also one publicly-traded flavours and fragrances company, which accounts for about 13 % of total industry sales.

The major companies in the market for specialty surfactants are Hoechst (D), Henkel (D), Rhone-Poulenc (F), Clermont-Tonnerre (UK) and ICI (UK).

### Strategies

The higher profitability of specialty chemicals over basic products has pushed many large chemical companies to extend their activities in the specialty business, mainly by taking over specialty chemical companies. This strategy has not always been successful, as producing and selling specialty chemicals is a very customer- and service-oriented activity. In recent years, a new restructuring took place, as companies reorganised their activity portfolio and focused on core businesses.

In flavours and fragrances, as well as in specialty surfactants, R&D expenditures have increased, partly to cope with stricter environmental regulations. The important expenditures in R&D have forced companies to cooperate, in order to benefit from economies of scale and to reduce their individual research

bill. Thus, there has been a number of mergers, mainly between large and medium-sized companies. A sizeable number of small to medium-sized companies remain in this business, which are increasingly forced to operate in specific geographical or market niches.

### Impact of the Single Market

Like other chemicals, specialty chemicals are subject to extensive regulation concerning their production and use. This applies in particular to the specialty chemicals that are used in the production of consumer products, such as foodstuffs, pharmaceuticals or cosmetics. The Internal Market programme has led to the harmonisation of product regulation, as well as of methods to test toxicity. Even where harmonised legislation is still absent, the Internal Market programme has increased contacts between Member States, thereby promoting a movement towards agreement on common standards, and exchange of information on safety issues. The implementation of the Single Market programme is still in progress, so that some specialty chemicals segments have not yet benefited from the full impact of European integration. For instance, the pressure equipment directive, important to the industrial gases industry, and the directive on flavouring substances are still in the drafting stage.

## ENVIRONMENT

Stricter environmental regulations and demand from the public are pushing specialty chemical producers to develop environmentally-friendly products. On the one hand, this increases R&D costs. On the other hand, it is an opportunity for increasing revenues, as demand for the new "green" products is increasing. It is important, however, to provide substitutes which are of comparable price and performance.

## REGULATIONS

The proposal on eco-audit from the European Commission has been approved by the environment council of ministers. Although the eco-audit is not compulsory, activities with high environmental impact are expected to carry out eco-audits once a year. Other proposals and directives deal with the control of hazardous waste shipments, the control of major accident hazards preparation and the provision of information on emissions and waste to the public.

In 1994 a new directive came into force concerning additives in food, containing procedures and regulations for the use of

additives. New uses should be authorised, environmental risks and other technical details should be specified. The European Council further adopted a directive concerning the use and marketing of enzymes, micro-organisms, and their preparations in animal food.

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## OUTLOOK

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The outlook for specialty chemicals is favourable. This heterogeneous and highly fragmented market still offers growth rates and profit margins higher than the market for commodity chemicals. Large chemical companies will increasingly try to penetrate these profitable segments. Large companies will try to cover customer needs in several types of applications, small producers will focus on particular markets or specific products. In order to penetrate the existing segments or explore new markets, R&D-efforts will become increasingly important. These efforts are more and more directed towards the development of environmentally-friendly products as the markets for these products will become highly profitable in the near future. Production of other specialty chemicals is expected to increase by 3 % in 1994 followed by slightly higher growth rates in the years until 1998 (3.5-4 %). Extra-EU exports are expected to reach an average growth rate of 6 % until 1998.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Industrial Gases Association (EIGA). Address: Avenue des Arts 3-4-5 Bte 16, B-1040 Brussels; tel: (32 2) 217 7098; fax: (32 2) 219 8514;

European Oleochemicals & Allied Products Group (APAG). Address: c/o CEFIC, Avenue E. van Nieuwenhuyse 4 Bte 10, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300;

European Fragrance and Flavour Association (EFFA). Address: Square Marie-Louise 49, B-1040 Brussels; tel: (32 2) 238 9711; fax: (32 2) 238 8288;

Federation of European Explosives Manufacturers (FEEM). Address: c/o CEFIC, Avenue E. van Nieuwenhuyse 4 Bte 10, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

# Agrochemicals

## NACE 256.8

The European Union, which shows a favourable trade balance for crop protection chemical products, is the leading region for the manufacture of these products. However, demand of agrochemicals within the EU has suffered from the effects of the 1993 reform of the Common Agricultural Policy. Nevertheless, taking into account the increased demand in developing countries, it is now possible to look forward to medium term growth in the EU production of agrochemicals for crop protection.

### INDUSTRY PROFILE

#### Description of the sector

As defined in NACE 256.8, the agrochemicals sector covers the manufacturing of agrochemicals for agricultural purposes. It includes two major sub-sectors: fertilisers and chemical products for crop protection. This monograph covers crop protection chemicals. The fact that compound fertilisers are covered in another monograph of the Panorama (under NACE 256.8) introduces a slight distortion in statistics. The problem is limited, however, as compound fertilisers represent only a small share of both the fertiliser and agrochemical markets.

Crop protection chemicals include insecticides, herbicides, fungicides and plant growth regulators, as well as products derived from biotechnologies designed to protect plants against diseases and parasites. Worldwide, cereals accounted for 17 % of agrochemical use, fruit and vines 13 %, maize 10 %, cotton 7 % and other products 25 %.

#### International comparison

Representing close to 40 % of the world's production, the European Union is the largest region for agrochemical production, ahead of Asia, Eastern Europe and North America.

In the 1980s, Western Europe ranked as the leader in crop protection markets. Nevertheless, since 1990, with the reform of the Common Agricultural Policy (CAP), demand in Europe has markedly dwindled. In 1993, the West European market ranked third worldwide, behind North America and Asia (including Japan). The sector's share in the world market declined from 30 % in 1990 to under 24 % in 1993.

France, Germany, Italy, the UK, Spain, the Netherlands and Denmark are the main EU agrochemical markets. The EU's number one crop in terms of pesticides sales is cereals, followed by vines, fruits and vegetables. The pattern of consumption according to product type varies significantly from

one European country to another, depending on climatic conditions. For example, insecticides are used more frequently in southern Member States, such as Spain and Greece, than in northern countries. In contrast, fungicides used to fight fungal diseases, particularly for high-value crops, are increasingly used in northern European countries, where there is a damper and cooler climate.

#### Foreign trade

The European Union is a major exporter of crop protection products, especially insecticides. The countries with the highest export levels are Germany, France and the United Kingdom. These three countries account for nearly 80 % of the total export values of pesticides from the EU.

Alongside a 12 % drop of imports in 1993 associated with shrinking demand in the EU, there was a 10 % increase in exports. Overall, foreign trade in crop protection chemicals showed a positive balance of about 1 billion ECU in 1993. However, this favourable trade balance remains short of the level reached in the mid-eighties.

Herbicides, fungicides and insecticides represented respectively 43 %, 32 %, 25 % of total agrochemical imports in 1993. The leading competitors of EU agrochemical companies are to be found in the EFTA countries (with just under 50 % of imports), which are ahead of the United States (about 25 %).

### MARKET FORCES

#### Demand

Demand for agrochemicals is closely linked to shifting dynamics within the agricultural sector, as well as to the search for technologies that are likely to increase profitability per hectare. Statutory, economic or even environmental constraints also exert a noticeable influence on developments in the demand for agrochemicals in Europe.

Following a period of steady development during the seventies and eighties, the 1993 reform of the CAP brought about a drop of nearly 20 % in the demand for agrochemical products. Following this reform, the surface area devoted to cereal cultivation decreased by almost 11 % in the EU, thus causing a reduction in total surface areas for potential treatment. Poor weather conditions in the early nineties and mediocre earnings in the agricultural sector also contributed to weak demand.

Certain economically-related factors, such as labour costs - which vary from one country to the next - are liable to generate demand that differs between countries. For example, herbicides are used more in those countries where labour is more expensive.

The overall reduction in demand led some companies to cut back production, and, in some cases, even to shut down their production facilities.

**Table 1: Agrochemicals for crop protection**  
**Sales by area and product, 1993**

(million ECU)	Herbicides	Insecticides	Fungicides	Others	Total
USA	4 666	1 517	430	351	6 964
Western Europe	2 275	929	1 588	466	5 258
Japan	1 149	1 274	1 216	80	3 719
Far East	781	1 199	340	162	2 482
Latin America	1 059	660	426	99	2 244
Eastern Europe	314	323	144	27	808
Others	156	900	106	48	1 210
Total	10 400	6 802	4 250	1 233	22 685

Source: Wood Mackenzie



**Table 2: Agrochemicals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	1 527.1	1 732.9	1 599.9	1 380.0	1 342.9	1 404.2	1 423.0	1 478.7	1 392.0	1 529.6
Extra-EU imports	374.2	426.3	378.5	392.0	461.2	571.8	593.8	636.4	507.9	448.5
Trade balance	1 152.9	1 306.6	1 221.5	988.1	881.6	832.0	829.7	842.3	883.8	1 081.1
Ratio exports / imports	4.1	4.1	4.2	3.5	2.9	2.5	2.4	2.3	2.7	3.4

Source: Eurostat

### Supply and competition

Since the early nineties, more intense competition has been observed in the context of reduced demand within Europe. Because of price competition and slack demand, agrochemical producers have seen a setback in revenues. Although European manufacturers are in the lead in the field of research and development, international competition will nevertheless force them to create new alliances in order to reach the "critical size" and benefit from economies of scale. Compared with the United States market, there is still some scope for concentration in Europe: whereas only four major agrochemical manufacturers remain in business in the United States, in Western Europe there are still seven.

American groups are trying to strengthen their position in Europe, and are attracted by potential opportunities in Eastern Europe. Dow Elanco (USA) has launched an investment programme in France and Germany, while Dupont de Nemours is opening a research centre for plant protection products in Europe.

### Production process

Research and development is a crucial competitive factor in agrochemicals, in order for companies to adapt to changes in agricultural practices and increasing environmental pressures. Research and development costs in the top 20 agrochemical companies worldwide represent nearly 10 % of their turnover.

One aspect of the research is to develop more environmentally-friendly products. Seed treatment is another focus of research. It involves coating seeds with a film of an active ingredient while at the same time allowing exchange with the atmosphere. The goal is to increase the seed resistance to pests. Finally, there is a growing interest in biological and biotechnological methods to increase resistance. Genetic engineering techniques have strengthened the effectiveness of the traditional selection of cultivated plants and made it more complex. New varieties have been developed with charac-

teristics that include, for example, resistance to disease and parasites, as well as to weed killers, frost and drought. The initial results of biotechnological research are likely to appear on the European market at the beginning of the next decade.

As in the pharmaceutical industry, the patent protection of agrochemicals is severely limited in time. It is thus crucial for the competitiveness of a particular product to shorten its development time as much as possible, as development is usually carried out after the patent has been registered, thus shortening the useful commercial life of a product.

## INDUSTRY STRUCTURE

### Companies

The crop protection chemicals company sector is relatively concentrated at the international level, with the top 12 companies controlling more than 80 % of the market. They are based mainly in the United States, Western Europe and Japan.

The four leading European companies in the sector, Ciba-Geigy (CH), AgrEvo (D), Zeneca (UK) and Bayer (D) are also among the six leading manufacturers worldwide. Zeneca is a result of the ICI split, whereas AgrEvo is a joint venture in the field of plant protection products created by Hoechst (D) and Schering (D) at the beginning of 1994.

### Strategies

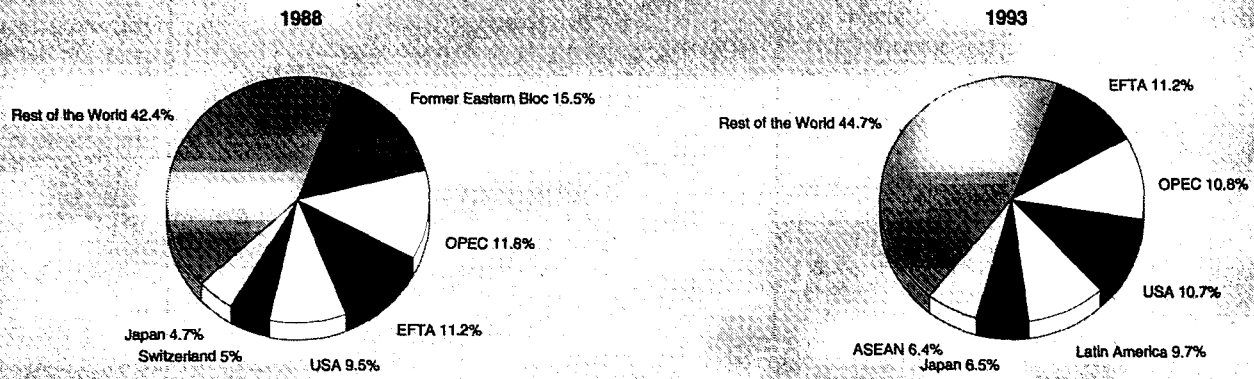
In recent years, agrochemicals producers have had to significantly enhance their R&D expenditures, in order to face the challenge of new regulatory frameworks - especially in the environmental protection area - and to take part in the latest developments in biotechnology. This trend is expected to continue, and will force the sector into a further wave of mergers or acquisitions, in order to benefit from further economies of scale and to increase the potential market of their product. Concentration will thus continue to increase in the agrochemical sector, both in Europe and worldwide.

**Table 3: Agrochemicals for crop protection**  
**Breakdown of external trade by product**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports										
Insecticides	768.7	761.6	629.2	541.3	529.0	543.9	500.7	541.6	445.2	472.8
Herbicides	362.0	433.3	383.3	355.6	350.5	351.3	384.9	427.3	388.5	438.0
Fungicides	260.9	396.9	448.5	328.3	328.0	385.7	395.7	374.2	407.7	441.7
Plant growth regulators	135.5	141.2	139.0	154.8	135.5	122.9	142.0	135.7	150.6	177.0
Extra-EU imports										
Insecticides	94.7	96.4	89.9	76.4	96.1	120.6	134.2	128.3	114.3	104.4
Herbicides	168.9	152.4	132.5	168.2	191.2	247.2	252.3	286.0	222.9	178.8
Fungicides	87.4	151.9	120.0	106.9	137.2	180.0	177.7	197.3	145.2	136.9
Plant growth regulators	23.2	25.5	36.0	40.5	36.7	24.0	29.6	24.8	25.5	28.4

Source: Eurostat

**Figure 1: Agrochemicals  
Destination of EU exports**



Source: Eurostat

At the same time, favourable market prospects in Asia, especially China, and Eastern Europe are inciting agrochemical companies to prepare the ground in these countries. In 1994, AgrEvo, already active in China, announced the formation of AgrEvo China to expand its business activities in that country and, in the same year, bought out the South Korean firm, Misung. Meanwhile, Zeneca is planning an agrochemicals joint venture with three local partners in Nantong, just north of Shanghai. In Poland, Sumitomo (JPN) has set up a subsidiary to market its products.

## REGIONAL DISTRIBUTION

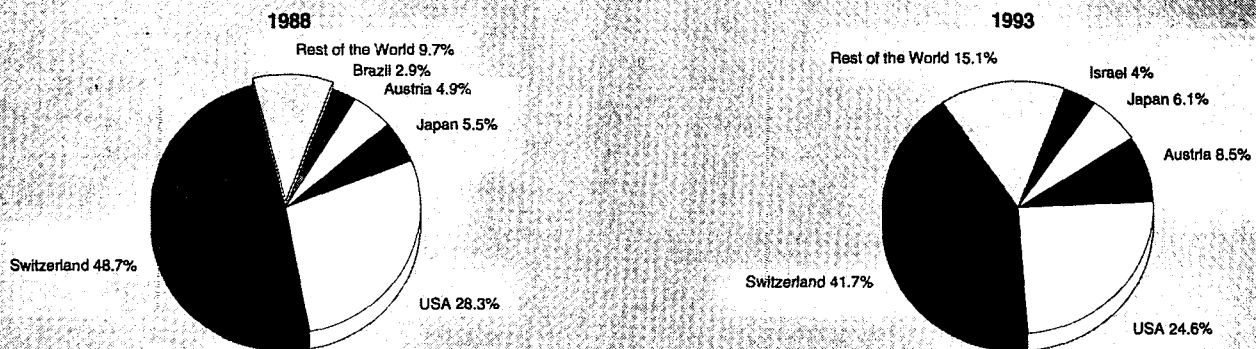
Large differences exist between regions and countries in terms of their use of pesticides in arable crop production. They range from 3 kg (Germany) to 22 kg (the Netherlands) of active ingredients per hectare. The use of pesticides is highest in areas with intensive horticulture (northern Italy, the southern coast of France, the south-east coast of Spain, and the Netherlands). Lastly, the use of fungicides to grow grapes is highest in regions with relatively high precipitation levels.

## Impact of the Single Market

The completion of the European Internal market had a mixed impact on the agrochemicals industry. New restrictions were imposed on the sector, while the industry perceives that the positive effects of the Single Market programme did not yet fully materialise. On the negative side, the reform of the CAP in 1993 brought about a reduction of the area under cultivation, which caused a substantial drop in the demand for agrochemicals. In addition, European regulations imposed strict environmental requirements on the production and use of plant protection products. Finally, reduced expectations have prompted some European producers to de-emphasise further development in the EU and to shift research activities to other world regions, particularly to the USA.

On the positive side, the free movement of goods is considered to be very important for the sector. When realised, it is expected to yield substantial gains. Unfortunately, and although much progress has been realised, this has not yet become reality. The directives on the harmonisation of the regulation of plant protection products are slowly being implemented, though some Member States continue to enforce divergent national rules. Further progress in the area of technical harmonisation

**Figure 2: Agrochemicals  
Origin of EU imports**



Source: Eurostat

and a consultation on environmental policy are considered to be policy priorities in this sector.

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## ENVIRONMENT

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The placing of agrochemicals on the market is regulated by Directive 91/414/EEC which lays down stringent requirements for the protection of the environment and of human and animal health. This directive ensures that agrochemicals, when used according to label instructions, do not represent a hazard to man, animals, or the environment.

Agrochemicals are designed to be biologically active in order to control undesirable target species in food crops. Therefore, it is essential that users of agrochemicals respect label instructions and good agricultural practices so as not to cause any environmental harm.

In this context, the agrochemicals industry is placing much emphasis on the development of Integrated Crop Management (ICM) techniques. ICM is a sensible, economical way of farming which combines the use of selective modern agrochemicals and technologies with traditional methods, thus encouraging the respect of the natural environment. The goal of ICM is not to destroy every last weed, pest or disease in a crop, but rather to keep infestation at a level that does not cause economic damage. If any control treatment is needed, whether biological or chemical, or a combination of both, it is applied only when a pest population reaches a damaging threshold.

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## REGULATIONS

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Reform of the CAP has strongly affected the agrochemicals market in Europe. This reform, implemented on 1 July 1993, reduces price support in favour of compensation paid directly to farmers. This reform has had a notable impact on the arable sector. The intervention purchase prices of cereals have dropped by nearly 25 %, and these reductions have been compensated for by direct aid per hectare. At the same time, aid payment is contingent on 15 % of the surface area devoted to cereals and oil and protein-yielding crops.

In July 1991, the Council adopted a directive concerning the registration of agrochemicals. The directive is aimed to harmonise the registration of agrochemicals in the EU and should contribute to the introduction of high standards of protection for man and the environment throughout the Community.

The Commission has been working on a certificate giving a longer patent protection for agrochemicals. (Proposals will be made in early 1995).

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## OUTLOOK

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Agrochemical consumption in the EU should display a slight growth over the medium term. Despite reform of the CAP, which reduced cultivated land area and thus agrochemical demand, production volume should benefit from dynamic export markets in Asia and North America.

Key issues for the European agrochemical industry are use reduction, environmental protection (in particular, factors linked to the quality of water) and intellectual property rights (i.e. the restoration of an effective patent term certificate via a supplementary protection).

Written by: BIPE Conseil

The industry is represented at the EU level by: European Crop Protection Association (ECPA). Address: Av. Albert Lancaster 79a, B-1180, Brussels; tel: (32 2) 375 6860; fax: (32 2) 375 2793.



# Fertilisers

## NACE 256.8

*Demand for fertilisers in Europe is suffering from recent developments in agricultural and environmental policy. Furthermore, the EU industry is confronted by stiff competition from East European countries. The sector's restructuring should continue in Europe into the medium term.*

### INDUSTRY PROFILE

#### Description of the sector

As included in NACE 256.8, the agrochemical industry can be defined as the manufacture of chemical products for agricultural purposes. There are two major branches within agrochemicals: fertilisers and chemical products for crop protection. This section of the Panorama is concerned with the first of these, fertilisers.

The fertiliser industry manufactures and markets products which contain one or more of the three primary plant nutrients: nitrogen (N), phosphorus (P) and potassium (K). Of the total nutrient volume applied in the EU (15.7 million tonnes of nutrient in 1992/1993), nitrogen fertilisers accounted for 54 % (8.5 million tonnes of N), whilst potash fertilisers (3.8 million tonnes of K<sub>2</sub>O) and phosphate fertilisers (3.4 million tonnes of P<sub>2</sub>O<sub>5</sub>) accounted for 24 % and 22 % of the total, respectively.

All fertilisers containing more than one primary are called multi-nutrient or compound fertilisers. Single-nutrient fertilisers (which contain only one of the three primary nutrients) are also called straight fertilisers. Whilst the majority of phosphate and potash fertilisers are applied as multi-nutrient fertilisers, nitrogen fertilisers are mainly supplied as straight fertilisers.

Fertilisers are usually sold as solids, in piled or granulated form. Between 5 % and 10 % of all fertilisers are, however, in liquid form. These require special storage and handling equipment.

The use of fertilisers follows a seasonal pattern. Fertilisers are mainly used in the growing season, from February/March to June, while fertiliser use is at its lowest in July. Sales follow a similar cycle, starting in December/January, with a peak in April/May. Price movements reflect this cycle, in order to cover the cost of storing fertilisers produced in the low demand season. Prices are thus lowest in July, and then grow regularly until they reach their peak in the Spring.

#### Recent trends

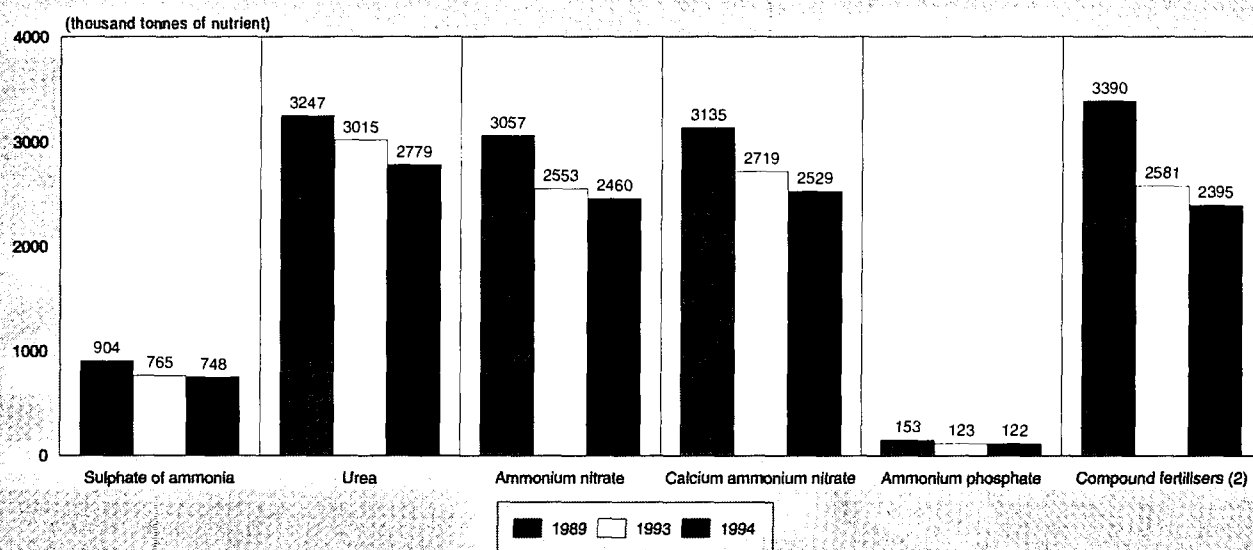
The market for fertilisers has been depressed for years, with overcapacity problems and weak demand. Since 1988, fertiliser demand has decreased steadily, with a drop of 20 % and 27 % in nitrogen and phosphate consumption, respectively. One of the main reasons for this decline was the reform of the Common Agricultural Policy (CAP), which imposed a 12 % freeze on arable land. Another reason for this decline is the setting up of new environmental legislation, which aims at reducing the releases of nitrates and phosphates into surface and underground water.

#### International comparison

In 1992/1993, consumption in Western Europe represented 14 % of the total world consumption of fertilisers while 60 % was accounted for by China, the former Soviet Union (FSU), the United States and India. Between 1989 and 1993, worldwide consumption of fertilisers declined by almost 12 %. This was most significant in Western and Eastern Europe and in the FSU. At the same time, North American demand remained stable while that of developing countries grew by nearly 10 %.

As regards production in general, ammonia nitrogen fertiliser is produced in almost all the main consuming areas of the world. Production of phosphate and potassium fertilisers tends to be located near regions rich in minerals: Canada, Germany and the FSU for potassium fertilisers and North America, the FSU and Asia for phosphate fertilisers. Taken as a whole,

**Figure 1: Fertilisers Capacity in the EU (1)**



(1) Includes former East Germany.

(2) NP/NPK/NK.

Source: EFMA



**Table 1: Fertilisers**  
Consumption and production breakdown by product (1)

(thousand tonnes of nutrient)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)	1994 (2)	1995 (2)	1996 (2)
<b>Consumption</b>													
Total Fert. N (3)	9 349	9 802	9 909	10 154	10 158	9 971	9 757	8 991	8 153	8 287	7 935	7 805	7 687
Total Fert. P205 (4)	4 734	4 810	4 799	4 764	4 743	4 664	4 338	3 832	3 418	3 173	3 186	3 145	3 106
Total Ammonia	12 007	12 036	11 011	11 511	11 256	10 935	10 784	9 337	8 663	8 702	8 154	8 070	7 910
<b>Production</b>													
Total Fert. N (3)	8 825	9 044	8 634	8 530	8 602	7 842	7 453	6 613	6 180	5 999	5 669	N/A	N/A
Total Fert. P205 (4)	3 895	3 702	3 667	3 360	3 247	3 049	2 598	2 284	1 916	1 743	1 636	N/A	N/A
Total Ammonia	10 459	10 075	9 370	9 433	9 078	8 460	7 959	7 373	6 788	6 883	5 904	N/A	N/A

(1) Products for technical use are not included (except Ammonia).

(2) Estimates made by EFMA.

(3) Total Fert. N Includes SA, UREA, AN, CAN, OSTRN, SOLUT., DAP-MAP-AP, NPK-NP-NK

(4) Total Fert. P205 includes AP, NP NPK, PK, TSP, SSP, O.STRGHT PHOSPH.

Source: EFMA

the European Union represents about 12 % of worldwide fertiliser production and ranks fourth behind the FSU, the USA and China.

### Foreign trade

Since the end of the eighties, the European Union has posted a trade deficit in fertilisers. In 1991, it reached 788 million ECU. This deficit lessened somewhat in 1992 and then in 1993, mainly thanks to a strong decline of imports (-17 % in two years). As European demand for fertilisers declined steadily in recent years, this affected both domestic production and imports.

Overall, Western European producers, which now mainly produce nitrogen fertilisers, have a cost disadvantage vis-à-vis their foreign competitors, as they have to pay a higher price for natural gas, the main raw material in nitrogen fertiliser production.

## MARKET FORCES

### Demand

In Europe, demand for fertilisers is directly linked to the implementation of the CAP reform: for example the 15 % set aside policy for eligible arable land already had a significant

impact. Furthermore, environmental legislation like the nitrate Directive, will have a substantial impact on demand.

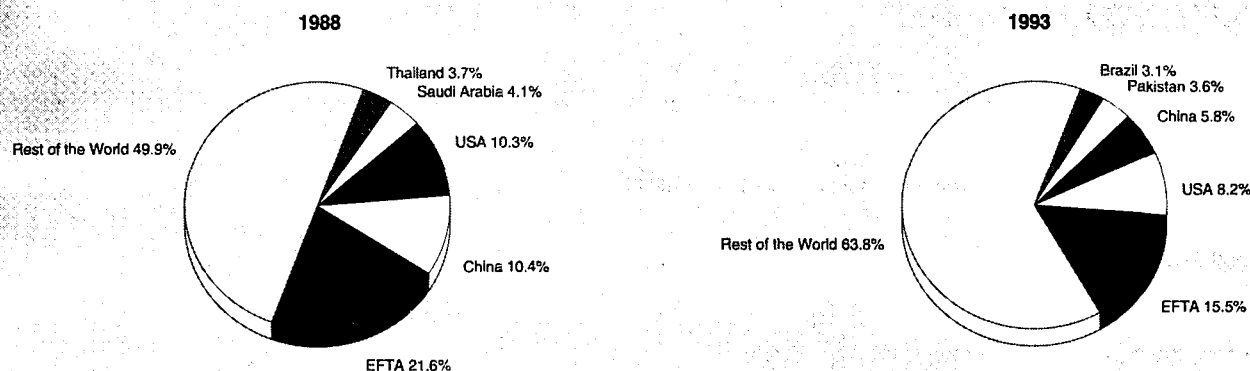
France is the largest single fertiliser market, followed by Germany, the United Kingdom, Italy and Spain. Concerning the fertiliser application rates per hectare throughout the EU, the highest application rates are found in the Netherlands, Germany, Belgium and Denmark.

### Supply and competition

Profitability of European fertiliser producers has been particularly low since the eighties. This stems from two factors: on one side, the demand for fertilisers has been particularly low in the EU, and on the other, an increasing share of the market has been covered by low-priced imports from Central and Eastern Europe and the former Soviet Union.

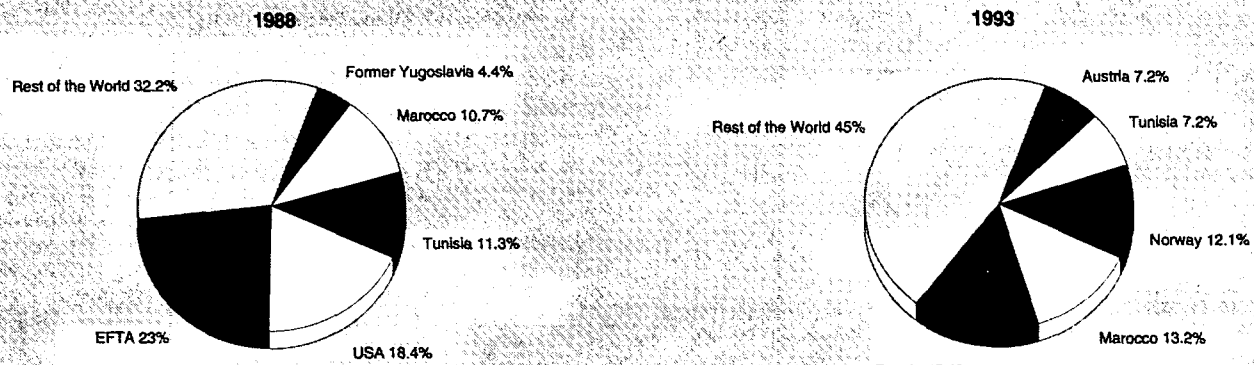
In an attempt to bolster its profitability, the European fertilisers industry undertook an extensive restructuring and downsizing. Employment, which in 1983 stood at 140 000 jobs in this sector, fell to only 40 000 jobs in 1991. However, despite massive restructuring European capacity of production still exceeds demand. Since 1980, European production capacities have been particularly cut in compound fertilisers, while capacities of ammonium nitrates have been left mostly intact. In the rest of the world, capacities of production have increased

**Figure 2: Fertilisers**  
Destination of EU exports



Source: Eurostat

**Figure 3: Fertilisers  
Origin of EU imports**



Source: Eurostat

in all segments of the fertiliser market, with ammonium nitrate being the segment that has grown the least.

The fertiliser industry is a global industry. Given that natural gas constitutes a large part of the input costs, the main competitors tend to come from regions with access to cheaper gas. In recent years, Eastern Europe and the FSU have become increasingly important players on export markets. Several factors contributed to this situation: a subsidised gas supply, a desire to earn foreign exchange and, more recently, a drop in fertiliser demand in their domestic market. As Eastern European economies have moved toward market economies, producers in these countries have had to pay international market prices. Thus, they lost most of their cost advantage, and fertiliser prices from these countries have risen. However, this is not yet the case in the former Soviet Union.

Given the state of the market, the question of fair international trade is becoming increasingly important. In the past, cases of dumping have been proven; and this is still an area of concern to the industry.

### Production process

Fertiliser plants are often large integrated operations that produce many important products, including fertilisers, for other industries. Typical products of a fertiliser plant include ammonia, urea, ammonium nitrate, nitric acid, sulphuric acid and phosphoric acid.

Although the components of finished fertiliser products are relatively simple chemicals, the technologies used are highly developed. The sector is capital intensive.

Continued improvements in production technology have reduced the amount of natural gas required to produce a tonne of ammonia, the basic intermediate for nitrogen fertilisers, significantly. Energy efficiency in the EU compares very fa-

vourably with that of ammonia producers in other regions such as the former Soviet Union.

## INDUSTRY STRUCTURE

### Companies

The fertilisers industry has become increasingly concentrated: from 1980 to 1991, a wave of mergers and acquisitions took place. The major producers of fertilisers in Western Europe are: Norsk Hydro (N), Kemira Oy (SF), BASF (D), Grande Paroisse (F), Enichem Agricoltura (I), DSM (NL) and Fertiheria (E). Norsk Hydro and Kemira have the largest capacities in Europe. At the end of 1994, the group Freeport McMoran Resource Partners (USA) acquired the Spanish manufacturer Fertiheria.

### Strategies

Given the decline in demand and the increasing competition from regions that enjoy considerable competitive advantages, further restructuring of the European fertiliser industry is expected. The EU fertiliser industry is committed to a huge restructuring and rationalisation process, both within national borders and at the EU level. Sales networks have been developed in all countries. Plants have been shut down and production concentrated in terms of supply and outlets at the most favourable locations. Investments have been made in order to improve efficiency and productivity (especially to optimise the use of energy), to produce the best fertilisers and market them in the best way.

### Impact of the Single Market

There are no significant barriers to trade in fertilizers within the EU. The largest steps towards European integration had already been taken with the creation of the Customs Union

**Table 2: Fertilisers  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	855.9	934.6	548.8	520.0	579.0	489.8	437.4	475.6	504.5	514.3
Extra-EU imports	910.5	1 034.1	1 036.7	1 032.2	1 028.9	1 212.3	1 224.5	1 263.4	1 192.8	1 053.0
Trade balance	-54.6	-99.5	-487.9	-512.2	-449.9	-722.5	-787.2	-787.8	-688.2	-538.7
Ratio exports / imports	0.94	0.90	0.53	0.50	0.56	0.40	0.36	0.38	0.42	0.49

Source: Eurostat

and the subsequent elimination of internal tariffs. Recent measures to improve the functioning of the Internal Market have had in comparison less impact on the fertilizer industry. This does not exclude, however, that several areas of European legislation are relevant to the fertilizer industry. Indeed, in some segments internal barriers to trade remain. This applies in particular to ammonium nitrate (AN), which is subject to regulations on its use and transport that vary greatly across Member States. Furthermore, the transitional VAT system imposes a considerable administrative burden on cross-border shipping, especially if goods are not exported directly to the country of destination, but first transit another Member State. Being one of the largest consumer of gas in Europe (4% of EU gas consumption), the fertilizer industry stands to benefit from initiatives liberalising the natural gas market. Finally, fertilizer manufacturing is subject to extensive environmental and safety regulations. In this area, EU rules are progressively replacing the individual national regulations of the Member States. The fertilizer industry favours an extension of the harmonisation of environmental protection regulation within the EU to the countries of Central and Eastern Europe.

## REGIONAL DISTRIBUTION

In the past, production capacity for each type of fertiliser has been widespread across the EU. However, this is less true now, due to the rationalisation of the industry. This had the effect of concentrating production for the different types of fertiliser in a smaller number of countries.

In the finished nitrogen (N) fertilisers segment, France, the Netherlands and Germany each account for around 18 % of total EU capacity, whilst Belgium, Italy, Spain and the United Kingdom each account for nearly 10 %. Potash (K) is directly mined in a limited number of regions in Europe. There are still some mines in France, which will soon be exhausted. The largest producing area in the EU is in central Germany. Phosphates are now mainly produced outside of Europe, for example in North Africa.

## ENVIRONMENT

Since the early 1980s, there has been considerable concern about the impact of agricultural chemicals and fertilisers on the environment.

In particular, there has been concern about the level of nitrates in water supplies and phosphorus in water sources and the sea. In December 1991, the Council adopted a directive on the protection of waters against pollution by nitrates from agricultural sources. The objectives of the directive are to ensure that the nitrate concentration in freshwater and groundwater supplies does not exceed the limit of 50 mg NO<sub>3</sub> per litre, as imposed by the EU Drinking Water Directive, and to control the incidence of eutrophication (i.e. enrichment of water by nutrients, such as phosphates and nitrates, which, under specific circumstances, may cause algae to bloom).

For its part, the industry is concentrating on producing high-quality products that ensure an even distribution of fertilisers and therefore minimise the leaking of excesses into the environment. However, the consumers also have a key role to play in this. Fertilisers have to be used in an appropriate way to achieve the most efficient results. It is thus necessary to ensure that the user is properly informed before applying fertilisers. The reform of the CAP, by reducing the agricultural surplus production, will help to reduce the amount of fertiliser used in farming.

## REGULATIONS

Regulations covering most aspects of fertiliser production and use already exist. In addition to normal health and safety regulations, fertiliser producers are subject to emission standards and product quality specifications.

The European fertilisers industry is considerably affected by legislative measures such as the reform of the CAP. This reform, implemented on 1 July 1993, abandons price support mechanisms in favour of compensation paid directly to farmers. It has had a notable impact on the arable land sector: the intervention purchase prices of cereals have dropped by nearly 25 %, and these reductions have been compensated for by direct aid per hectare. At the same time, aid payment is contingent upon a 15 % freeze of the surface area devoted to cereals, oil and protein-yielding crops. As the cultivated area was reduced, demand for fertilisers declined by about the same proportion.

Finally, the fertiliser industry is willing to contribute to the promotion of legislation concerning the use of its products.

## OUTLOOK

In view of current developments related to the ongoing changes to the Common Agricultural Policy and to the awareness of environmental concerns, EU production of fertilisers should stabilise in the years to come, with a return to growth and output reaching around 3.3 million tonnes in 2005.

Written by: BIPE Conseil

The industry is represented at the EU level by: European Fertilizer Manufacturers Association (EFMA). Address: Avenue E. van Nieuwenhuysse 4 Bte 7, B-1160 Brussels; tel: (32 2) 675 3550; fax: (32 2) 675 3961.

# Soaps, detergents, perfumes and toiletries

## NACE 258

Most products covered by NACE 258 are considered non-luxury goods. A growing public awareness of environmental issues has led to the development of more and more environmentally acceptable products and product accessories. The large multinational companies which operate on the global market try to establish growth not only by new product development, but also by entering new geographical markets, taking over smaller companies, spending large amounts on promotional activities, following a strong brand strategy and choosing mass distribution channels. Also, in recent years, the trend towards own brands and generic brands in the soaps and detergents market has resulted also in an intensifying price competition. In the market for personal care products, own brands are expected to be limited to low-end markets. The economic downturn in recent years caused a drop in demand. However, this trend is not expected to continue, as the current economic recovery will increase free disposable incomes in the years to come.

### INDUSTRY PROFILE

#### Description of the sector

NACE 258 is divided into two product categories:

- the manufacture of soaps and synthetic detergents (NACE 258.1) which covers toilet, household and industrial soaps and washing products; and
- the manufacture of personal care products (NACE 258.2) which covers beauty products (skin care, sun care, cosmetics, etc.), bath and shower products, hair care products, perfumes and fragrances, deodorants, etc.

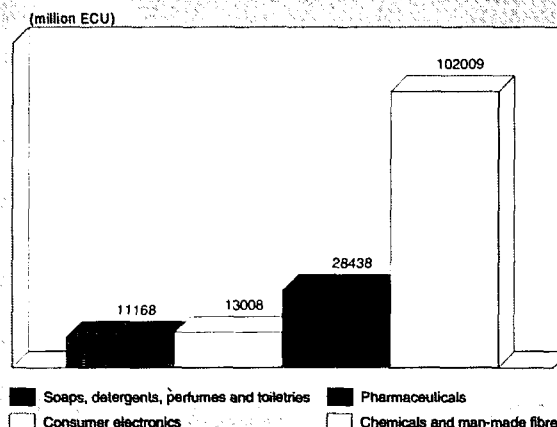
The manufacture of soaps and detergents is closely related to maintenance products (NACE 259.2). Whilst sanitary cleaners, bleaches and air fresheners are categorised under maintenance products, sanitary water fresheners are categorised under soaps and detergents. Soaps and detergents and the market for personal care products differ substantially in market demand, supply and development. Therefore, these categories will be considered separately.

Compared with related industries, the sector as a whole has a relatively low level of value added. Within the EU market, demand for personal care products was estimated at between 25-30 billion ECU in 1994, whilst sales of soaps and detergents amounted to an estimated 8-12 billion ECU in the same year.

#### Recent trends

Over the 1984-1993 period the industry grew at an average rate of more than 6 % per annum. In 1993, however, the economic recession in most Member States resulted in a drop of demand. In contrast, the largest EU market, Germany, recorded growth rates in 1993: consumer spending on personal care products rose 4.4 %, whilst sales of soaps and detergents recorded a growth of 2.7 %. The most recent German figures indicate a stabilisation of overall sales, with personal care products slightly falling (-0.3 %) compared to soaps and detergents (0.2 %). This trend, however, does not represent a clear picture of the EU market as a whole. For most other Member States, production and sales increases are expected for 1994.

Figure 1: Soaps, detergents, perfumes and toiletries  
Value added in comparison with related industries, 1993



Source: DEBA

### International comparison

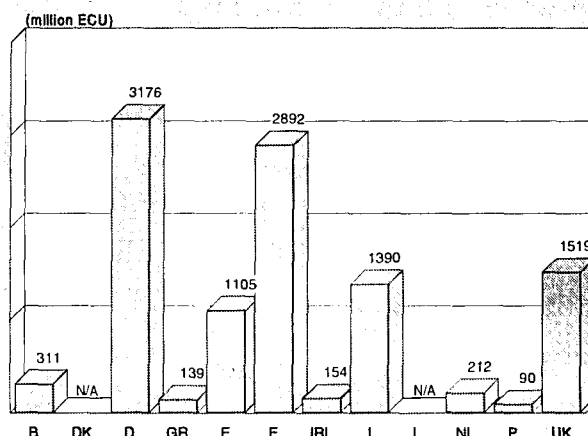
The industry is relatively large: total production for 1994 is estimated at nearly 40 billion ECU. The industry employed over 185 000 that year, although this amount is decreasing. Another 430 000 jobs in related areas (e.g. distribution, transport and retailing) can be attributed to the industry.

The EU is the world's largest producer of soaps, detergents and personal care products, with the USA and Japan following at a distance. Within the EU, Germany is the largest market accounting for 26 % of total sales. Germany is followed by France (22 %), Italy (18 %) and the United Kingdom (13 %). If the consumption per capita is considered, the rank order is changed, and France appears to be the leader with nearly 136 ECU per inhabitant. Germany and Italy are tied for second, with 106 ECU per person. The other EU countries follow at a distance.

### Foreign trade

The EU is a net exporter of soaps and detergents. With Extra-EU exports and imports totalling 4 645 and 930 million

Figure 2: Soaps, detergents, perfumes and toiletries  
Value added by Member State, 1993



Source: DEBA

**Table 1: Soaps, detergents, perfumes and toiletries**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	19 669	26 084	29 026	30 560	32 801	34 178	33 698	35 554	35 570	36 109	36 645
Production	21 418	28 217	31 655	33 391	35 695	37 498	37 413	39 872	40 470	41 279	42 105
Extra-EU exports	1 992	2 590	3 164	3 415	3 633	4 133	4 645	5 357	5 630	5 910	6 210
Trade balance	1 749	2 133	2 629	2 831	2 894	3 320	3 715	4 318	4 900	5 170	5 460
Employment (thousands)	190.6	198.2	203.7	205.1	203.3	197.6	192.4	185.1	184.0	182.0	180.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Soaps, detergents, perfumes and toiletries**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.59	0.98	2.97	-1.34
Production	4.51	1.36	3.10	-0.57
Extra-EU exports	4.76	5.87	5.25	5.72
Extra-EU imports	11.73	8.18	10.14	-1.08

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Soaps, detergents, perfumes and toiletries**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 992	2 311	2 250	2 342	2 590	3 164	3 415	3 633	4 133	4 645	5 357
Extra-EU imports	243	290	298	361	457	535	584	738	813	930	1 039
Trade balance	1 749	2 021	1 952	1 981	2 133	2 629	2 831	2 894	3 320	3 715	4 318
Ratio exports / imports	8.19	7.97	7.56	6.50	5.67	5.91	5.84	4.92	5.09	4.99	5.16
Terms of trade index	101.2	99.9	104.3	106.5	100.3	100.8	100.0	100.4	101.0	92.8	N/A

Source: DEBA

**Table 4: Soaps, detergents, perfumes and toiletries**  
Labour productivity, unit costs and gross operating rate (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	84.6	89.3	89.5	91.6	94.6	98.7	100.0	103.3	108.0	110.3
Unit labour costs index (3)	86.2	88.0	91.9	93.0	94.8	96.1	100.0	103.9	104.6	104.0
Total unit costs index (4)	83.2	85.6	86.8	88.1	91.8	97.1	100.0	103.8	107.6	107.3
Gross operating rate (%) (5)	10.0	10.9	11.9	12.1	11.8	10.7	11.0	11.3	10.9	11.5

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

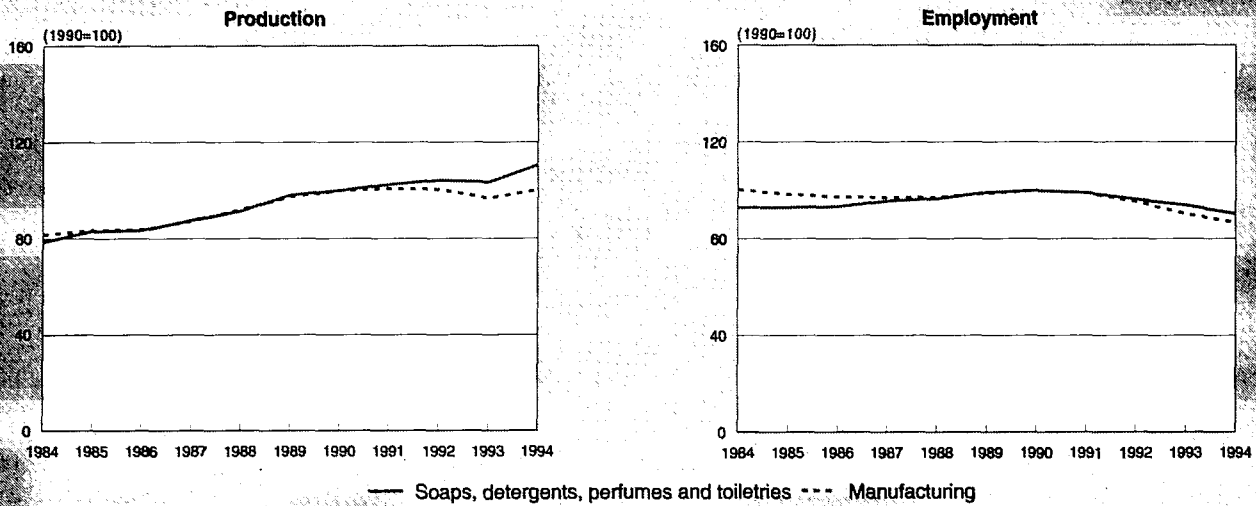
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Soaps, detergents, perfumes and toiletries**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

ECU respectively, the trade balance demonstrated a surplus in 1993. More than 26 % of total EU exports find their destination in EFTA countries. Compared with 1988, the total value of exports to these countries increased by 61 %. The USA is another large export market, which also has been increasing in value since 1988. Noteworthy are the increasing exports to Eastern Europe, especially Poland and Russia. Extra-EU imports mainly find their origin in Switzerland and the USA. The import shares of these countries are 34 % and 31 % respectively.

**MARKET FORCES**

**Demand**

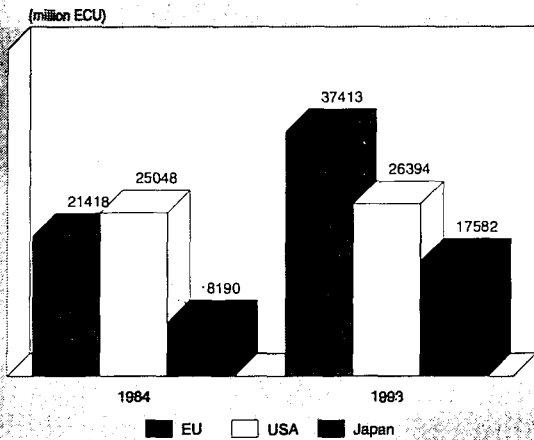
*Soaps and detergents*

The sales of laundry detergents, dishwashing liquids etc., are estimated at 10 billion ECU. With an annual capita consump-

tion of 21 kg, the European use of these products was about 10 million metric tonnes in 1993. In value terms, nearly 40 % of this market is made up of heavy-duty detergents. Growth rates in the EU market, however, are modest. The trend towards super concentration and lower wash temperatures will continue, causing the market share of compact powders to increase. Also with respect to compact powders, the Netherlands has taken the lead, recording a domestic market share of 80 % followed by Germany with 52 %. The other EU countries follow at a distance, with domestic market shares of compact powders of less than 30 %.

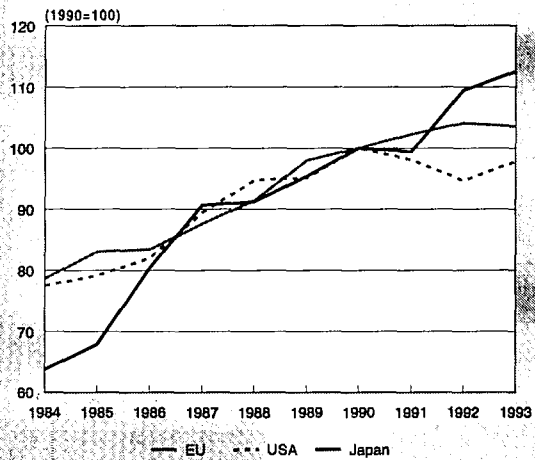
While demand for powders looks healthy, the market for liquid detergents is decreasing. Liquids appear to have peaked in 1989, when they claimed an overall market share 14 % in the EU. The level has fallen to 9 %, although market shares vary across the region.

**Figure 4: Soaps, detergents, perfumes and toiletries**  
**International comparison of production in current prices**



Source: DEBA

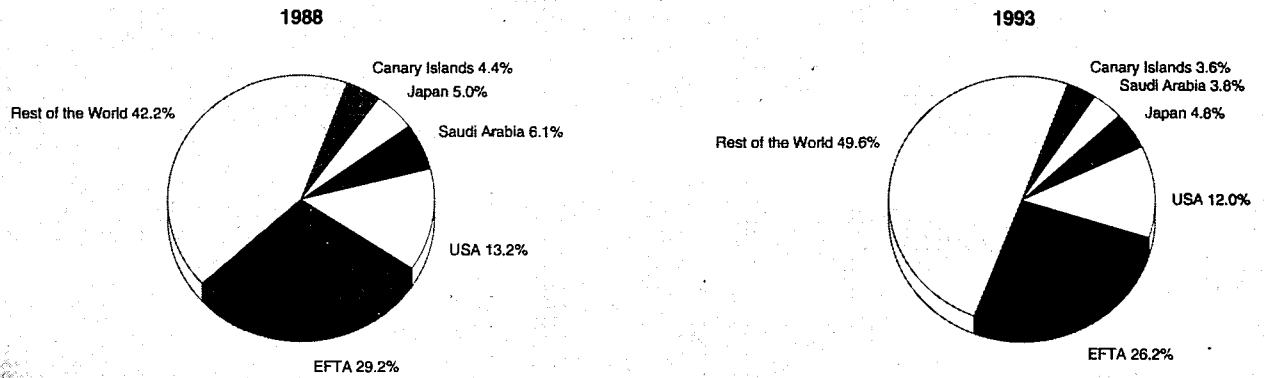
**Figure 5: Soaps, detergents, perfumes and toiletries**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 6: Soaps, detergents, perfumes and toiletries  
Destination of EU exports**



Source: Eurostat

**Cosmetics, perfumes and toiletries**

The personal care market includes a wide variety of products of which hair care and skin care products are the major segments with shares between 20-25 % of total EU demand. Other important segments are perfumes and fragrances, men's toiletries, cosmetics, oral hygiene products, bath and shower products and deodorants.

Demographic trends have made the more mature consumer the target market for the 1990s. This has led to an emphasis on more expensive products, especially in the skin care market.

In this segment, consumers now demand a range of skin care products wide enough to suit every skin type and capable of alleviating dermatological problems. In addition, there has been an increased demand for more and varied skin care products for men. The picture is the same across Europe. There is an increased demand for multi-functional products which are safe, made of natural products and either recyclable or biodegradable. A special key growth area is for products which claim to have distinct benefit to the skin, such as anti-wrinkle, anti-ageing or fat reduction. Recent trends show that the gap between the premium and mass markets has closed, in par-

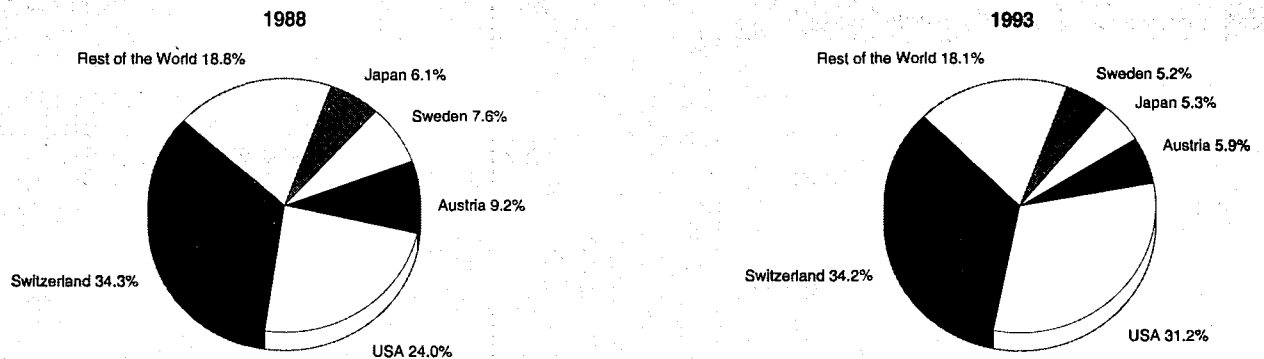
ticular for skin care products. Ingredients once restricted to an exclusive corner of the market have found their way into mass market products, sales of which have increased dramatically.

With respect to hair care products, demand for convenience has resulted in increasing sales of two-in-one (i.e. cleaning and conditioning) shampoos. Three-in-one formulations (additionally either strengthening the hair or providing sun protection) are likely to be a future growth area. The shampoo sector is highly fragmented with a variety of niche products. Styling products are the fastest growing sector of the market for hair care products.

**Supply and competition**

The fragmentation of both markets on the demand side is not fully reflected in the structure on the supply side: many companies are operating in both markets. In their attempt to dominate each market segment, a few large, globally-operating, multinational companies are active both in segments of the market for soaps and detergents and in several segments of the market for personal care products.

**Figure 7: Soaps, detergents, perfumes and toiletries  
Origin of EU imports**

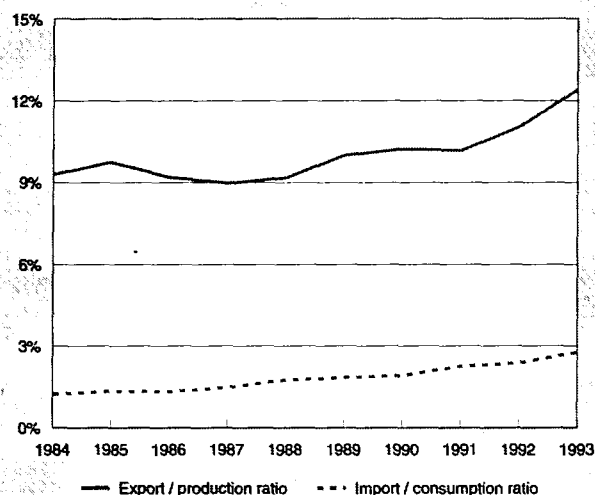


Source: Eurostat





**Figure 8: Soaps, detergents, perfumes and toiletries Trade intensities**



Source: DEBA

One important link between the two markets can be found in the channels which are used for the distribution of the products. To an increasing extent, soaps, detergents and personal care products are sold through supermarkets, for instance. Another link is the importance of the brand image created by the manufacturer.

#### Soaps and detergents

A relatively small number of large multinational companies operate worldwide in the market for soaps and detergents. The intensifying global competition between them concentrates on new product development accompanied by large expenditures on R&D and promotion. Manufacturers try to improve their market positions by finding and/or creating new trends in market demand. The emphasis on new product development is reflected in an increasing flood of new products or new product varieties.

The large manufacturers also try to establish growth by exploring new geographical markets and by taking over small and medium-sized companies. In recent years, the international market for soaps and detergents has also been increasingly affected by the use of generics and own brands.

The intensifying competition brought about by these developments is reflected in price competition, a further concentration of supply, a growing number of product varieties, large R&D expenditures on new product development and, finally, on advertising and promotional activities.

#### Cosmetics, perfumes and toiletries

More companies operate in the personal care market, although in recent years the concentration in supply has increased. As in the market for soaps and detergents, competition is fierce, with the emphasis still on sales, the distribution of personal care products and advertising.

Fine fragrances are considered to be luxury items. This is reflected by the attention manufacturers pay to their exclusive distribution and creative presentation. Experience has shown that mass distribution may eventually lead to a loss of prestige resulting in a reduction in demand. Faced with the reality of the economic downturn, traditional independent perfumeries in France have responded by forming their own voluntary chains and franchises and by increasing their sales points. They have geared their strategy around product quality, pres-

tige and also self-service, recognising that customers sometimes prefer to choose products on their own.

Following the trend towards more mass distribution, more own brands and generic brands can be expected, which will result in an intensification of price competition.

The industry is dedicated to continuously meeting the needs of its consumers and improving the performance of the business overall through intensive market research. This, in all areas of the industry (cosmetics, toiletry and perfume) - from the capture of the exquisite ingredients which give a luxury perfume its undefinable qualities, to the testing of new ingredients for the increasingly sophisticated skin care market, and the creation of new and seductive packaging designs.

#### Production process

As a result of rationalising production and cost reductions, the industry's labour productivity has been increasing at a higher rate than unit labour costs. On the one hand, this development demonstrates the growing efficiency of production. However, on the other hand this rationalisation has resulted in a drop in employment despite production increases.

### INDUSTRY STRUCTURE

#### Companies

The world market for soaps and detergents is led by five major multinational companies, of which three are EU-based: Unilever (NL/UK), Henkel (D), Benckiser (D), Colgate Palmolive (USA) and Procter & Gamble (USA). The flood of mergers and acquisitions seems to have reached its peak in the late 1980s and early 1990s.

Unilever and Procter & Gamble are also competitors on the market for personal care products. Both companies have been expanding their presence in the personal care market. However, in this market more large companies are operating, e.g. L'Oréal (F), Shiseido (J), Avon (USA), Wella (D), Sanofi (F), Schwarzkopf (D), Beiersdorf (D), to name just a few.

#### Strategies

The large multinationals try to establish growth either by developing new markets for existing products (e.g. Eastern Europe) and, subsequently, new products for these markets; or by developing new products or product varieties for existing markets; or, finally, by mergers and take-overs.

The smaller companies, active in one or two market niches, are often limited to local markets. Only if they possess a patent for a certain product are they able to operate on a larger scale. The backward integration tendency towards own brands and generic brands is a retail strategy that directly affects the market forces on producers.

The acquisition turmoil of the 1980s and early 1990s has undermined the once clear demarcation between the cosmetic industry's distinct markets: class (prestige), mass and direct sale. The arrival of multinationals such as Unilever (Fabergé, Elizabeth Arden, Calvin Klein) and Procter & Gamble (Max Factor, Old Spice, Santa Fe, etc.) introduced much more financial muscle to personal care products. The multinational companies try to move some of their strong brands towards the mass market by choosing other distribution channels. As a result, customers are buying more and more personal care articles in drugstores and supermarkets, thus putting pressure on profit margins as sales volumes increase.

Furthermore, some backward integration towards own brands can be expected in this market, especially for low-end personal care products which are distributed through supermarkets. For luxury perfumes and fragrances, however, the strong image surrounding the products makes it more difficult for retailers to create their own successful brands.

**Table 5: Soaps, detergents, perfumes and toiletries  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.82	0.77
Danmark	0.91	N/A
BR Deutschland	0.99	0.76
Hellas	1.51	1.69
España	1.09	1.26
France	1.22	1.52
Irland	0.52	0.83
Italia	0.98	1.15
Luxembourg	N/A	N/A
Nederland	N/A	0.44
Portugal	1.19	0.62
United Kingdom	0.89	0.88

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

Between 10-20 % of all luxury products in the world are sold through duty-free sales outlets. With the possibility that this channel could be abolished in the EU as of June 1999 - since it is seen as being inconsistent with the Single Market - the issue has become a priority for the industry. The IDFC (International Duty-Free Confederation) made up of national duty-free associations in all EU Member States (except France) and the EFTA countries, has achieved its goal of retaining intra-EU duty-free sales in the short term, and is now developing a new five-year strategy plan. The industry has recently suggested the idea of introducing "free zones" with special fiscal advantages, as an alternative to the current duty-free system. This would allow duty-free sales without jeopardising the credibility of the Single Market, and will be investigated further.

### Impact of the Single Market

The overall impact of the Internal Market on this sector has been positive in that it has led to cost savings (more efficiency in trade and decreased bureaucracy) and to an increase in competition as the free movement of goods has improved market access in other Member States, and has offered the industry the opportunity to rationalise production by reducing the number of products being offered in different EU markets. For large multinational companies, this has meant a concentration of production and thus an increase of 'crossborder' transport. SME's, which were previously not able to operate internationally due to a lack of resources and other barriers, can also benefit from the increased trade possibilities and from decreased paperwork. Still, many things need to be done such as a greater enforcement of EU measures at the Member States level and the break-down of current monopoly positions in upstream markets. This could eventually lead to additional cost savings.

### ENVIRONMENT

Growing consumer concern for the environment has been reflected in their increased demand for more environmentally acceptable products. Of particular interest to the industry is the ecological debate on the use of aerosols for deodorants, body sprays and hair sprays. With the rejection of CFC (chlorofluorocarbons) aerosol propellants, and VOCs (volatile organic compounds) on environmental grounds, the industry's initial response was to introduce pump sprays as a more environmentally acceptable alternative. However, pump sprays have proved to be less popular with consumers as they give a lower level of performance and are more difficult to use.

Even in countries which first embraced pump sprays, the trend is a return towards aerosols. The industry has been quick to respond to these new demands in other ways and has given its full cooperation to the EU market-based initiative in which products are awarded an eco-label if certain environmental criteria are met.

Another aspect of the ecological debate has focused on packaging. The cosmetics industry is in favour of initiatives aimed at reducing unnecessary packaging, and fully supports the goals of the proposed Packaging Directive, which was adopted in December 1994. The text of the directive recognises that some exceptions should be made in certain cases for luxury packaging. It is clear that the packaging of a luxury product is an integral part of the whole product image, and this is maintained by using the best technologies and highest quality materials.

In the market for soaps and detergents the use of more compact product formulas already has resulted in less packaging. Reuse has been encouraged by the introduction of refill bags, resulting in even greater packaging resource savings. Several companies are actively participating in the recycling of plastics used in the production of detergent bottles.

### REGULATIONS

#### Soaps and detergents

This sector of the industry is covered by the Directive 88/379 concerning dangerous preparations. In December 1993, the Commission Directive 93/112 was adopted, which delineated the arrangements for the system of specific information relating to dangerous substances and preparations.

Other recently adopted or drafted directives concern the assessment of risks to man and the environment of substances notified in accordance with Directive 67/548 on dangerous substances (Directive 93/67); the assessment of the effects of certain public and private projects on the environment; and the incineration of hazardous waste.

Furthermore, the Commission's eco-audit proposal has been approved by the environment council of ministers. Although the eco-audit is not compulsory, activities with high environmental impact are expected to carry out eco-audits once a year. Where appropriate, the industry is expected to carry these out alongside existing eco-audits.

#### Cosmetics, perfumes and toiletries

The European cosmetics industry guidelines for consumer and manufacturer safety are contained in the European Union Cosmetics Directive. The creation of an ingredient inventory and a potential ban on animal testing represent two areas among others raised in this directive (it its sixth amendment) wherein the industry will need to adapt quickly.

Ingredient labelling is an area which has rightly received much attention. COLIPA, with support from the Commission, is developing a common ingredient nomenclature, the result of which will be that a particular ingredient will appear under the same name on every cosmetic product that contains it, no matter where in Europe it is sold. In this way it will be possible for ingredients to be rapidly and correctly identified from the list of ingredients on the product label and thus enable consumers to purchase products most well-suited to their needs. A similar system is already in use in the soap and detergent industry.

The early 1980s saw a change in public attitudes towards the use of animals in laboratory experiments, which resulted in increased international demands for this practice to end. The cosmetics industry is unanimously in favour of ending animal testing but is guarded against a premature ban. The difficulty in this complex issue lies in the fact that any alternative method not only has to be reliable but also validated and approved

by the regulatory authorities. Meanwhile, the industry remains committed to ensuring that ingredients and products are safe for consumers.

In fact, tests on cosmetic products currently represent only 0.3 % of all animal experiments and the number of animals used in cosmetic testing continues to fall. Already many companies have developed *in vitro* methods for the early screening stages of new products.

The industry has set up a specific steering committee to create a pool of expertise on the development of alternative testing methods. It is also involved, with the Commission and the European Centre for the Validation of Alternative Methods (ECVAM), in carrying out programmes and generating data which will contribute to the speedy validation of alternative methods.

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## OUTLOOK

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The growth of the market for soaps and detergents and personal care products is expected to continue at a modest but constant rate. According to our forecast, overall production and consumption of these products will increase by about 1.5 % per annum for the period 1994-1997 after a remarkable recovery in 1994. As a result of environmental pressures, even more environmentally acceptable products and product accessories will be developed and marketed. More shifts in demand can be expected from the ongoing demographic developments (especially in the cosmetics market). The growing demand for convenience and the distribution strategies of the large multinationals will further increase the use of mass distribution channels. As most products covered by NACE 258 are considered as being necessary items, it is not expected that any changes in demand or in the regulatory environment will lead to a considerable decrease in overall demand.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: International Association of the Soap and Detergent Industry (AIS). Address: Square Marie-Louise 49, B-1040 Brussels; tel: (32 2) 230 8371; fax: (32 2) 230 8288; and European Cosmetic Toiletory and Perfumery Association (COLIPA). Address: Rue de la Loi 223 Bte 2, B-1040 Brussels; tel: (32 2) 230 9179; fax: (32 2) 231 1587.



# Pharmaceuticals

## NACE 257

The EU is both the largest world producer and the largest exporter of pharmaceutical products. Total EU output amounted to 68.9 billion ECU in 1993, of which prescription pharmaceuticals accounted for a share of close to 85%. R&D accounts for a large part of investments in the pharmaceutical sector. At 11.8% in 1992, the R&D/turnover ratio of the top pharmaceutical companies in Europe is the highest of all manufacturing sectors. This is also higher than the R&D/turnover ratio of the top US pharmaceutical producers, which was 10.5% in 1992. There are, however, major challenges facing the pharmaceutical industry. The sector has to adapt to the changing regulatory environment for health care, which takes different forms in different countries. In Europe, this effectively puts limits on the volume of pharmaceuticals sales and prices. Other challenges confronting the industry include stiffening world-wide competition and the continuously increasing costs of research and development. As a result, many companies are restructuring their operations, with the research-based firms trying to expand their presence in the self-medication market and changing the way they operate, sometimes making major changes in their distribution systems or in the organisation of R&D.

### INDUSTRY PROFILE

#### Description of the sector

In the EU, medicinal products are defined according to Article 1 of Council Directive 65/65/EEC (see Official Journal L 22 of 9.2.65 for more details):

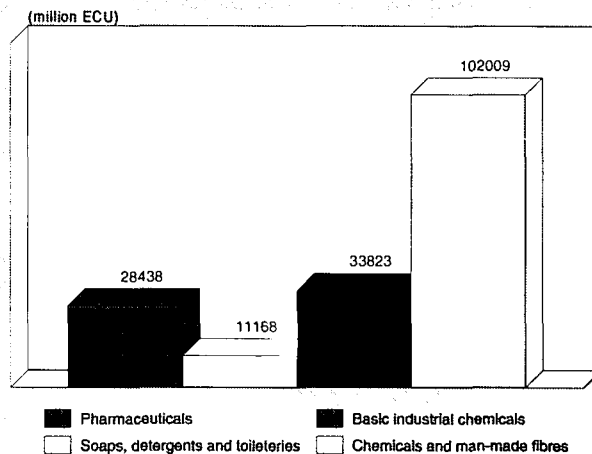
- Proprietary medicinal products: any prepared medicinal product placed on the market under a special name and in a special pack;
- Medicinal product: any substance presented for treating or preventing disease in human beings or animals;
- Substance: any matter irrespective of origin (i.e. human, animal, vegetable, chemical).

The sector includes both pharmaceuticals for human consumption and for veterinary use. Although from a scientific and technical point of view there are strong similarities between the two categories, there are significant differences in the social and economic framework within which they operate. For this reason a separate section is dedicated to the veterinary sector at the end of the monograph.

The market for pharmaceuticals is sometimes divided into two categories, according to the way the products are purchased: the first is prescription pharmaceuticals, i.e. products which can only be sold on the basis of a medical prescription, and the second covers non-prescription pharmaceuticals. Non-prescription pharmaceuticals can be both prescribed by a doctor or purchased directly by the patient without a prescription. Non-prescription pharmaceuticals which are bought directly by the patient without being prescribed by a doctor are commonly defined as over-the-counter (OTC), or self-medication products. Non prescription pharmaceuticals are considered to be OTC products when the four following criteria are fulfilled:

- the product is registered;
- the product is used for a minor ailment;
- the product is advertised to the public;
- the product is not subject to prescription.

Figure 1: Pharmaceuticals  
Value added in comparison with related Industries, 1993



Source: DEBA

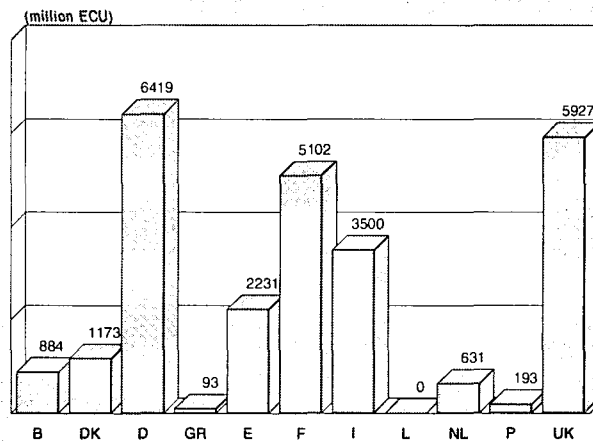
Relevant to both the prescription and the non-prescription pharmaceuticals markets is their division between branded pharmaceutical products and generics. At the expiry of the exclusive period of marketing granted by patent laws and the supplementary protection certificate to the inventor, generic medicines may be put on the market. They are copies of original products and are usually less expensive than the original branded products.

Pharmaceuticals are either made from chemicals or, increasingly since the mid-1980s, from biotechnological processes. Biopharmaceuticals are now estimated to command more than 4% of world pharmaceutical products' sales.

#### Recent trends

Following a period of rapid growth in real production between 1987 and 1991, the production of pharmaceuticals started decelerating in 1992 and actually fell in the first months of 1993 before reaching a turning point towards the middle of the year. On a year over year basis, however, 1993 production

Figure 2: Pharmaceuticals  
Value added by Member State, 1993



Source: DEBA

**Table 1: Pharmaceuticals**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	31 451	45 492	50 747	55 637	61 807	64 146	62 635	66 529	71 920	78 410	85 540
Production	34 879	49 460	54 889	59 675	66 187	69 035	68 867	73 770	80 040	87 440	95 570
Extra-EU exports	5 508	6 817	7 621	7 974	9 124	10 559	12 536	14 303	16 100	18 100	20 400
Trade balance	3 428	3 968	4 143	4 038	4 381	4 889	6 232	7 241	8 120	9 030	10 030
Employment (thousands)	363.2	385.7	398.3	412.0	422.4	425.2	414.3	398.6	410.0	420.0	430.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Pharmaceuticals**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	7.88	5.28	6.72	1.59
Production	6.78	5.37	6.15	2.33
Extra-EU exports	0.25	5.60	2.59	4.89
Extra-EU imports	4.98	4.60	4.81	-2.59

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Pharmaceuticals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	5 508	6 193	6 246	6 302	6 817	7 621	7 974	9 124	10 559	12 536	14 303
Extra-EU imports	2 080	2 350	2 461	2 509	2 848	3 479	3 937	4 743	5 669	6 303	7 062
Trade balance	3 428	3 843	3 785	3 793	3 968	4 143	4 038	4 381	4 889	6 232	7 241
Ratio exports / imports	2.65	2.64	2.54	2.51	2.39	2.19	2.03	1.92	1.86	1.99	2.03
Terms of trade index	99.6	102.1	103.7	104.6	104.9	103.7	100.0	92.6	91.4	90.6	N/A

Source: DEBA

**Table 4: Pharmaceuticals**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	76.0	79.5	82.8	85.8	92.4	96.2	100.0	105.6	108.5	114.0
Unit labour costs index (3)	88.9	91.9	92.5	95.1	94.5	97.3	100.0	101.4	102.6	98.6
Total unit costs index (4)	87.1	92.2	91.3	91.9	94.4	98.4	100.0	102.2	103.1	99.3
Gross operating rate (%) (5)	16.7	16.5	16.2	16.4	17.8	16.9	16.3	16.7	16.1	16.9

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

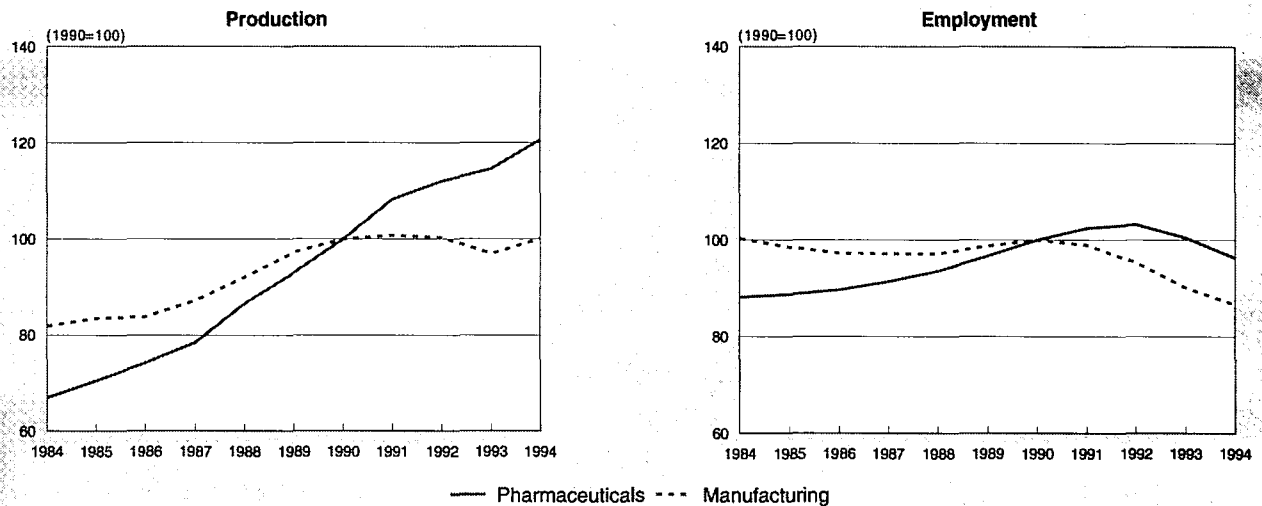
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Pharmaceuticals**  
Production and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: DEBA

volumes were 2.3 % higher than in 1992 (Table 2). Growth accelerated further in 1994, in line with the general economic recovery in Europe. In 1994, production in the EU is estimated to have increased by close to 4 % in volume.

Apparent consumption of pharmaceuticals in the EU also decelerated in 1993, its rate of growth falling to 1.6 % in real terms from an average annual growth of 6.7 % between 1984-93. Again, growth recovered partly in 1994. The two main sub-segments of the market (prescription pharmaceuticals and non-prescription products) posted very different performances, however, as explained in more detail in the section on Market Forces.

In 1993, employment in the EU pharmaceutical sector decreased for the first time in ten years, by 2.6 %. All Member States recorded diminishing or stable employment figures. The trend continued in 1994, with employment down by 4.2 %. This represents a loss of 28 500 jobs compared to the peak 1992 employment level of 425 200. Hurt by the fall in demand

and by the multiplication of cost containment measures adopted by Member States in order to keep health care costs under control, which negatively affected their profitability, most pharmaceutical producers restructured internally and took measures to reduce costs, in particular labour costs. This is confirmed by the trend in labour productivity, which increased by 5 % in 1993 despite the slowdown in production, and which continued growing at a high rate in 1994.

Partly thanks to this rapid growth in productivity, unit labour costs fell by 3.8 % in 1993 and total unit costs were down by 3.7 % in 1993 compared to the year before.

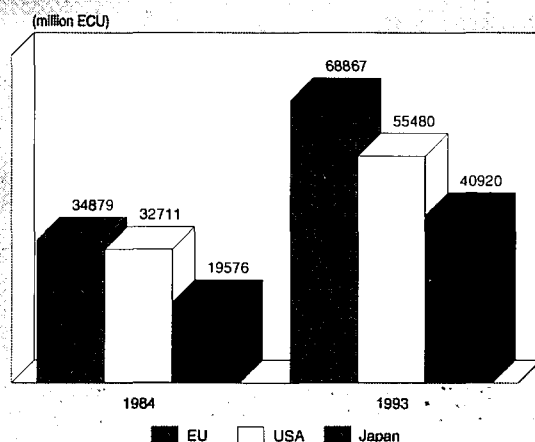
#### International comparison

The EU is the leading world producer of pharmaceuticals. In 1993, the value of production in the EU was 24 % higher than that of the USA and 68 % higher than that of Japan. Between 1984 and 1993, the EU recorded an increase in production of 46 % (measured in constant prices), at a time when the USA and Japan posted production growth of 29.5 % and 20.6 % respectively.

Until recently, the Japanese pharmaceutical industry was mainly focused on its domestic market, an attitude encouraged by the national health insurance system which provides the entire population with access to low-cost health care. This resulted in growing demand for medicinal products and in a steady expansion of the Japanese pharmaceutical industry. As in other countries, this has, however, also increased the burden of health care in total public spending. In order to control spending the government introduced limits on the official drug reimbursement prices. In April 1992, reimbursed prices were thus cut by 8.1 %. As elsewhere, downward pressures on domestic prices progressively reduced profits on all drugs. Partly as a result of this, the Japanese industry is now increasingly turning to other world regions, expanding its presence in the USA and Europe through acquisitions and the setting up of production units in Asia. Investment in research and development by the top Japanese firms is also rising rapidly, although total R&D in this sector in Japan is still well below the levels recorded in the US or in Europe.

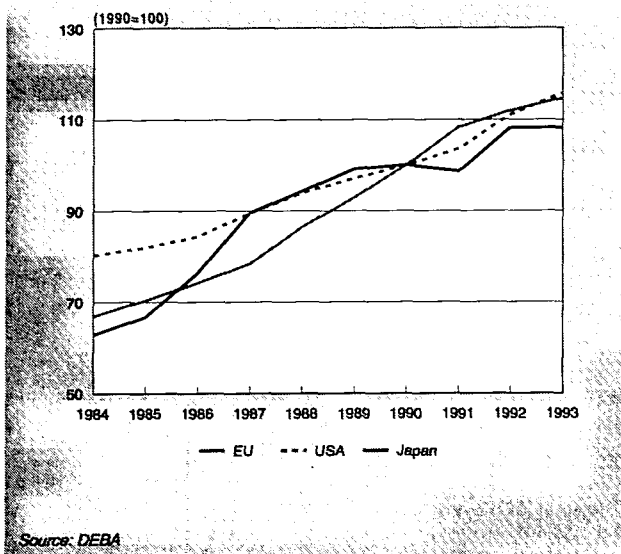
In the US, where the market is much less regulated than in either the EU or Japan, producers furthermore benefit from a large, unified market on which they can generate a sufficient turnover of new drugs to pay-back R&D costs during the

**Figure 4: Pharmaceuticals**  
International comparison of production in current prices



Source: DEBA

**Figure 5: Pharmaceuticals**  
International comparison of production in constant prices



period of patent protection. Pharmaceutical product prices in the US have also grown faster than in other world regions, and downward pressures on profits have been less obvious. Between 1984 and 1993, the value of USA production rose by 69.6 %, while production volumes grew by 44.2 %. This implies that the growth in prices was about 17 %. In the EU, over the same period, production value increased by 97.4 % and volumes by 71 %, implying a price rise of 15.4 %.

#### Foreign trade

The EU is a net exporter of pharmaceutical products. In 1993, 18 % of EU production was exported, whereas the share of domestic consumption which was supplied by imports was 10 %. Within the EU, the major exporter is Germany (with a share of 27 % of extra-EU trade) followed by the UK (17 %), France (16 %) and Italy (11 %). Only Italy has a negative trade balance, which dates back to the early 1980s. However, when calculated at ex-factory prices, the cover ratio (production/consumption) for Italy was 1.14 in 1992.

On average, growth in EU exports between 1984-93 was 2.6 % p.a., while growth in EU imports has been stronger, at 4.8 % per year on average. This has led to a steady decline in the

export/import ratio, from 2.65 in 1984 to 1.86 in 1992. The latter increased again in 1993, to 1.99, as a result of a strong export performance in that year.

The EU's net surplus on the pharmaceuticals trade balance has nevertheless increased steadily over time, rising from 3.4 billion ECU in 1984 to 4.9 billion ECU in 1992, and to 6.2 billion ECU in 1994. Notwithstanding this positive performance in the EU's trade balance, there are signs that the industry's competitive position is at risk in world markets. In addition to the steady decline in the export/import ratio, which only reversed in 1993, the EU's trade position is slightly less favourable for active substances, which generate more added value and which are more closely related to research than finished or semi-finished products.

EU imports overwhelmingly come from western industrialised countries, with the USA accounting for 25.8 % of total imports in 1993 and Switzerland for 37 %. Austria and Sweden, two new EU members, were the source of 20.1 % of the EU's pharmaceutical imports in 1993.

The export markets of EU pharmaceutical producers are more dispersed. Developing countries, which account for most of the "rest of the world" category in Figure 6, take up nearly half of extra-EU exports. Their share is slowly decreasing over time due to the expansion of pharmaceutical production within those countries which has taken some market share from exports from western Europe. Partly as a result of this development, the share of total exports which is destined for the USA and EFTA countries has been growing in importance.

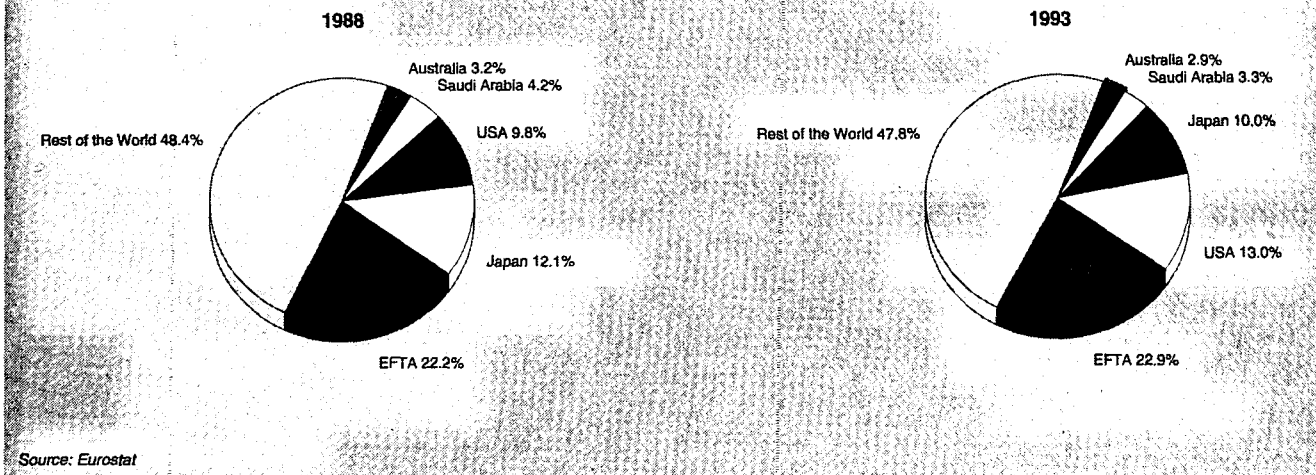
### MARKET FORCES

#### Demand

Based on official statistics, the total EU market for pharmaceutical products was worth 62.6 billion ECU in 1993, about 2.5 % less than in 1992 (Table 1). It is difficult to provide a breakdown of the European Union market for pharmaceuticals into prescription and non-prescription medicines as the rules governing the sale and reimbursement of individual products vary. For example, pharmaceutical products which are available without a prescription may also often be reimbursed if prescribed.

Within the EU, an estimated 85 % of all pharmaceutical products sold in 1993 - including on the hospital market - were prescription pharmaceuticals. The different categories of purchasers of prescription pharmaceuticals are patients, along

**Figure 6: Pharmaceuticals**  
Destination of EU exports



**Table 5: Pharmaceuticals  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.90	0.82
Danmark	1.60	1.75
BR Deutschland	0.81	0.67
Hellas	0.76	0.99
España	0.86	1.15
France	1.17	1.30
Irland	N/A	N/A
Italia	1.19	1.02
Luxembourg	0.00	0.00
Nederland	N/A	0.75
Portugal	0.58	0.56
United Kingdom	0.96	1.08

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

with medical doctors, hospitals and other institutions operating in the health-care sector.

Sales of non-prescription medicines in the eight larger EU markets amounted to 18.3 billion ECU in 1993, 2.8 % more than in 1992. The non-prescription share of the total ambulatory pharmaceutical market at public price level was just under 25 % in 1993. The hospital market is dominated by prescription pharmaceuticals.

The recent initiatives by some governments to control spending on health-care by reducing the reimbursement rates of medicines or putting limits on prescriptions have seriously limited the growth in sales of prescription pharmaceuticals. In some countries (for instance Germany and Italy) the tightening of government controls and regulatory changes have effectively resulted in a reduction in the overall volume of pharmaceutical sales. In Germany, sales of prescription pharmaceuticals dropped by close to 15 % in 1993, while in Italy the rate of decline of prescription pharmaceuticals' sales in the first half of 1994 was 7 % (compared to the same period in 1993).

Estimates of the share of the total pharmaceutical market which is accounted for by generics vary significantly depending on the data source considered. It is nevertheless estimated that generics sales account for about 20 % of the market in Den-

mark, 13-15 % of the market in Germany, and about 10 % in both the United Kingdom and the Netherlands. These countries are also the ones in which pharmaceutical products are considered to be comparatively expensive, and in which the development of the market for generics has been partly encouraged by the health authorities. The market share of generics is much lower in the other EU Member States.

The relative size and rate of growth of the non-prescription pharmaceuticals market, and, within it, of the self-medication market, varies greatly from country to country. Self-medication products are generally used preventively and for benign disorders, so that the market is dominated by cough and cold products and analgesics. However, whereas the practice of self-medication is generally well established in the northern Member States (including France), it remains somewhat underdeveloped in the southern Member States. Until recently, self-medication was, at least officially, non-existent in Greece.

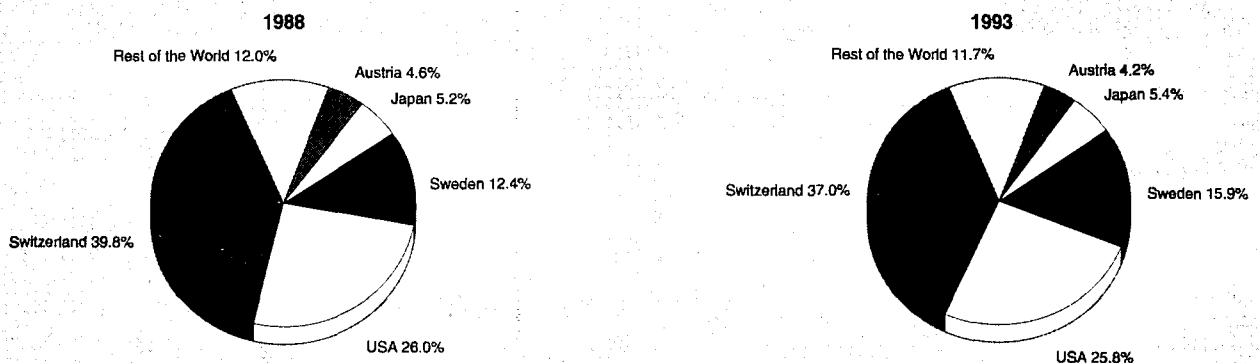
Whereas non-prescription pharmaceuticals sales grew by 8.4 % per year on average (in value terms) between 1989 and 1993, the self-medication market grew by 10.2 % per year on average. In 1993, when total sales of pharmaceutical products were falling in value terms, the self-medication market remained buoyant, growing by 8 % over 1992. Similarly fast growth was experienced in 1994. The self-medication market is expected to remain one of the most dynamic demand segments in the medium term.

### Supply and competition

Although the EU remains the largest producer of pharmaceuticals at world level and accounts for about one third of the total world market in pharmaceuticals, competition has stiffened and EU producers are progressively losing ground to competitors from other countries, in particular the USA and Switzerland. At present, EU companies account for roughly two thirds of the EU market, one third of the market in the USA and 10 % of the market in Japan. The US pharmaceutical industry has similar market shares in the EU and Japan, while the Japanese industry, which controls 80 % of its domestic market, only has a market share of about 1 % in both the EU and the USA. The Japanese pharmaceutical industry is nevertheless expected to increase its penetration of the world market with new medicinal products researched and developed in Japan and purchased under licence by companies from the USA and Europe.

As in other industries, competition within the sector takes place on two fronts: internationally and between companies

**Figure 7: Pharmaceuticals  
Origin of EU imports**



Source: Eurostat



**Table 6: Non-prescription pharmaceuticals**  
**Turnover and share of the ambulatory pharmaceutical market at public price level**

(million ECU)	Turnover					Total market share (%)				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
Belgique/België	460	490	492	523	587	30	30	29	25	24
BR Deutschland	5 480	5 800	6 015	7 556	7 537	36	35	34	33	34
España	798	877	980	1 021	943	13	14	13	16	17
France	4 220	4 700	5 031	5 266	5 573	35	37	34	33	32
Italia	990	1 196	1 261	1 348	1 243	10	10	10	9	11
Nederland	182	217	251	286	298	11	11	12	11	12
Portugal	N/A	N/A	45	60	183	N/A	N/A	5	4.5	9
United Kingdom	1 090	1 311	1 455	1 778	1 941	22	20	19	18	19

Source: AESGP / IMS, 1994

within the sector. The nature of competition between companies, however, differs from that in other sectors.

In most Member States, indeed, there is a price control system for reimbursed medicinal products, in some cases even for non-reimbursed medicines. The market for medicines which are available without a prescription and which are not eligible for reimbursement by social security is highly competitive. In this market, companies compete in terms of prices as the market is much less administered. In the area of reimbursed medicinal products, however, where many prices are regulated, companies channel competitive efforts into therapeutic innovation and continued improvements to existing products. Enterprises in this market thus compete less on prices and rather concentrate on their costs, finances and sales volumes, as well as on the development of new products.

Another area of competition in this market is between generics and original drugs which have come off-patent (i.e. for which the patent has expired). It is currently estimated that when a high-selling drug comes off-patent, sales revenue can be cut by up to three quarters in only a few months as non-branded rival products are launched. This makes it ever more important for the innovative drugs producers to maintain a continuous flow of innovation.

#### Research and development

The pharmaceuticals sector is thus one whose survival depends on a continuous stream of innovation. This, in turn, requires that:

- The financial means for undertaking research and development are available;
- There is a healthy regulatory environment for developing new drugs and bringing them to the market.

Pharmaceutical research is both long and costly. It takes 10 to 12 years to develop a newly-synthesised active substance into a marketable medicine which can be used in current medical practice. The average cost of researching and developing an entirely new medicinal product, several dozen of which

are launched each year on the world market, was estimated in 1993 at 275 million ECU.

Because such investments can only be financed if companies are able to generate the necessary cash flow during the period of patent protection, it is essential to launch the medicinal product on as large a market as possible as quickly as possible. On the other hand, because the costs associated with research are high as well as the risks, only the bigger pharmaceutical companies can afford to spend large sums on R&D. On average, 95 % of R&D spending is currently financed by the industry itself.

Most European companies are smaller in size than their USA competitors. From the start, their relative disadvantage in terms of launching R&D projects is the lower level of financing available. Although both the average size and the average profitability of the top EU pharmaceutical producers have increased in past years, this has not enabled the industry to compete on equal footing with the leading USA manufacturers. Hence, whereas 20 years ago 50 % of new medicines were developed in the Community, today this share has fallen to about one third. Over the same period, the USA continued to discover about a quarter of all active substances, whilst Japan increased its share from 10 % to 22 %.

The picture is even more worrying in respect of biotechnology.

This segment of the market is the fastest growing of the industry. Medicines derived from biotechnology have seized 4 % of the world market in less than a decade. Among the 50 new medicinal products appearing each year on the world market, 10 to 15 are derived from biotechnology methods. This share is expected to continue to grow over the next years.

In this market segment, however, 65 % of patents are American, 15 % are European and 13 % Japanese. Although the European companies' interest in biotechnology is growing steadily, as indicated by the number of acquisitions of biotechnology companies by European firms in the USA market in past years, R&D expertise in biotechnology still predominantly lies in the USA where more than 1 000 firms were active in

**Table 7: Self-medication products**  
**Turnover of the principal products at public price level, 1993**

(million ECU)	B	D	E	F	I	NL	P	UK
Cough and cold remedies	84.2	631.1	102.6	551.6	213.3	55.2	15.7	334.5
Analgesics	88.7	724.0	163.6	398.3	177.6	69.0	8.6	274.9
Digestives and intestinal remedies	72.4	407.5	104.6	435.1	210.5	39.5	7.8	160.3
Skin treatment	35.7	311.4	91.2	316.0	138.4	35.4	10.8	178.0
Vitamins and mineral supplements	47.1	397.1	61.1	285.7	133.1	37.2	4.6	116.5

Source: AESGP / IMS, 1994



**Table 8: Self-medication products****Turnover and share of the ambulatory pharmaceutical market at public price level**

(million ECU)	Turnover					Total market share (%)				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
Belgique/België	280	311	333	360	417	18	19	18	17	17
BR Deutschland	2 430	2 650	2 903	3 447	3 862	16	17	16	15	18
España	518	598	686	722	687	11	12	11	11	12
France	2 420	2 500	2 692	2 829	3 080	20	20	18	17	18
Italia	890	1 063	1 051	1 215	1 145	9	9	8	8	10
Nederland	148	184	222	252	238	10	10	11	10	10
Portugal	N/A	N/A	45	59	123	N/A	N/A	5	4.5	6
United Kingdom	690	850	956	1 248	1 386	14	13	13	12	13

Source: AESGP / IMS, 1994

the pharmaceutical field in 1993, compared to about 30 in Europe.

Most pharmaceutical companies have invested heavily in this domain, either directly in R&D or through participation in emerging biotechnology companies.

There are signs that the R&D situation of the top European producers is improving, however. In 1990, the share of R&D to turnover amongst the top 500 west European pharmaceutical companies was 10.8 %, compared to Japan's share of 10.1 %, and the USA's share of 9.5 %. By 1992, despite the slowdown in production growth and domestic sales in Europe, the share of R&D in turnover amongst the top firms had risen to 11.8 %, again higher than the USA's 1992 share of 10.5 %. Given that total sales by the top European pharmaceutical companies are less than those of their US competitors, however, this still means that the total nominal value of investment in R&D in Europe is lower than that by US firms, though the difference is shrinking. Recent changes to the regulatory environment should help to further improve these figures.

## INDUSTRY STRUCTURE

### Companies

The pharmaceutical sector has a complex structure, with about two dozen large companies responsible for most of R&D operating alongside a large number of medium-sized companies whose activities are not world-wide but are nonetheless international. These medium-sized firms exploit both the products of their own research and other companies' products under licence. There is also a large number of small companies, some working in promising specialised fields (such as biotechnology) and others producing only a selected range of products, essentially for local markets.

Contrary to the situation in Japan and in the US, small European firms concentrate on traditional production, which implies that not all the innovative potential of the sector is fully exploited.

The pharmaceuticals market is one in which strong competition exists both within Europe and worldwide. Although there are only a few companies present in the drugs market, no single company has a dominant position. Taken together, the top ten pharmaceutical producers represent 22 % of the world market, based on turnover, and no single company has a share of more than 3.9 % of the world market.

The larger European pharmaceutical companies are relatively well placed in the world ranking. In 1993, there were seven European companies amongst the top 10 firms: three from Switzerland and the other four from the EU: Glaxo (UK, n°2), Hoechst (D, n°4), Roche (CH, in 5th position), SmithKline Beecham (UK, n°6), Ciba-Geigy (CH, n°8), Sandoz (CH, n°9) and Bayer (D, n°10). Other leading west European com-

panies are Sandoz (CH), Rhône-Poulenc Rorer (F), Boehringer Ingelheim (D), and Zeneca (UK). The largest Japanese pharmaceutical company, Takeda, re-entered the world top 15 ranking in 1993 after a four-year absence, thanks to a 15.5 % growth in turnover in that year.

Recent acquisitions and restructuring moves amongst the top firms have, however, already changed the rankings presented in Table 9. Roche moved to 4th position after its merger with Syntex, whereas the combined American Home Products/Cyanamid operation moved up to third position. American Home Products previously ranked 11 in the world ranking of the top pharmaceutical producers. The most important change in 1995 was Glaxo's acquisition of Wellcome of the UK, which has turned it into the largest world pharmaceutical producer, ahead of its rival Merck of the US.

In the biopharmaceuticals market, the top companies are mainly from the USA. Several of the top European pharmaceutical producers are increasing their stake in this market, mostly through acquisition. In 1992, Genentech of the US had sales (including licensed-out products) of about 1.1 billion ECU, followed by Amgen with 0.7 billion ECU. In the EU the main player is Novo Nordisk (DK). Rhône-Poulenc Rorer is one of the companies increasing its stake in the biotechnology market, through the creation of its new division RPR Gencell, which will concentrate on the treatment of genetic diseases. RPR has set up a network involving cooperation with 14 companies and research laboratories, and already has a number of products in clinical trials.

Another example of EU pharmaceutical manufacturers' increased involvement in the biopharmaceuticals market is Glaxo's acquisition of the USA based biotechnology company Affymax.

### Strategies

There are four main challenges facing the EU pharmaceutical industry. These are (1) heightened competition at world level due to the emergence of new technology; (2) downward pressure on prices and profits from governments trying to reduce the growth in health spending; (3) rising R&D costs; and (4) increased market harmonisation.

To respond to these challenges, the world's largest pharmaceutical producers typically follow one or another of two types of strategies. One of these, which has recently been adopted by Glaxo with its acquisition of Wellcome, consists in buying drug companies (as opposed to distributors) and expanding into the OTC market. Other companies having recently pursued this strategy are American Home Products, with its purchase of Cyanamid in the US, and Switzerland's Roche which acquired its California rival Syntex in 1994. The second type of strategy, which is more frequently adopted in the USA, is that which has been followed by Merck, SmithKline Beecham

and Eli Lilly, and which consists in taking over drug distributors.

Both in Europe and in the USA, many large pharmaceutical companies are also putting the emphasis on the development of products for the self-medication segment of the market, in order to respond to the change in behaviour of patients and to increase their share of a market which is perceived to be fast growing. To fend-off competition and limit sales losses after patents expire, some innovative-drugs producers even engage in the production of their own generics.

In the research-based segment of the market, the pressure on prices imposed by governments in Europe and the changes in national reimbursement systems are impacting the type of research underway. Emphasis is increasingly put on those compounds or molecules that are directly therapy oriented, that respond to broad medical needs and that have a large potential market. The change in emphasis is sometimes accompanied by a separation between the "research" and "development" functions within the companies. Efforts are also made to make a more thorough analysis of the potential market for new drugs between the "research" and the "development" stages, with a view to prioritising those products with a high potential turnover and a rapid rate of return on the initial investment.

Although a great number of enterprises are active in the pharmaceutical industry, large multinational firms are each pre-eminent in only a few of the many market segments constituted by diverse therapeutic indications. Consequently, the trend for large companies to link up or merge is likely to gather pace.

Finally, in some countries, collaboration between firms, e.g. through co-marketing ventures, and investment by major multinationals in local research and development and/or manufacturing units, has helped to hatch a local research industry later able to position itself on world markets. Technical collaboration between world class research and undertakings closer to the culture of their markets often results in marketing agreements or in more elaborate joint venture programmes which themselves provide development opportunities in a growth industry from which these countries would be excluded without the contribution of know-how essential to a successful start-up.

As competition continues to grow in this market, this puts continuous pressure on margins and creates a difficult operating environment for the innovative drug producers. Increasingly, the maintenance of high profit ratios will be conditional on companies being both innovative but also "more efficient" than their competitors at controlling costs or distributing their products on a large market.

### Impact of the Single Market

Prior to the implementation of the Internal Market programme, pharmaceutical markets in the EU were very fragmented, as there were numerous non-tariff barriers to trade such as differences in marketing authorisation rules and different classification systems across Member States. As indicated elsewhere in this monograph, most of the technical barriers to trade have now been eliminated. Since the new marketing authorisation system only became effective January 1st, 1995, however, it is still too early to measure its actual impact on production or trade in Europe.

The creation of a truly integrated EU market for pharmaceuticals is nevertheless reliant on a further harmonisation of national health systems. Although transparency has been much improved in this market, differences across Member States in the lists of products that are subject to reimbursement, or in terms of types and levels of price control still create important market distortions.

Although the process is not yet completed, the greater harmonisation of the EU pharmaceuticals market has already

**Table 9: Pharmaceuticals**  
**The top 15 pharmaceutical companies worldwide, 1993**

(million USD)	Country	Sales
Merck & Co	US	8 774.6
Glaxo	UK	8 495.0
Bristol-Myers Squibb	US	6 524.0
Hoechst	D	6 010.4
Roche	CH	5 285.6
SmithKline Beecham	UK/US	5 231.3
Pfizer	US	5 128.5
Ciba-Geigy	CH	5 103.5
Sandoz	CH	4 972.2
Bayer	D	4 792.2
American Home Products	US	4 774.6
Eli Lilly	US	4 700.0
Johnson & Johnson	US	4 490.0
Abbott	US	4 389.0
Takeda Chemical	JP	4 204.9

Source: SCRIP Reports

influenced the strategies of firms, mainly of SMEs. Thus, although the mergers and alliances which have taken place in past years amongst the bigger firms are more the result of globalisation trends in the industry than of increased EU harmonisation, the same cannot be said of a number of cross-border mergers amongst medium-sized firms. There have also been implications on the geographical location of production, with some countries such as Portugal and Ireland in particular benefiting from increased investments by the larger companies in this sector. The number of production facilities has also gone down as companies are concentrating production in fewer production sites to cut costs.

An emerging trend which many have implications on the future structure of the industry in a harmonised EU market is the increased concentration among wholesalers. This is discussed in more detail in the Chapter on wholesale and retail trade.

## REGULATIONS

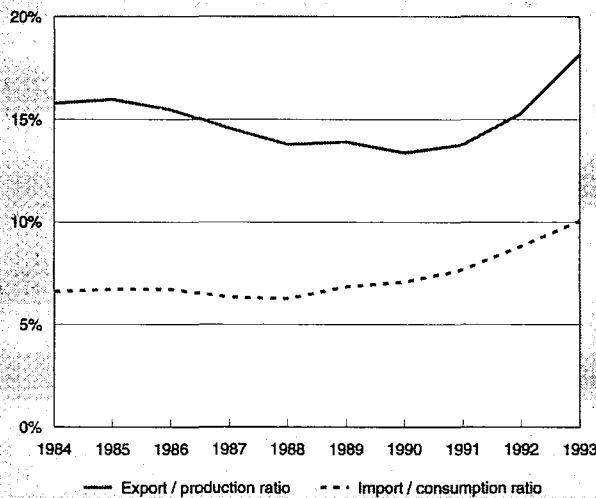
Until recently, the EU pharmaceutical market was very segmented, due to the existence of numerous and varied national regulations which often constituted important barriers to intra-EU trade. The situation is now changing rapidly, following the adoption and implementation of a set of EU Directives relating to technical harmonisation, to market access and to increased transparency. The creation of a truly integrated market for pharmaceuticals in Europe is, however, reliant on a further approximation of national health care systems.

EU regulations, which are spelled out in more detail below, cover all industrially-manufactured medicines, including vaccines, blood products, radiopharmaceuticals and homeopathic medicines. These regulations reflect two key objectives: the first is to harmonise the essential health protection rules across Member States, and the second is to remove barriers to trade within the EU by defining the conditions for market access. By 1993, all measures relating to technical harmonisation of products, to product approval and to marketing authorisations had been adopted and are now being implemented. Progress has been slower in terms of convergence of national measures on price and reimbursement.

### Technical regulations and marketing authorisations

On January 1st, 1995, a new system for marketing authorisation and supervision of medicines entered into force, and a European Agency for the Evaluation of Medicinal Products was set up (Regulation (EEC) 2309/93 and Directives (93/39/EEC,

**Figure 8: Pharmaceuticals  
Trade intensities**



Source: DEBA

93/40/EEC and 93/41/EEC). The new marketing authorisation system gives medicines a quicker and simpler access to the whole of the EU market, while guaranteeing an evaluation of high scientific quality. The new marketing authorisation procedures respond both to the specific needs of the companies and to the public health requirements in the EU. Thus, since January 1995, two procedures are available for pharmaceutical companies giving a quicker and easier access to the whole of the EU market:

- a centralised procedure, leading to a single authorisation for the whole of the European Union, designed for certain new medicinal products and mandatory for those derived from biotechnology;
- a decentralised procedure designed for most medicinal products, based on mutual recognition of national marketing authorisations (with disputes to be settled by binding Community arbitration).

The European Agency for the Evaluation of Medicinal Products which has been set up to operate the system is an administrative and technical secretariat with substantial scientific support provided by the competent authorities of the Member States. Once a product has undergone one of these authorisation procedures, the Commission will turn the Agency's opinion on it into a binding decision.

The new marketing authorisation system should give firms access to the large internal market they need to recoup their research and development costs. Sharing the workload between the European Agency and existing national authorities should also reduce the time it takes to authorise a product from several years to 300 days, and halt runaway increases in registration fees.

The research-based pharmaceutical industry has an obvious interest in the quality of protection afforded by industrial property rights to new medicinal products.

In theory, patents granted under the Munich Convention, to which all EEC Member States are party, afford 20 years' protection, which runs from the date the patent application is filed. In practice, by the time a medicinal product has been developed and a marketing authorisation obtained, only 8-10 years' protection remain.

To remedy this anomaly, the Council adopted Regulation (EEC) 1768/92, creating a supplementary protection certificate

for medicinal products to provide up to 15 years' protection from the date of the first marketing authorisation in the Community. This gave the European industry better protection, similar to that obtained in the USA in 1984 and in Japan in 1986.

### Price controls and reimbursement regulations

Progress in terms of harmonising national legislation in the area of pricing and reimbursement of medicine has been slower, as Member States remain responsible for the organisation and financing of their social protection system. The divergence of national pharmaceutical pricing and reimbursement systems, however, makes the European market for pharmaceutical products more fragmented than is the case in the USA and Japan.

There are differing reimbursement rules for products in the different Member States, different approaches to controlling prices or volumes sold, and different lists of products qualifying for reimbursement. Historically, national regulations were developed to address concerns about public health and social conditions. Over time, however, they have become increasingly focused on public financing issues, in particular on how to reduce the burden of health care in total public expenditure. In most Member States, the entire population benefits from a publicly financed health care coverage which includes pharmaceuticals. The reimbursement rates for pharmaceuticals vary across countries and according to the individual medicine, but can be up to 100 %. Total spending on pharmaceuticals is estimated to represent about 14 % of total health care costs in the EU.

The proportion of the price of a medicine which is not covered by social protection is borne either by private insurance, or by the patients themselves. The reimbursement rate is typically higher (i.e. about 60 %) for products which are only available on medical prescription, and therefore for innovative products.

In past years, national authorities have multiplied cost containment measures. These have included price cuts (in Germany, Ireland, Italy, Portugal, Spain, the UK and Japan), price freezes (in Belgium, Denmark, Germany, Ireland, Portugal and Switzerland), reductions in the rate of reimbursement (France, Belgium), limits on the value of doctors' prescriptions (Germany), restrictions on the categories of products reimbursed (Italy), tightened controls on the industry's advertising practices (France), and measures to encourage national prescribing and use of medicines. These have resulted in a fall in demand for (and sales of) prescription pharmaceuticals in some Member States, triggering a new wave of restructuring in the industry.

Although price controls and reimbursement systems fall within the competence of Member States, they create distortions in the market, preventing pharmaceutical manufacturers from reaping the full advantages of a unified EU market. To limit these distortions as much as possible, the Commission has adopted the so-called "Price-Transparency" Directive, which lays down the transparency rules to which Member States must conform. The price transparency directive establishes that national measures must be based on objective and verifiable criteria, and that all individual decisions must be duly motivated. A Committee has been instituted by the Directive (Council Directive 89/105/EEC), which constitutes an important forum for discussion and exchange of information in this field, and which should help further improving the situation in this area.

### OUTLOOK

Pharmaceutical products are non-durable goods for which the demand is only moderately influenced by the business cycle, as has been confirmed during the last economic downturn. The demand for these products is thus dominated by structural developments.

There are a number of factors influencing structural trends in demand for pharmaceutical products. Looking at the market in general, the predominant factors are the ageing of the population, combined with technological progress in medical science. These two factors are slowly changing the levels and structure of demand for pharmaceutical products. Along the same lines, the opening-up of Eastern Europe has created new market opportunities for the EU pharmaceutical producers. The need for more advanced medicinal products in those countries has already resulted in a growing trade surplus of the EU with Eastern Europe. The potential for increased EU exports to other world regions is enormous, provided EU producers can gain access to these markets.

In line with the "natural" trend in demand within the EU, however, is another factor working in an opposite direction. This is the desire of government authorities to limit growth in health care spending, particularly public spending. Although this mainly influences developments on the drugs market, it has implications for other segments as well. Largely as a result of these government pressures, the past years have seen a gradual change in the organisation of the market, with a shift of products from the prescription to the non-prescription pharmaceuticals category, and with limits on the sales (and prices) of certain drugs. This has translated into a major slowdown in the rate of growth of the prescription pharmaceuticals market, a trend which will likely persist over the rest of the 1990s.

Partly as a result of this, the market for non-prescription pharmaceuticals and in particular for self-medication products is likely to expand rapidly in the coming years. Governments are also encouraging the development of this market, by increasingly recognising the need to support self-medication through pro-active measures.

Although future trends in production and sales are likely to differ across the different market segments, the pharmaceutical sector as a whole is expected to remain one of the fastest growing manufacturing sectors in Europe, as a result of both the continued dynamism in demand from an ageing population, and medical progress and innovation.

## VETERINARY PRODUCTS

Sales of therapeutic products for veterinary use amounted to 1 527 million ECU in 1991, a share of the total pharmaceuticals market of about 2.5 % in that year. This share, however, is growing progressively over time. Between 1989 and 1991, sales of therapeutic products for veterinary use grew at an average annual rate of 7.5 % per year.

The total market for veterinary products includes both therapeutic products, such as antibacterials, antiparasites, biologicals and medicines for metabolic disorders, and feed additives, which cover antibiotics, coccidiostats and vitamins. Antibacterials accounted for a little over 36 % of total EU sales of therapeutic products for veterinary use in 1991, followed by antiparasites (22.6 % of total sales), and biologicals (20 % of total sales).

Within the EU, the largest markets for therapeutic products for veterinary use is the French market, followed by the German and UK markets.

As the remainder of the pharmaceutical industry, this sector is very R&D intensive. On average, the share of sales devoted to R&D in the top thirty animal health and nutrition companies was 8.3 %. The industry estimates that the total amount that needs to be spent on R&D is 100-150 million ECU, which is a very high figure when compared to the average size of the market. Whereas the top pharmaceutical products for human consumption can record sales figures of up to 3 billion ECU, only half a dozen veterinary products have ever exceeded annual sales of 120 million ECU.

In general terms, the highest R&D to turnover ratios are recorded by those firms which are principally involved in biologicals and pharmaceuticals, whereas those companies which mainly produce feed additives have lower R&D to turnover ratios.

Several of the larger companies producing pharmaceuticals for human consumption are also involved in the production of therapeutic products for veterinary use or feed additives. In 1993, the five major animal health and nutrition companies were Hoffmann-La Roche, followed by Rhone-Poulenc, MSD, SmithKline Beecham and Mallinckrodt Veterinary. Together, these accounted for 33 % of the sales of the animal health industry's thirty largest producers, but only 3 % of the total sales of Europe's five largest pharmaceutical producers. Amongst the top 30 animal health and nutrition producers, 10 also rank in the world's top 15 pharmaceutical companies.

The EU market for veterinary and animal health products is currently undergoing major shifts and rationalisation as a result of two factors: the creation of the Single Market and stringent regulations aimed at ensuring safe residue levels in food and in the environment (these have resulted in a considerable reduction in the number of products).

In recent years, a number of major pharmaceutical producers have divested from the animal health and nutrition sector to generate cash to finance their restructuring or new acquisitions in the human health sector. Given the enormous difference in market size and turnover value between the human drugs businesses and animal health products, the animal health divisions are indeed not perceived to be a strategic enough asset for the larger pharmaceutical firms to want to keep them in their group. This represents a new threat to an industry which is already faced with relatively slow growth in demand.

Written by: DRI Europe

The industry is represented at the EU level by: European Federation of Pharmaceuticals Industries Associations (EFPIA). Address: Avenue Louise 250, Bte 91, B-1050 Brussels; tel: (32 2) 640 6815; fax: (32 2) 647 6049; European Proprietary Medicines Manufacturers' Association (AESGP). Address: Avenue de Tervuren 7, B-1040 Brussels; tel: (32 2) 735 5130; fax: (32 2) 735 5222; European Federation of Animal Health (FEDESA). Address: Rue Defacqz 1, Bte 8, B-1050 Brussels; tel:(32 2) 537 2125; fax: (32 2) 537 0049.



# Maintenance products

## NACE 259.2

Maintenance products have been influenced by changing demographic and lifestyle patterns which, along with the growing public concern for environmental issues, have led to the development and marketing of new products and new product varieties. The large multinational companies which operate on the global market for maintenance products not only try to establish growth through new product development, but also by entering new geographical markets, by taking over smaller companies and by large investment in promotional activities.

### INDUSTRY PROFILE

#### Description of the sector

Maintenance products are defined as preparations designed to meet the cleaning, preserving and protective requirements encountered in a wide range of domestic, institutional and industrial applications. The maintenance products can be subdivided into four categories: scourer and surface cleaning products, polish products and waxes, bleaches and sanitary cleaners and air fresheners and insecticides. Soaps and detergents, classified under NACE 258, are not considered in this chapter.

Scourer and surface cleaning products include all-purpose cleaners, scouring powders and preparations for specific applications, such as car, oven and window cleaning products. Their market size is estimated at nearly 2 billion ECU. Polish products and waxes include polishes for wood, shoes, leather etc. For these products, sales are estimated at more than 800 million ECU. Bleaches and lavatory cleaners include both powder and liquid products. They are chiefly used for the cleaning and disinfecting of sanitary ware. Their market size is estimated at nearly 1.5 billion ECU. The market for air fresheners and insecticides is estimated at more than 500 million ECU. Air fresheners appear in an aerosol or solid form; insecticides in powder, solid or liquid form. Electrically-operated products (NACE 34) are excluded.

Compared to the soap and detergents industry, the market for maintenance products is relatively small. With sales totalling an estimated 36 billion ECU the soaps and detergents industry

is six to seven times larger than the market for maintenance products.

#### Recent trends

Over the period 1987-1992 the EU market for maintenance products grew at an average annual rate of 5%. In real terms, however, consumption only increased by 1.2%. In 1993, the industry suffered from the economic recession.

#### International comparison

Some large multinational companies are operating on the international market for maintenance products. With their headquarters located in the USA or in Europe, these companies have branch offices and production facilities around the world, often close to the local markets. As the same competitors can be found in different countries, country performance is directly related to company performance.

#### Foreign trade

In 1993, extra-EU exports in value were 18.3% up from the year before. Meanwhile, extra-EU imports jumped by 24.6% in value, keeping the sector's trade balance positive at 101 million ECU in 1993.

The USA has become the major supplier of maintenance products to the EU market, raising its share in EU imports from 19% in 1988 to 40.5% in 1993. This growth, however, might be distorted by the inclusion of the agricultural and horticultural applications of insecticides and pesticides into the trade figures. The EFTA area is the major market for EU-manufactured maintenance products.

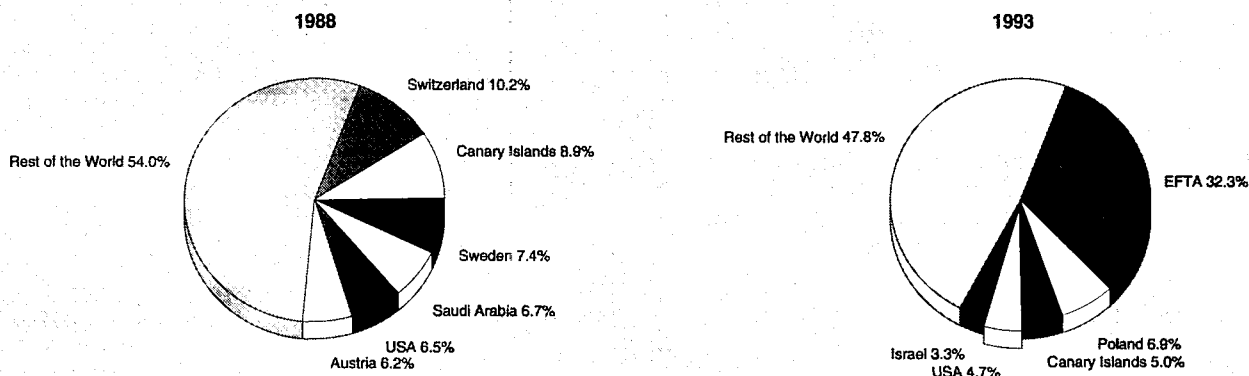
### MARKET FORCES

#### Demand

The long-term development of the demand for maintenance products is linked to a number of demographic factors. The ageing of the population brings with it the need for more intensive use of space and thus more frequent maintenance. The number of households is increasing, with more smaller (e.g. single person) households, pushing up demand. The increasing number of women working outside the home has changed the nature of demand: more practical and convenient products designed to help save time are needed.

The demand for convenience is reflected in the growth of liquid products and the increasing demand for multi-purpose products, or on the contrary for task-specific products. For

Figure 1: Maintenance products  
Destination of EU exports



Source: Eurostat

**Table 1: Maintenance products  
Extra-EU exports**

(thousand ECU)	1988	1989	1990	1991	1992	1993
Hypochlorite	8 561	11 853	11 679	11 095	10 204	15 542
Deodorisers	28 134	27 652	26 786	30 346	31 763	37 753
Polishes/creams shoes, leather	20 519	14 802	15 332	18 809	22 580	30 047
Polishes/creams woodwork	12 069	12 500	14 374	14 183	15 290	14 694
Polishes coachwork	10 445	11 879	15 972	15 634	18 466	22 305
Metal polishes	11 637	12 696	12 824	15 438	14 644	14 084
Other polishes	15 333	16 212	16 879	20 030	18 178	22 252
Scouring pastes	11 468	13 079	12 276	14 965	22 158	24 742

Source: Eurostat

**Table 2: Maintenance products  
Extra-EU imports**

(thousand ECU)	1988	1989	1990	1991	1992	1993
Hypochlorite	1 515	1 971	1 702	1 777	3 319	4 972
Deodorisers	14 561	17 284	19 638	25 813	30 230	38 763
Polishes/creams shoes, leather	5 891	4 341	3 964	5 812	4 808	6 655
Polishes/creams woodwork	4 220	5 103	5 047	6 785	4 337	5 116
Polishes coachwork	2 474	3 221	3 878	4 760	5 712	6 033
Metal polishes	2 704	2 161	2 037	2 687	2 802	4 583
Other polishes	7 486	7 769	8 627	10 496	11 780	12 755
Scouring pastes	3 216	2 171	1 739	2 336	1 314	1 252

Source: Eurostat

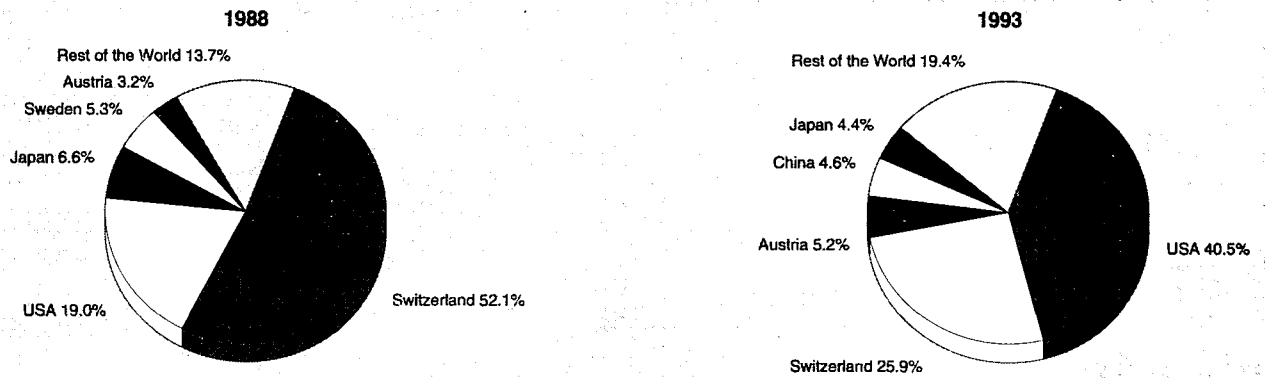
**Table 3: Maintenance products  
Extra-EU exports by country**

(thousand ECU)	1988	1989	1990	1991	1992	1993
EU	118 166	120 673	126 122	140 500	153 283	181 419
Belgique/België, Luxembourg	2 025	2 391	2 240	2 841	2 556	5 744
Danmark	3 029	2 944	2 967	3 499	4 178	4 317
BR Deutschland	30 790	33 407	36 812	40 615	42 696	46 269
Hellas	475	636	521	874	2 415	3 261
España	15 468	15 848	14 986	15 130	14 423	14 511
France	17 820	17 751	19 091	22 216	26 874	31 697
Ireland	117	87	766	290	880	1 127
Italia	6 476	7 486	9 863	8 506	10 076	14 284
Nederland	7 110	11 580	11 107	13 337	18 821	22 818
Portugal	172	191	287	416	278	359
United Kingdom	34 684	28 543	27 458	32 953	30 594	37 032

Source: Eurostat



**Figure 2: Maintenance products  
Origin of EU imports**



Source: Eurostat

instance, in their search for new market niches manufacturers have developed low-abrasive products for particular areas of the house, such as the kitchen or the bathroom. Other marketing elements, which increasingly impact on consumers' purchasing behaviour, include the technical performance of preparations, a convenient packaging, along with strongly scented and coloured products.

The patterns of consumption vary regionally from one country to the other, according to the climate, local customs and the degree of environmental concern. For example, the per capita consumption of domestic hypochlorite in Germany is 0.14 kg and in Denmark 0.5 kg, while the corresponding figures for Portugal and Spain are 8.2 kg and 12.2 kg respectively. In the surface cleaners and scourers subsector, the highest per capita consumption in value is in Italy (8.75 ECU) and Switzerland (7.71 ECU), while the Swedish and the English consume the largest volume (8.1 kilos and 6.7 kilos, respectively). The main users of air fresheners and insecticides are the French (2.12 ECU) and Portuguese (2.06 ECU). Finally, in 1992, Belgium and Sweden were the two countries where per capita sales of shoe polish were the most important (1.47 ECU and 0.96 ECU, respectively).

### Supply and competition

A relatively small number of large multinational companies is operates worldwide in the maintenance products segment.

Intensifying global competition has forced the industry to concentrate on new product development, which has involved large expenditure on R&D and promotion. The emphasis on new product development is reflected in an increasing flood of new products on international markets. The large manufacturers, however, also try to generate growth by exploring new geographical markets and by taking over small and medium-sized companies. In recent years, the international market for maintenance products has also been increasingly affected by the rise of generics and own brands by some retailers, resulting in an intensification of price competition.

## INDUSTRY STRUCTURE

### Companies

A few large multinationals are active on the international market for maintenance products, including the two US-based companies Colgate-Palmolive and Procter & Gamble, and the Anglo-Dutch group Unilever. However, on the markets for air fresheners and insecticides their market positions are weak. Other companies which are also operating in one or more segments of the market for household cleaning products are Reckitt & Colman (UK), SC Johnson (US) and the German companies Henkel and Benckiser.

**Table 4: Maintenance products  
Extra-EU imports by country**

(thousand ECU)	1988	1989	1990	1991	1992	1993
EU	42 067	44 021	46 632	60 466	64 302	80 129
Belgique/België, Luxembourg	1 701	2 811	2 575	1 973	1 530	2 097
Danmark	1 875	2 192	1 492	1 986	3 370	3 852
BR Deutschland	13 147	12 701	16 779	24 869	23 699	31 421
Hellas	347	673	668	1 030	1 471	1 918
España	1 034	1 095	1 475	2 720	3 652	2 315
France	5 799	6 345	5 170	5 968	5 414	7 803
Ireland	221	237	1 907	2 155	2 287	478
Italia	3 186	5 373	4 414	4 477	4 795	6 177
Nederland	7 308	6 693	6 873	7 070	8 302	10 537
Portugal	364	214	450	601	648	956
United Kingdom	7 085	6 315	8 130	9 537	11 227	12 575

Source: Eurostat



**Table 5: Maintenance products  
Dimensions of the EU maintenance products industry, 1993**

Turnover (million ECU)	3 000
Number of employees (1)	48 000
Number of companies	600

(1) The significant increase in the number of employees for 1993 is because the figure include sales, marketing, distributional activities and not only production activities as in 1992.

Source: FIFE

Beside these major international companies, many small and medium-sized firms are active in manufacturing and selling maintenance products throughout the EU. Their number is estimated at around 600. The total number of employees in the sector, estimated to be at least 60 000, remains fairly stable.

### Strategies

The major multinational companies try to generate growth either by developing new markets for existing products (the exploration of the East European markets for instance), developing new products or product varieties for existing markets and by developing new products for new markets. Mergers and takeovers are also often made in order to benefit from growing markets and to diversify into new markets.

Smaller companies, active in one or two market niches, are often limited to local markets. Only if they had an exclusive patent for their product would they be able to operate on a larger scale.

### Impact of the Single Market

The European Single Market programme has been a success for the maintenance products industry. A unified market, with harmonised standards has indeed emerged, while in the past, product specification had to adapt to each national set of regulations. As a result, large multinational companies (about 80% of the market) have restructured their operations. They have been able to concentrate production in a small number of large factories, each specialised in a limited number of products, from where they serve the entire European market. Small and medium size enterprises have also increased their specialisation, developing their presence in niche markets.

As far as this industry is concerned, two important Directives remain under discussion: the biocides directive, and the actualisation of the directive on biodegradability which dates back from 1973.

### ENVIRONMENT

In the maintenance products industry, environmental protection is at the forefront of the research and development of new products. EU and national environmental regulations are becoming increasingly strict as the pressure of public opinion is intensifying. Minimising toxicity has thus become not only mandatory, but also a criterion for success. The industry is devoting a considerable share of its R&D expenditure on more environmentally acceptable products. Actually, a large number of toxic products have been phased out, as the more environmentally acceptable substitutes have started to pay off.

Specifically, in accordance with EU regulations and following public opinion, major efforts have been made to develop new types of propellants for aerosols and containers that do not involve the use of pressure.

The use of products containing active chlorine is also under scrutiny. Under the EU legislation on dangerous preparations, hypochlorite products that contain below 5 % of active chlo-

rine are not classified; products containing 5 to 10 % of active chlorine are classified as irritants, and those above 10 % are classified as corrosive. Although the average hypochlorite solution contains around 5 % of active chlorine (or less) and thus not classified as dangerous, a possible hazard can arise from the improper use of hypochlorites in a very limited number of situations (which represents 0.12 % of household accidents). This can occur if the products are mixed with other cleaners of an acidic type. Accident statistics further show that direct contact with eyes and skin does not cause permanent injuries and that ingestion very seldom leads to serious or permanent injuries.

Although the risk of having an accident linked to the use of hypochlorite products is very low, the industry has strongly supported improved labelling to ensure that hypochlorites are not used incorrectly and has developed a public information programme on their benefits and safety when used correctly.

The industry also has implemented measures aimed at reducing packaging waste, thus contributing to energy savings. Reductions are being achieved through lightweighting (using less material to make the packs), concentration (using a formula to deliver performance from smaller volumes of product), refilling (using the pack more than once), recycling (reusing the material from the pack). These measures not only lead to waste reduction, but to energy saving as well.

### REGULATIONS

Some 200 regulations, directives and amendments are relevant to the maintenance products industry. Subjects covered include dangerous substances, dangerous preparations, solvents, pesticides and insecticides, consumer protection, environment, waste, water quality, biodegradability, eco-labelling, eco-auditing, risk assessment, packaging, taxation and transport.

The industry is mainly covered by the Directive 88/379 concerning dangerous preparations. In December 1993 the Commission Directive 93/112 was adopted, defining and laying down arrangements for the system of specific information relating to dangerous preparations.

Other recently adopted or drafted directives concern the assessment of the risks posed by substances to human beings and the environment in accordance with Directive 67/548 on dangerous substances (Directive 93/67), warnings for products containing more than 1 % of active chlorine, the assessment of the effects of certain public and private projects on the environment and the incineration of hazardous waste.

### OUTLOOK

Given their secure integration into many aspects of daily life, the use of maintenance products is unlikely to be reduced. The growth of the market for maintenance products is expected to continue at the same modest, but constant rate. According to our forecast, overall production and consumption of these products will increase by about 1.5 % per annum for the period 1994-1997. As a result of environmental pressures, an increasing volume of more environmentally acceptable products and product accessories will be developed and marketed.

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# Man-made fibres

## NACE 26

World production of man-made fibres grew by 2 % in 1993 to a record level of 20.3 million metric tons. However, production in Western Europe declined by 3 %. The sector's major outlets, were hit by a combination of recession and structural change. With stronger demand during 1994, prospects seem to improve in the near future.

The manufacture of man-made fibres in the EU is confronted with intense competition, particularly from developing countries and NICs in Asia. Thus, the European industry is turning its attention to higher value added products, continued work on modernisation to lower production costs, and restructuring to trim excess capacity and the number of producers.

### INDUSTRY PROFILE

#### Description of the sector

The man-made fibres (or chemical fibres) industry covers three different types of fibres: synthetic fibres, cellulosic fibres, and mineral fibres.

Chemical fibres mainly consist of synthetic fibres, which accounted for 85 % of world chemical fibre production in 1992. The main synthetic fibres, with their share of total 1992 world production, are: polyester (54 %), nylons and aramids (20 %) and acrylic (13 %) fibres. Cellulose-based fibres, which are made from natural sources, such as modified wood pulp that has been dissolved into a liquid, include: acetates, rayon, triacetate and viscose. They account for 13 % of world chemical fibres production. Although mineral fibres are also part of the chemical fibre sector, they are excluded from the statistics presented in this chapter.

All of these fibres are divided into sub-categories according to their physical form. Filament is a polymer which is remilled in its molten state via a fine strainer and then solidified by cooling. It is then processed in a variety of ways, depending on how it is to be sold. It can also be cut up into short fibres.

These short fibres often have very similar characteristics to those of natural fibres.

The preponderance of synthetic fibres over cellulosic products is becoming more pronounced. Short synthetic fibres represent the bulk of EU production, with 54 % of the total. Synthetic filaments come second with 33 %. Cellulosic fibres, which represented about 22 % of total chemical fibres in 1980, now only represent 13 %.

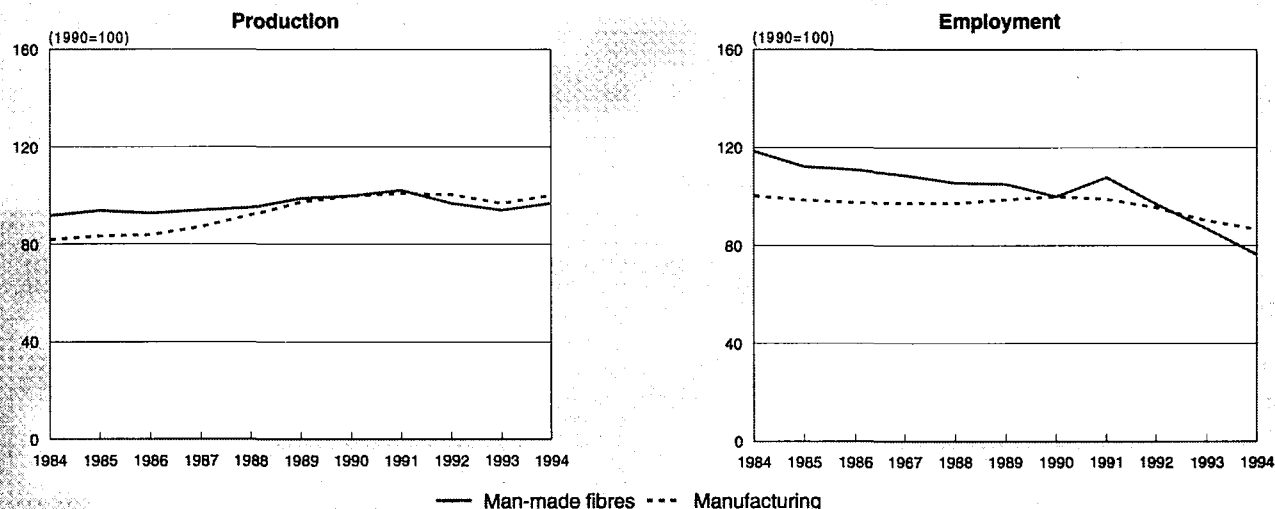
Among EU Member States, the largest producer of man-made fibres is Germany (34.1 % in 1993), followed by Italy (22.5 %). Benelux and the United Kingdom are also important producers, each accounting for about 11 % of EU production, followed closely by Spain (9.2 %).

#### Recent trends

Between 1986 and 1991, EU production of man-made fibres had grown at an average annual rate of 2 %. In 1992, however, EU production in volume decreased by 5.2 %, the first decline since 1986, followed by a 3 % decline in 1993. These declines were mainly driven by an equal fall in consumption, due to a downturn in the textiles and clothing and automotive industries, which were hit by a combination of recession and structural change. This output fall is significant when compared to world production which grew at 4.6 % in 1992 and 2 % in 1993.

The EU chemical fibres industry has undergone extensive restructuring since the late 1970s. The low rate of increase in European textile consumption during the late 1970s (following the first oil crisis) contributed to the structural change. Other reasons for restructuring were: the growing deficit on the EU's textile and clothing trade balance; the development of chemical fibre production capabilities in the rest of the world; and, numerous investments made by EU firms in other parts of the world. In fact, two waves of production capacity reduction have occurred. During the 1978-85 period, over 900 000 tonnes was cut, or one-third of the total West European capacity. Another development has been technological changes which reduced manpower requirements. Employment has been falling gradually since 1980, except for an increase of 7.8 % in 1991, due to the inclusion of eastern Germany. However, employment in the industry has continued to fall from 77.4 thousand in 1991 to 62.4 thousand employees in 1993, i.e. 10 % yearly. This decline was accompanied by a significant

**Figure 1: Man-made fibres**  
Production in volume and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: CIRFS, DEBA

**Table 1: Man-made fibres**  
**Production, breakdown by sub-sector in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Synthetic filament	879	919	916	927	962	1 017	1 025	1 076	1 012	974
Synthetic staples	1 511	1 579	1 568	1 595	1 570	1 625	1 692	1 724	1 615	1 579
Cellulosic filaments and staples	466	419	399	402	426	434	394	379	388	369
Total	2 856	2 917	2 883	2 924	2 958	3 076	3 111	3 179	3 015	2 923

Source: CIRFS

**Table 2: Man-made fibres**  
**Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	2 659	2 745	2 839	2 860	3 003	3 230	3 334	3 375	3 204	3 093
Production	2 856	2 917	2 883	2 924	2 958	3 076	3 111	3 179	3 015	2 923
Extra-EU exports	561	588	516	565	569	496	430	410	447	438
Trade balance	197	172	44	64	-45	-154	-223	-196	-189	-170
Employment (thousands)	85.1	80.5	79.5	77.9	75.8	75.3	71.8	77.4	69.6	62.4

Source: CIRFS, Eurostat

**Table 3: Man-made fibres**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.0	-1.1	1.7	3.4
Production	1.5	-1.3	0.3	3.0
Extra-EU exports	-2.4	-3.1	-2.7	2.0
Extra-EU imports	12.3	-1.7	5.9	-4.4

Source: CIRFS, Eurostat

**Table 4: Man-made fibres**  
**External trade in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	561	588	516	565	569	496	430	410	447	438
Extra-EU imports	364	416	472	501	614	650	653	606	636	608
Trade balance	197	172	44	64	-45	-154	-223	-196	-189	-170
Ratio exports / imports	1.54	1.41	1.09	1.13	0.93	0.76	0.66	0.68	0.70	0.72

Source: Eurostat

upgrade of apparent labour productivity and an increase of utilisation rates from 74.4 % in 1991/92 to 77 % in 1993.

#### International comparison

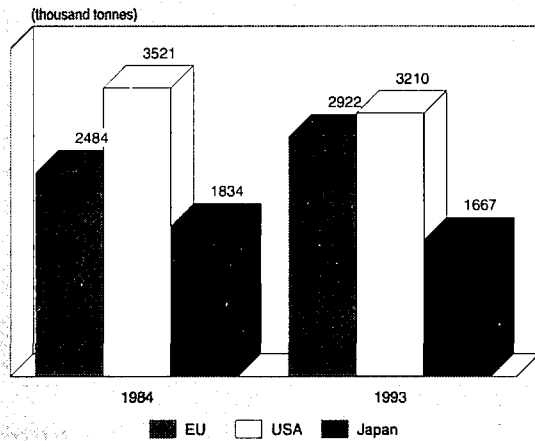
Over the past decade the production of man-made fibres has decreased by 9 % in both the USA and Japan. Although total production in the EU increased, the industry has been losing ground in relative terms in the production of all kinds of fibres. Between 1992 and 1994, estimated man-made fibre production capacity declined by 1 % in Western Europe, mostly because of the capacity reduction which took place in East Germany during this period; while it increased by 23 % in the developing countries (excluding China). During this period, production capacity hardly increased at all in the US and Japan. The relative decline is particularly strong in the field of synthetic filaments, where the EU represented

less than 12.4 % of world production in 1992, down from 20.6 % in 1977.

The US man-made fibre industry remains one of the largest in the world, with a market share of 19 % in 1993, compared to 16 % for Western Europe, 11 % for Taiwan and 9 % for Japan. Production in the newly industrialised countries (NICs) accounts for an increasing share of world output, displacing the former pre-eminence of the USA and some EU Member States. In 1993, already 49 % of man-made fibres were produced in Asia, while combined production of Taiwan, China and South Korea reached 29 % of world output.

The NICs are becoming crucial actors in the industry. The most dynamic region is Southeast Asia, which includes: Taiwan, South Korea, China and the ASEAN countries. For example, while the East Asian countries represented only 22 %

**Figure 2: Man-made fibres**  
International comparison of production in volume



Source: CIRFS

of world production of polyester in 1980, this share jumped to 40 % in 1992 and could rise to 60 % of world production by 2001. Overall, the Southeast Asian industry should see its share of synthetic fibres grow from 28 % in 1992 to 31 % in 2001.

### Foreign trade

The EU has a strong rate of import penetration, while its share of exports in production remains weak. The EU trade balance on man-made fibres has declined steadily since 1983, falling into deficit in 1988, when imports jumped by 23 % to 614 000 tonnes. Meanwhile, exports declined from an average of 560 000 tonnes between 1984 and 1988 to an average of 431 000 tonnes between 1990 and 1993. Combined with imports peaking at 653 000 tonnes in 1990, after which they declined again to 1988 levels, the cover ratio (exports/imports) fell from 1.54 in 1984 to 0.66 in 1990, after which it steadily increased to 0.72 in 1993.

After an increase of 5 % in 1992, extra-EU imports decreased by 4 % in 1993. As a consequence, EU imports as a percentage of consumption decreased slightly; a ratio that has shown an increase from 14 % in 1984 to 20 % in 1992. Comparing

1993 to 1988, the USA and EFTA countries lost ground in the EU-market (origin of EU imports from these countries declined from 57.3 to 50.7 %), while Japan increased its share in EU imports from 2.9 to 4.5 % and the "Rest of the World" increased from 29.6 to 34.7 %.

Extra-EU exports, after an increase of 9 % in 1992, decreased by 2 % in 1993. EU manufacturers exported roughly 15 % of their production in 1993 to non-EU markets. However, declining demand, along with increasing supply from other regions of the world, put pressure on prices as the weakness of the dollar continued to negatively affect extra-EU exports.

Germany is by far the largest exporter of man-made fibres, accounting for 53 % of extra-EU exports. It is also the leading importer, with 19 % of extra-EU imports. Italy (15 % of exports, 19 % of imports) and the United Kingdom (13 % of exports, 16 % of imports) are also big trade players. However, only Germany recorded a trade surplus outside of the EU in 1992.

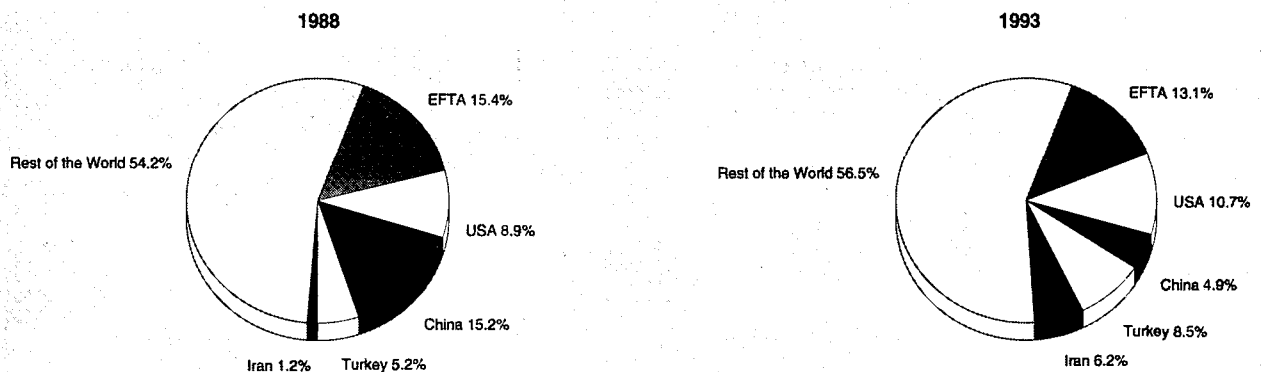
The USA is the EU's foremost national trading partner. Over the period 1988 to 1993 the share of exports to the USA increased from 8.9 to 10.7 %, while imports from the USA decreased from 16.3 to 12.9 %. Exports to China decreased dramatically, from 15.2 % in 1988 to only 4.9 % in 1993. This fall has been partially compensated for an increase in exports to countries such as Iran (6.2 %, up from 1.2 %) and Turkey (8.5 %, up from 5.2 %). Eastern Europe has also been an important EU export market. Until 1990, this region had been more important in terms of exports (with about 25 % of total extra-EU exports in 1986) than the EFTA countries. However, since 1990, EU exports to Eastern Europe have fallen drastically, in spite of a decline of synthetic fibre output in Eastern Europe of 14 % in 1992. In that year, total consumption in Eastern Europe had still not reached the peak of 1980.

## MARKET FORCES

### Demand

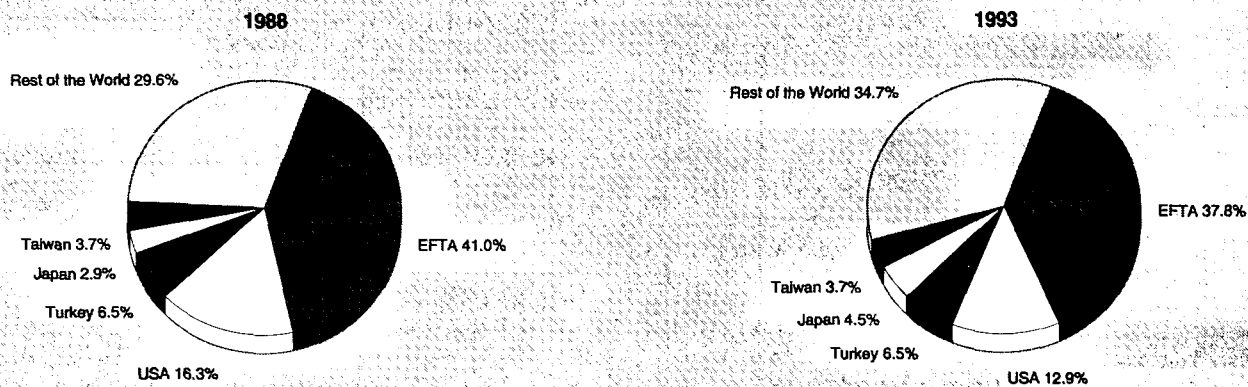
The main end-market for man-made fibres is the clothing industry, with 47 % of total consumption, while interior furnishings represents another 35 % and industrial applications 18 %. As consumers account for an important share of demand, overall economic activity and personal disposable income are overriding factors in the dynamics of the man-made fibres industry. Chemical fibres represent an important share (approximately 66 %) of total fibres consumption in the EU.

**Figure 3: Man-made fibres**  
Destination of EU exports in volume



Source: Eurostat

**Figure 4: Man-made fibres**  
Origin of EU imports in volume



Source: Eurostat

Growth recorded throughout the 1980s in the textiles sector mirrored the overall increasing trend in consumption of man-made fibres. Technical textiles is the sector with the most favourable market prospects in the EU, as the sector is continuously finding new markets; not least because of a high rate of innovation. On the other hand, synthetic fibre consumption for spun-yarn production has fallen back to the levels of the late 1970s, and further declines are expected for the coming decade. The main reason for the decline are increased imports of apparel, primarily made from cotton.

As the seventies were the decade that created pan-European markets, the past decade implied the globalisation of markets. The barriers between Europe and the rest of the world being swept away have required, once more, a radical reassessment. The reduction of the European market for man-made fibres has been partially driven by the fact that several textile clients have shifted operations to extra-EU countries. Another minor factor was the change in the tyre market, which saw increasing buyer power and falling market boundaries. Within five years, a dozen major world tyre manufacturers merged to form five.

Combined with oversupply of fibres, the industry's margins have decreased.

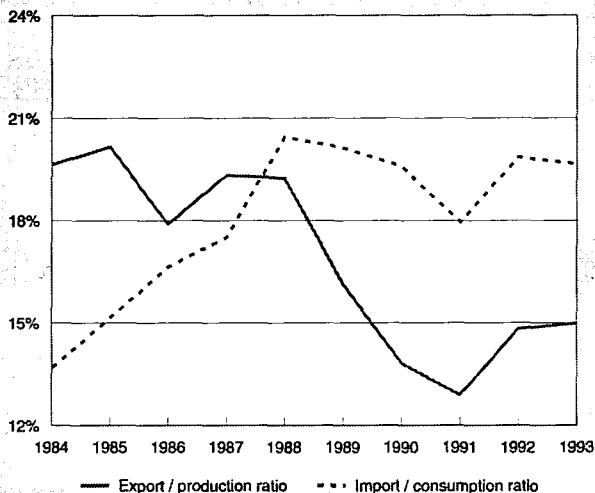
### Production process

Enhancements in the technology of yarn and fabric manufacturing have been major factors in the increasing dominance of synthetic fibres over natural fibres. Some processes, such as tufting for carpet manufacture, were initially made possible by developments in synthetic fibres technology. Given their particular suitability for a variety of end-uses, man-made fibres, in particular synthetic fibres, have been able to capture a significant part of the fibres market.

The production process is increasingly capital intensive, following the need for higher technology products.

Two recent innovations have been developed in the clothing industry. Microfilaments, which have properties similar to silk, geared towards casual wears, and Lyocell, a new man-made cellulosic fibre developed by Courtaulds (UK), AKZO Nobel (NL) and Lenzing (A), aimed at the high fashion market. The latter's manufacturing process is an important chemical simplification over that of rayon and viscose and environmentally more friendly; because of the use of a renewable raw material and the recycling of solvents.

**Figure 5: Man-made fibres**  
Trade intensities



Source: Eurostat, CIRFS

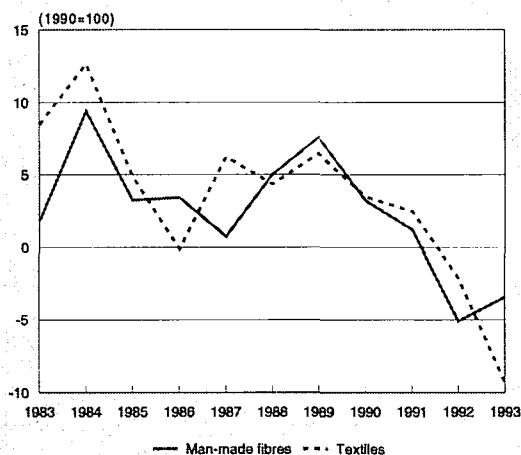
## INDUSTRY STRUCTURE

### Companies

The global man-made fibres market is dominated by a small number of big companies. Companies are specialised and concentrate on speciality fibres in order to avoid competition from developing countries.

With a production capacity of 1.1 million tonnes, Hoechst AG (D) is the world's largest producer of polyester. Its turnover, in chemical fibres, amounted to 6 945 million DM in 1992. In polyamides, the joint venture between Rhône-Poulenc (F) and SNIA Fibre SpA (I) controls about a third of the West European market, followed by DuPont (USA) with 25%. The latter is also the first world producer, followed by Allied Signals (USA) and BASF (D). For acrylic fibres, Enichem (I) and Bayer (D) are the main world producers, recently joined by the joint venture between Courtaulds (UK) and Hoechst (D). As far as polypropylene is concerned, two EU companies belong to the world top ten, Moplefan (I) and Danaklon (DK). Courtaulds (UK), Lenzing (A) and AKZO Nobel Fibres (NL) are other major players in the sector.

**Figure 6: Man-made fibres**  
Consumption growth of man-made fibres and textiles



Source: CIRFS, Eurostat

### Strategies

Globalisation of markets and increasing pressure from Asian competition had a profound impact on the strategies of EU companies. The latest strategy is one of specialisation in one type of fibre through asset swaps, sales and/or alliances. As a result, the major firms in the industry are increasingly operating with a global perspective. For example, ICI's tyre cord business moved from having a strong market share in Europe to a weaker position in the global market. However, its quality advantage was less easy to realise over a wider geographical spread. In spite of a major restructuring programme, doubling labour productivity without increasing capital employed, it became clear that profitable investments would only be possible in conjunction with DuPont. In July 1993, ICI completed the sale of its fibres business to DuPont in exchange for a cash sum and for DuPont's interests in acrylic materials.

Polyamide alliances have been concluded between Allied Signal and Akzo and between Rhône-Poulenc and SNIA. Another important joint venture between Courtaulds and Hoechst, announced in May 1993, concerns their acrylic and viscose operations. In viscose, the new company will command a strong position in both the industrial and textile end-uses. It will also provide Courtaulds with a wider platform to launch its new Tencel fibre on the European market. BASF also illustrates the drive towards specialisation. After divesting from viscose and acrylic, which it sold to Lenzing and ICI (respectively) in 1992, it is now planning to do the same for its polyester operation in the USA, in order to focus on polyamide. On the eastern front, Rhône-Poulenc has set up a joint venture with Chemlon SP of Slovakia, the leading producer of polyamide yarn in Central Europe.

An increasing number of fibre producers are following textile demand to Southeast Asia. This trend is not because of the lower level of labour costs per se, but rather to be nearer major sources of apparel manufacture, which can subsequently be exported to Western Europe. In the beginning of 1994, DuPont and China Worldbest Development Corp. agreed to explore the possibility of a joint venture to make and market Lycra elastane fibres in China. Lycra can be combined with other fibres to enhance the fit and shape retention of garments. DuPont recently doubled its capacity for Lycra in its Singapore plant. Akzo Nobel is also exploring investment opportunities in China and other Southeast Asian countries.

### Impact of the Single Market

The legislative measures taken to create a Single European Market are considered to have been globally positive by the man made fibre industry. One of the measures which the industry considers to have been particularly relevant is the creation of a centralised system to monitor and approve mergers and acquisitions at the European level. As this sector is mostly composed of large multinational companies, and because restructuring activity (through M&A, asset swaps, etc.) has been and will continue to be important, the existence of a centralised authority is essential to allow a fast completion of restructuring agreements.

In order to have a balanced competitive environment within the EU, it is, however, also important for the man made fibre industry that state aid to nationalised or other producers be carefully monitored and regulated. Another important competitive factor is the cost of energy, which accounts for more than 5% of total costs. The set up of the Energy Internal Market and a further liberalisation of the energy sector would help keeping energy price down and would harmonise prices across the European Union.

### ENVIRONMENT

Firms in the industry will have the choice to apply or not for the Eco-label award, depending on whether they can and want to fulfil the requirements developed by the competent body and approved, in the last instance, by the Council of the EU.

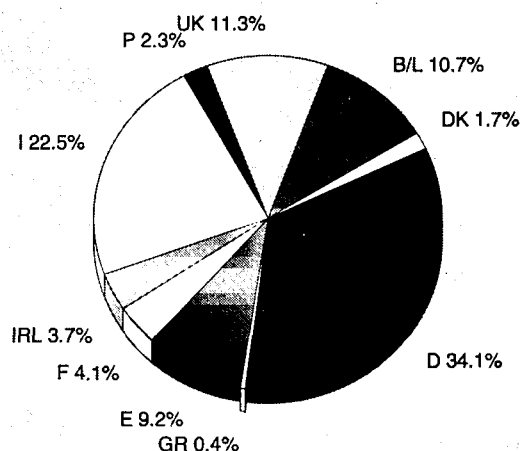
The UK's Chemical Industries Association (CIA) reported that its members' "green" spending for environmental protection, energy conservation, and health and safety is expected to hold steady at 27 % of total capital spending.

### REGULATIONS

The industry is carefully following extra-EU imports to detect cases of "unfair" trade. Under the auspices of its industrial association, CIRFS, it has already won several anti-dumping cases.

The Uruguay Round package brings trade in textiles and clothing gradually back to more liberal GATT rules. With regard to tariffs, European tariffs are being trimmed to about 4 %, recently in India tariffs have been reduced up to a maximum

**Figure 7: Man-made fibres**  
Production in volume by Member State, 1993



Source: CIRFS

of 65 % in 1995 and will be reduced to 20 % at the beginning of the year 2000, Pakistan will reduce its tariffs in July 2000 up to a maximum of 30 %. The structure of the textile phase-out will have a major influence on textile industries all over the world, causing restructuring of the textile and fibre industries. In the short term, international trade may not be affected, but between the fourth and eighth years, major influences will impact exporting and importing countries. In the long term, the biggest benefit is expected to accrue to China.

A framework agreement, with the European Commission, covers national subsidies for investments in the man-made fibres industry. The Commission must be notified, in advance, of all government subsidies to the synthetic fibres sector, and any subsidy assistance for increasing capacity is forbidden. Where subsidies are granted for modernisation, the funds should be linked with restructuring and reducing capacity.

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## OUTLOOK

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The EU man-made fibres industry is expected to perform slightly better in the 1995-1997 period. The bulk of the growth will be accounted for by synthetic fibres, especially nylon (about 5 % yearly), polypropylene (4 % yearly) and polyester (2.5 % yearly). Development of new cellulosic fibre variants may reverse the decline of cellulose production in Western Europe.

Demand from the industry's main clients is expected to improve in the second half of the decade. The automotive industry is expected to start recovering by 1995, thus contributing to a stronger production performance in the man-made fibres industry. Industrial applications, including geo-textiles and nonwovens, seem to be a solid growth area, while the prospects for household textiles and carpets are also healthy. The textiles industry will witness a slight increase in production, with customers looking for materials with specific, higher value added, qualities. Import growth is expected to benefit from the growth in textile consumption, and restructuring is expected to continue as a result of import pressure from Southeast Asia. NEI also estimates that at least one-third of the European textile industry will be relocated by the year 2000, probably resulting in a similar, but less profound, relocation of the fibre industry.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: International Rayon and Synthetic Fibres Committee (CIRFS). Address: Avenue E. Van Nieuwenhuyse 4, B-1160 Brussels; tel (32 2) 676 7464; fax (32 2) 676 7454.



# Biotechnology

*Biotechnology is a small but fast growing, high technology field. The European Union's 1993 White Paper on Growth, Competitiveness and Employment recognises that biotechnology is one of the key technology for Europe future prosperity. At present, most commercial biotechnology production occurs within the pharmaceutical sector. Other areas of increasing importance are the agricultural sector, the food processing sector, renewable energy production and environmental and waste management.*

*The EU is an important player in biotechnology. However, comparatively favourable market conditions in terms of financial arrangements, intellectual property protection, regulation and public acceptance in the USA makes this country the world leader of the field. Many European companies invest in the USA.*

*According to Ernst & Young, the market for biotechnology products in Europe, reached 38 billion ECU in 1993, with about 27 000 jobs where biotechnology is directly applied, and 184 000 jobs in biotechnology-related activities. By 2000, Ernst & Young expects this market to reach 80 billion ECU.*

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## INDUSTRY PROFILE

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### Description of the sector

Biotechnology can be broadly defined as the application of scientific and engineering principles to the processing of materials by biological agents. Biotechnology consists of two segments. Classical biotechnology is comprised of fermentation and preservation processes used in the production of beer, wine, cheese, bread, vinegar, etc., where advances have been made predominantly without the use of genetic engineering. Modern biotechnology is characterised by the utilisation of genetic engineering and is a small but rapidly growing segment. Only modern biotechnology will be considered here. Modern biotechnology is based predominantly on recombinant DNA (rDNA) and cell fusion techniques and has considerable potential for a wide range of applications. So far, around 400 genetically modified organisms (GMOs) have been released in the environment worldwide. Major impacts are expected in pharmaceuticals, agriculture and food processing, health (diagnostics), renewable energy, environmental management (including waste management). Large growth in biotechnology equipment is expected to impact on relevant high-technology fields of the electronic engineering sector.

According to a recent study by Ernst & Young, the European market for goods which are dependent on the successful application of biotechnology is about 38 billion ECU. About 27 000 jobs depend directly on modern biotechnology applications, and about 184 000 people have jobs where biotechnology is involved to some degree. According to the European Commission, the number of employees in modern biotechnology firms is slightly higher than estimated by Ernst & Young, and would be between 35 000 and 40 000. The Ernst & Young study also shows that research and development expenditure by European biotechnology firms amounted to more than 1 billion ECU in 1993. This is significantly below US biotechnology investments

### Recent trends

Over the eighties, there was a 10.6 % per year increase in the number of patent applications in the area of biotechnology in the EU. The structure of biotechnology inventions (i.e. those with patent applications in at least two countries) remained roughly stable over the second half of the 1980s. While Germany had the highest share, this fell slightly towards the end of the decade and the United Kingdom was among

those that increased their share. Since 1993, because of easier access to capital in the United Kingdom, the biotechnology sector has developed more rapidly in this country, thus reinforcing the trend noted above.

In 1994, according to Ernst & Young, employment in biotechnology-related activities increased by 1 %. However, employment increased more rapidly in small companies (less than 1 000 employees), at 6.5 %, than in large companies, where employment only increased by 0.5 %.

### International comparison

Ernst & Young estimates that the number of biotechnology companies in Europe at about 400, including university research programmes and pharmaceutical companies subsidiary. This compares to about 1 500 companies in the United States, which remains the dominant country in the field. Even European companies are now investing more in the USA in the EU. The Ernst & Young survey mentions that, while European companies realised about 60 % of their investment within Europe in the past few years, and only 20 % in the US, current plans for future investments by European companies show a balanced split between investments planned in Europe and in the US.

Mergers and acquisition activity gives another sign of the leading role of US companies in the biotechnology sector. An analysis by Roche, the Swiss pharmaceutical company, shows that, over the 55 major R&D alliances formed by the pharmaceutical industry in 1993, 52 of the 55 "technology providers" were US biotech companies, and only three were European.

European companies have historically tended to specialise in different product areas than their US and Japanese counterparts. In the USA, biotechnology companies focus their interest on diagnostic agents, pharmaceutical products and equipment. In Europe, there is no marked specialisation. In Japan, there are proportionally more biotechnology companies active in applications for the chemical industry.

In the pharmaceutical market, all three main players are developing and using rDNA and cell merging techniques to produce proteins for a wide range of pharmaceutical products. In the agro-biotechnology market, there are marked differences in product specialisation. European expertise is fairly broad but particularly strong in the area of agro-chemicals. The USA is superior in its level of development in seeds, geared towards oil and cereal crops. Japan concentrates mostly in fermentation products and biotechnology directly related to horticulture.

### Foreign trade

At present, trade in biotechnology-derived products is principally for pharmaceutical applications. Compared with the pharmaceutical sector as a whole, where slightly less than half of extra-EU exports goes to countries outside the USA and EFTA, biotechnology derived pharmaceuticals are much less traded with countries outside these two foreign markets. The biotechnology pharmaceutical products tend to be high value, specialist drugs designed for ailments prevalent in the industrialised world. Trade in agro-biotechnology is small in comparison and is largely of seeds. Non-compliance with intellectual property rights is a barrier to trade, as companies only export to countries where their products are protected by effective patent regulations.

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## MARKET FORCES

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### Demand

At present the market for biotechnology derived products is almost totally in the North America, Japan and western Europe. Although potential developments in industrialising countries are enormous, especially in the agriculture sector, sales to



these countries are very limited. The market fails to take advantage of developing biotechnology products, pitched at demand from the developing world for two main reasons. Firstly, the return on the large investments in R&D that would be needed to bring the products to commercialisation would be too small to justify. Secondly, if the product was brought to commercial status, the risk attached to non-compliance with international intellectual property rights would be very high. Technology for equity deals may be one viable way forward as a mean of technology transfer in the less high-tech industries, particularly agro-biotechnology.

Factors hindering demand include concern over the safety of genetically engineered organisms on the natural environment. In Europe, a certain distrust of the public in some Member States towards biotechnology is a handicap for the development of the sector.

A promising sector for biotechnology applications in Europe is environment management. Demand in this field is likely to increase with the growing concern over the environment in the EU and the rest of the world. An example of possible application has been developed by Brixham, a subsidiary of Zeneca (UK). The company is working with the University of Luton (UK) to develop a biosensor to detect and monitor toxicity levels at sewage works.

Products of biotechnologies can also be used in agriculture, where productivity gains and cost reductions are important in a heavily subsidised sector in the EU.

Agro-biotechnology products have taken longer to be brought to the market than biotechnology derived pharmaceuticals for at least three reasons. Firstly, in the EU and other developed countries, high technology pharmaceuticals are part of a more profitable and faster growing sector than the agricultural sector. Secondly, basic research in agro-biotechnology takes longer than for bio-medical products, partly because of the scale (genetically altering a whole organism compared to cells used to produce proteins for a new drug) but also because testing of new strains of crop is limited by seasonal factors and in animals, testing is constrained by the gestation cycle. Thirdly, the delay in adopting EU-wide regulations on the marketing of biotechnology-derived agricultural products (Novel Foods, animal feed, seeds, plant protection products, etc.) may have some impact on the sector's development.

An estimated 872 transgenic plant trials have been achieved in Europe and North America between 1988 and 1993. Oilseed, rape, potato, tobacco sugar beet and maize accounted for most of these trials. Over the last three years, the number of trials has been stable in Europe (from 79 in 1991 to 93 in 1993), while they have doubled in North America (from 83 in 1990 to 177 in 1993). Furthermore, trials are limited to a few experimental sites in Europe (175 in 1993), while in North America, trials are achieved in a large variety of sites (1300 in 1993), which indicates that many transgenic plants are in the final stages of testing in the US, while still in preliminary test in Europe.

### Supply and competition

The world leader in the biotechnology-derived pharmaceuticals' market is Amgen (USA) with sales of about 1.6 billion USD in 1994. In Europe, Switzerland (with Roche), Germany (with Bayer and Hoechst) and Denmark (with Novo-Nordisk) are particularly well placed in the market. As far as attracting investment is concerned, the Netherlands, where many US owned companies have settled, and the UK, with an easier access to stock market, are amongst the most attractive business environments. However, other countries' environments, due to lower public acceptance, are perceived by the industry as less favourable.

Several factors contribute to the preference for European companies to invest in biotechnology outside the EU: the relatively

low level of subsidies to biotechnology R&D (in the ten years to 1992, the EU provided 600 million ECU in to improve basic knowledge and reinforce biotechnology in Europe); public mistrust and interest group opposition, both higher in Europe than in the USA or Japan; the level of bureaucracy that is high compared to USA and Japan, and finally trade restriction, such as a relatively low level of intellectual property protection.

Indeed, in Europe, the non-uniformity of intellectual property rights remains a stumbling block for producers of biotechnology derived products, within the EU domestic market and also in many export markets. The very high levels of investment that are necessary to bring the product to the market necessitate some form of generic licensing enforced through patents. In the past, an estimated 14.5 billion ECU per year have been lost on the world pharmaceutical market due to the non-recognition of patents by many large export markets such as Brazil, Hungary, India and Thailand. If international intellectual property rights were enforced it could increase world pharmaceuticals' sales revenues by up to 8.5 billion ECU. On the other hand, a recent report on biodiversity commissioned by the UN Development Programme estimates the value of Third World plant species to the pharmaceutical industry at more than 30 billion USD per year, as 90 % of the earth's remaining biodiversity is located in non-industrialised countries.

### Production process

Biotechnology has made great strides in the field of human health since 1980 when insulin became the first product of genetic engineering and modern biotechnology to reach clinical trials. In the pharmaceutical sector, biotechnology is used in three ways: to produce drugs and vaccines using rDNA technology, to make intelligent screens for new compounds and to apply techniques for rational drug design by understanding molecular structures. Since the early 1980s biotechnology has also branched into other areas.

In the field of diagnostics, kits are available that use monoclonal antibodies (MABS) to diagnose such diseases as the AIDS virus. MABS can also be used to direct treatments or attack a target themselves which have important consequences for the treatment of cancer and other diseases. In the chemical sector, biotechnology research is mainly in the field of enzymes (which act as catalysts) with markets such as washing powder.

In the agricultural sector, developments have been in the areas of pesticides, plant and animal health and the increasing of yields. Bio-pesticides are produced using strains of a bacterium *Bacillus thuringiensis*. They have been in commercial use for over 30 years and, over this period, biotechnology has increased the range of target pests. Plants and animals have been selectively bred for generations to bring out useful traits. However, it was not until 1983 that the first rDNA engineered plant was produced. Since then there has been much research and development in the area (known as transgenic plant technology) and over 50 species of crop plant can now be genetically transformed. In addition to increased yield, biotechnology has also enabled increased resistance to pests, diseases and to herbicides, which allow a more selective and effective use of herbicides.

In the food sector, developments have included the genetic modification of plants to improve flavour and smell, lengthen shelf life and eliminate toxins. Also, genetically engineered enzymes can be used to enhance the efficiency of certain areas of food production. For example, Bovine Somatotrophin (BST) increases milk production of cattle, and a rennin substitute (Chymosin) eliminates problems of supply and infections from animal sources of rennin. BST is currently commercialised in the USA. In Europe, the Council of Ministers has decided to ban BST use until the end of the nineties.

Non-food uses of animals and plants will become important for the production of antibodies and therapeutic proteins. In June 1994, Genzyme (US), has launched the first "transgenic farm". The thousand goats raised in the farm have been genetically modified to produce humane proteins in their milk. These proteins can then be used to create new drugs. Genzyme's plans include the production of a new anticoagulant, or drugs against multiple sclerosis and cancer.

The areas in which biotechnology could play a key role in environmental and waste management are: treatment of contaminated land and water; reducing the cost of effective pollution control for hazardous industrial effluent; a reduction in the volume of household, agricultural and industrial waste through bacterial digestion and the use of biodegradable packaging. In addition, the use of biotechnology to engineer organisms to increase the rate of digestion of woody matter would enable the yield of biogas from landfill sites, sewage works and agricultural digestors to be increased.

## INDUSTRY STRUCTURE

### Companies

European biotechnology has developed primarily within large pharmaceutical companies and in non-profit research institutes such as universities. The typical European biotech company is thus quite different from the often quoted US biotech company, typically a small research company, whose financing rely essentially on investor's confidence and thus on announcing as widely as possible every achievement. In Japan, the players on the market are almost exclusively large companies.

The first biotechnology survey published in March 1994 by Ernst & Young reports about 400 European biotechnology companies, about a third of what can be found in the USA. However, the average size of a biotechnology company is larger in Europe than in North America. In the USA, the typical biotechnology company is a small entrepreneurial young companies. In Europe, biotechnology has developed primarily within large pharmaceutical or chemical groups, or in universities.

European biotechnology companies are especially active in pharmaceuticals and food businesses. On total biotech-related sales of 38 billion ECU in 1993, pharmaceuticals account for 15 billion ECU, and food for 10 billion ECU (according to Ernst & Young). Other sectors of activity are chemicals, agriculture supplies and diagnostics and equipment.

In the few years of its short history, the biotechnology industry has developed in a few specific locations, such as Oxford, Cambridge, Scotland and London in the UK, or in the areas around San Francisco and Boston in the US. According to the Ernst & Young's study, the most important factors are the availability of skilled staff, the regulatory environment, the proximity of scientific institutes and the cost factor. Other factors that influence the location of an investment are access to capital, a favourable tax regime, easy access to airports and highways, the quality of the environment.

Most of these factors are slow to change, and it is likely that the same regions will continue to attract biotechnology companies in the future, if only because biotechnology companies gain from being next to each other, so new ideas can move around and develop quickly.

Many companies also set up in the US because it is the largest and most profitable market for biotechnology products. The entry into force of the new marketing authorisation system for medicinal products, run by the European Agency for Evaluation of Medicinal Products (EAEMP), will help in attracting more biotechnology companies to Europe.

The European regulatory environment is likely to undergo changes in the near future. A number of European companies

are reported to have established new laboratories in the US largely because of stringent regulations in Europe. This is for example the case of Bayer, Boehringer Mannheim or Hoechst in Germany. On the other hand, the EU regulatory framework is currently reviewed, in order to incorporate scientific progress and gained experience on work with genetically modified organisms (GMO). This is expected to bring about the added benefit of a positive impact on European competitiveness.

Access to capital is a crucial factor for the development of the biotechnology industry. Indeed, it often takes 10 years before a biotechnology company becomes profitable, if ever. Until now, on the 2 000 or so biotechnology companies in the Europe and North America, less than a dozen have shown any profit. Despite this, there is a highly dynamic entry of new firms in this domain. Capital is a necessity for a biotechnology company, not only to pay the bills and salaries, but also because it provides a strong asset when negotiating strategic agreements with potential partners such as large pharmaceutical concerns.

However, accessing capital is difficult. In the US, biotechnology companies raised 3.4 billion USD in 1991, but this amount declined to 2.5 billion in 1992 and 2.8 billion in 1993. Capital raised through flotation on the stock markets also declined in the US, from 33 million USD in 1991 to 26 million in 1992 and 22 million in 1993. One of the main reasons which explain the decline in interest for funding biotechnology companies is the fear of healthcare reforms, which cast doubts on the ability of new biotechnology products to generate large profits once they reach the market.

Another important reason is the change of mood among investors. While optimism over a buoyant future for the biotech industry was the rule in the early eighties, the results achieved by the industry has somewhat watered down that optimism. Many biotechnologically-developed drugs did not live up to expectations, as they were either dropped by their developer (such as Synergen of California abandoning its sepsis treatment Antril), or had only limited success.

In Europe, cash raised through public offering has been more limited, but the situation is slowly changing. In the UK, the London Stock Exchange has adapted its rules for biotech companies. Normally, to obtain a quotation on the stock exchange, a five year track record and three years of profit were required, a technical impossibility for young biotechnology companies, which usually do not show profits for years after their creation. Now that more appropriate criteria have been set, the number of flotation has dramatically increased in the UK. In March 1994, 11 biotechnology companies were quoted on the London Stock Exchange. That number was expected to double a year later.

As the venture capital and stock market source do not provide enough capital to finance the cash hungry biotechnology industry, new sources of capital have to be found. The industry is now turning to large pharmaceutical companies, which are always keen to spend their resources to increase their research and new drug portfolio. The drawback, for small biotechnology companies, is that they often have to give up a lot in terms of marketing and manufacturing rights, or in equity and management responsibilities.

### Strategies

Because the field has a large capital requirement and it is difficult to raise capital in the EU for a biotech venture, large companies are prominent in the field. On the other hand in the United Kingdom there are a larger than average number of smaller companies due to exceptional arrangements that have been in force since 1993, allowing biotechnology companies to be floated on the London stock exchange without the usual three years record of trading profits.

For the average European pharmaceutical company, alliances or minority shareholdings are generally preferred over acquisitions in the biotechnology field. Large companies see this as a way of allowing smaller, innovative companies the freedom to bring a novel technology to the market, whilst widening their technical knowledge and increasing the opportunities for spin offs. During the late 1980s, European companies spent about 2-3 million ECU sounding out the US biotechnology market by investing in small, specialised Californian companies. The testing period ended when Roche (CH) acquired a 60 % share of Genentech (USA), adopting an aggressive apprenticeship strategy. Since then, European activity in the USA has been increasing. Recently, for example, Ciba (CH) secured a 49.9 % holding in Chiron, a 13 year old biotechnology company in the USA.

For smaller companies, two strategies are possible. Some companies, such as Synergen (US), want to develop a product on their own. While this strategy can bring high rewards, it is also highly risky. In the case of Synergen, the company recently announced it was abandoning the development of its main product, Antril, laying off half of its staff, and putting the company up for sale.

One of the structural problem of the small biotech companies is that they only master a limited numbers of the numerous technologies that constitute biotechnology. Alliances or mergers between small companies, or company networks such as the one set up by Rhône-Poulenc recently, would create entities better able to face the arduous task of developing a new biotechnology product. The new entity can also benefit from economies of scale.

Example of this strategy are Chiron (US), or Celltech (US), which developed a network of alliance, especially with large, cash-rich pharmaceutical companies. Although this involve some loss of independence, they bring new resources, in terms of knowledge as well as in terms of capital, and secure somewhat the future of the biotech companies. This is done at the clinical trial or manufacturing stage for example, where large financial resources are needed. Small companies are then used as a subcontracting laboratory, that creates the new drug, while the large pharmaceutical concern takes care of the testing and marketing, which needs large investments. This structure makes sense as in the pharmaceutical sector, the average development costs for a new drug in smaller companies average is almost 50 % of those of a large pharmaceutical company.

### Impact of the Single Market

It is difficult to assess the impact of the European Single Market programme on biotechnology, as this is more a technology than a product. Indeed, a large number of industries use - or will soon use - biotechnologies in their normal production process (agriculture, pharmaceuticals, food and drink, chemicals, environmental services, etc.). Furthermore, the rapid development of technology has been the dominant factor of evolution in the past 10 years, dwarfing any impact European harmonisation could have had.

However, directives on the release of genetically modified organisms (90/219 and 220) have put a burden on the development of biotechnology in Europe, and several European companies have invested abroad. The definition of new rules on intellectual property rights is viewed as important for the future of biotechnology in Europe. A major concern of the industry is the lack of European harmonisation in regulations linked to biotechnology. Even when directives exist, differences remain important between Member States, as they only set minimum standards to be met.

**Table 1: Biotechnology**  
**Geographical distribution of major pharmaceutical biotechnological companies in Europe**

Austria	Bender & Co. Biochemie Immuno
Belgique/België	Innogenetics Janssen Pharmaceutica Smithkline Beecham Biologicals Solvay UCB
Danmark	Lovens Kemiske Fabrik Lundbeck Novo Nordisk
BR Deutschland	BASF Bayer Behringwerke Boehringer Ingelheim Boehringer Mannheim Hoechst Karl Thomae Schering
France	Laboratoires Fournier Pasteur-Mérieux-Connaught Pierre Fabre Rhône-Poulenc-Rorer Sanofi-Wintrop-Diagnostic Pasteur Servier
Italia	Biocine (Sclavo) Dompé Farmitalia-Carlo Erba (Pharmacia) Lepetit (Marion Merrell Dow) Menarini Sigma-Tau
Nederland	Akzo Bio-Intermediair Gist-Brocades Solvay Duphar Yamanouchi
United Kingdom	British Biotechnology Celltech Evans Glaxo Medeva Smithkline Beecham Wellcome Zeneca
Sweden	Astra Pharmacia Procordia
Switzerland	Ares-Serono Baxter Ciba-Geigy Glaxo Hoffman La Roche Neslé Sandoz SSVI

Source: Belgian Bioindustries Association

## ENVIRONMENT

The pharmaceutical sector is presently the largest market for biotechnology and this application has the least impact on the environment.

Biotechnology can benefit the environment directly in several ways. Using biotechnology to improve the ability of bacteria to digest woody material could improve biogas production from sewage works, landfills and agricultural digestors, boosting renewable energy production. It could also reduce the volume of waste from domestic, agricultural and even industrial sources. Bacteria could be designed to provide effective effluent pollution control at much reduced costs. The decontamination of polluted land and water is another possible application. In oil spills, for example, the use of detergents and the consequent detrimental effects to the environment could be avoided through the use of biotechnology.

In agricultural applications, biotechnology could transform modern farming methods. Consequences for the environment are still difficult to assess. On the one side, genetically engineered resistance to pests and diseases will reduce the necessity for artificial pesticides (and improve the environment); resistance to specific herbicides will allow a more effective and selective use of herbicides. On the other side, there are fears that the resistance to herbicides could, in the long run, increase herbicide usage. For example, a genetically modified rapeseed, tolerant to Hoechst herbicide Basta, recently gained marketing approval in the UK. The application is currently in discussion at the EU level. Fears have raised that rapeseed could become a weed if in subsequent years a field is planted with a different crop and farmers may then resort to using even stronger or multiple herbicides.

The safety of GMOs on the environment is another important issue. The industry is highly regulated, both in R&D and in the clinical or field testing of genetically engineered organisms before commercialisation. Currently moves are underway to set out more clearly the procedures applicable for the marketing of biotechnology products.

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## REGULATIONS

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On one level, biotechnology is a new set of techniques that modify the way in which a number of industrial sectors are approaching R&D and production. It is therefore subject to all pre-existing regulations controlling those industries.

There have also been various Council directives and regulations specifically in the field of biotechnology.

Registration of biotechnology-derived pharmaceutical products has been the responsibility of the Committee for Proprietary Medicinal Products (CPMP) and the Committee for Veterinary Medicinal Products (CVMP) as regulated by Council Directive 87/21/EEC. As from January 1, 1995, these two bodies constitute the scientific support of the European Agency for the Evaluation of Medicinal Products (EMEA). This new European body will allow for a single application for a community-wide marketing authorisation for new medicines. This should significantly shorten approval cycles for new drugs.

In the area of health and safety at work, Council Directive 90/679/EEC has been adopted to protect workers against the risks to their health and security from exposure to biological, irrespective of whether these are biotechnology-derived or not, agents and to promote the harmonisation of the regulations applied by Member States in this area.

Council Directive 90/219 covers the contained use of GMMs (genetically modified micro-organisms), while Council Directive 90/220 deals with the deliberate release of GMOs in the environment. Both directives require a risk assessment to be carried out before operations with GMMs and GMOs are undertaken. Directive 90/219 foresees different administrative procedures for the several categories of micro-organisms and operations established. A Member State is competent for authorising contained uses and R&D releases taking place in its territory. There exists a European procedure (with the participation of national authorities) for authorising the marketing

of GMOs. After receiving marketing approval, GMOs can circulate freely in the EU.

As announced in its Communication "Biotechnology and the White Paper on Growth, Competitiveness and Employment: preparing the next stage (COM(94)219, 1st June)", the Commission is currently reviewing Directive 90/219, in order to incorporate the wider range of available knowledge and experience, which should result in more risk-based administrative provisions. This is equally expected to bring about the added benefit of a positive impact on European competitiveness.

On the other hand, the EU is currently making an effort to complete biotechnology's regulatory framework by implementing the "one door, one key" policy for the marketing of GMOs. This policy integrates the environmental risk assessment foreseen under Part C of Directive 90/220 in the relevant vertical product legislation. This will eliminate administrative burdens for operators wishing to market biotechnology-derived products. The policy has been fully implemented in the fields of pharmaceuticals and animal feed additives, and is at different stages of development in the areas of food, seeds, plant protection products and feed.

As concerns the juridical protection of intellectual property, the Commission adopted in 1992 a regulation on a supplementary protection certificate for medicinal products, while the regulation on community plant variety rights was adopted in 1994. The conciliation committee between the European Parliament and the Council has recently adopted a common project for a Directive on the legal protection of biotechnology inventions.

Additional proposals under consideration refer to transgenic animals and to the transport of GMOs. The Council of Ministers for Agriculture recently decided on the extension until 1999 of the moratorium on the use of BST (bovine somatotrophin).

A move by the European Commission in 1992 established standards in the field of biotechnology with a program conducted by the European Committee for Standardisation (CEN). The standardisation will complement existing legislative actions, and will allow to reflect technical progress. By building a common approach on technical questions, the program should strengthen the competitiveness of the European biotechnology industry.

Community support is given to the biotechnology research through a number of research programs, including BEP, BAP, BRIDGE, ECLAIR, FLAIR, HUMAN GENOME ANALYSIS, VALUE, and MONITOR, that have been designed to improve basic knowledge and reinforce biotechnology in the EU. The Fourth Framework Programme (1994 to 1998) of the EU allocates 552 million ECU to R&D in biotechnology.

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## OUTLOOK

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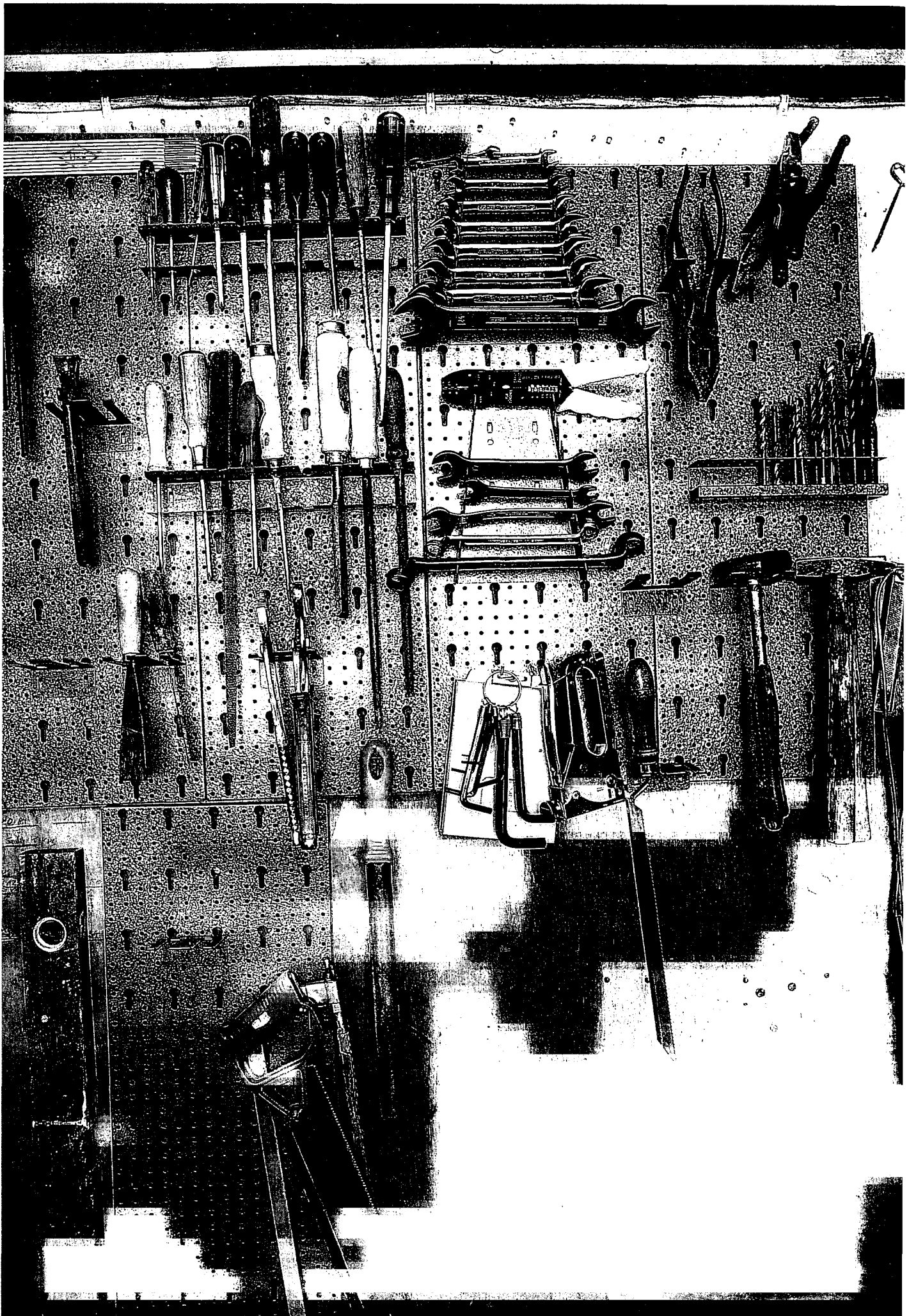
Given the front-ranking position of the USA, it is expected to continue to act as a magnet for investment. The Japanese industry, too, should experience high growth. Investment is likely to continue to flow out of Europe.

In Europe, according to Ernst & Young, a large proportion of companies expect sales of biotech products to remain flat until 2000. Only 20 % expect their sales to double before the end of the decade. Overall, sales should increase from 38 billion ECU in 1993 to 80 billion ECU in 2000.

Written by: DRI Europe

The industry is represented at the EU level by: The European Secretariat of National Bioindustry Associations (ESNBA). Address: Avenue Louise 490 bte 9, B-1050 Brussels; tel: (32 2) 646 3703; fax: (32 2) 640 3759; and Senior Advisory Group Biotechnology (SAGB). Address: Avenue de l'Armée 6, Bte 1, B-1040 Brussels; tel. (32 2) 735 0313; fax. (32 2) 735 4960.





## Overview NACE 31

The metal products industry, consisting of many small companies, is a relatively large industry employing approximately 2 million people. During 1984-1991, the EU metal products industry demonstrated a growing trend in production and consumption. In 1992 and 1993, however, the industry was confronted with production and consumption declines due to the economic recession. In the near future, increases in consumption and production are expected as demand from downstream industries has started to recover. Fierce international competition urges EU manufacturers to rationalise production processes and improve quality. To an increasing extent, technical know-how and high product quality constitute the core of EU competitive power.

### INDUSTRY PROFILE

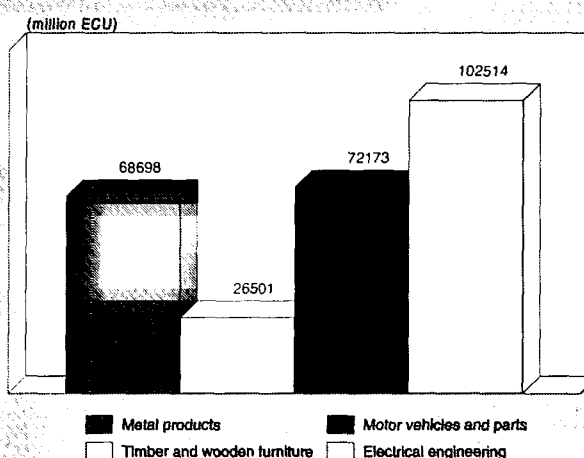
#### Description of the sector

The metal products industry as defined by NACE 31 can be subdivided into seven sectors:

- Foundries (NACE 311) include ferrous metal foundries like iron and steel foundries, and non-ferrous metal foundries like copper and aluminium foundries;
- Forging (NACE 312) includes drop forging, closed die-forging, pressing and stamping;
- Secondary transformation, treatment and coating of metals (NACE 313) includes the manufacture of articles on turning machines, such as lathes, screws, bolts, nuts, springs (except furniture and watch springs) and chains (except articulated link chains); the sintering, treatment and coating of metals; and general mechanical engineering on a subcontract basis;
- Structural metal products (NACE 314) include the manufacture of metal structures and parts of structures (such as bridges and frames); metal doors or windows from rolled angles, shapes and sections; pit-propping equipment; and standard-gauge railway track, fixtures and fittings;
- Boilers and metal containers (NACE 315) include the manufacture of large boilers (including complete furnaces) and other boiler house products, reservoirs, tanks and other containers;
- Tools and finished metal goods (NACE 316) include the manufacture of hand tools and agricultural tools; kitchen and tableware; general hardware like locks and fittings; heavy and light metal packaging products; domestic and kitchen heating appliances; metal furniture (including safes); domestic articles of base metal; small arms and ammunition thereof; and other finished metal products; and
- Other metal workshops (NACE 319) include soldering, welding, smithery, blacksmithery and rural workshops for the repair of agricultural equipment.

It should be noted that there is much overlap between some of these sectors. Aggregate figures on production and consumption should therefore be treated as giving an idea of size rather than stating exact levels. In 1992, tools and finished metal goods accounted for the largest share of total production with approximately 40 % of total EU production of metal products. The shares of the other sectors were much smaller with the manufacture of structural metal products at 16 %,

**Figure 1: Metal products**  
Value added in comparison with related industries, 1993



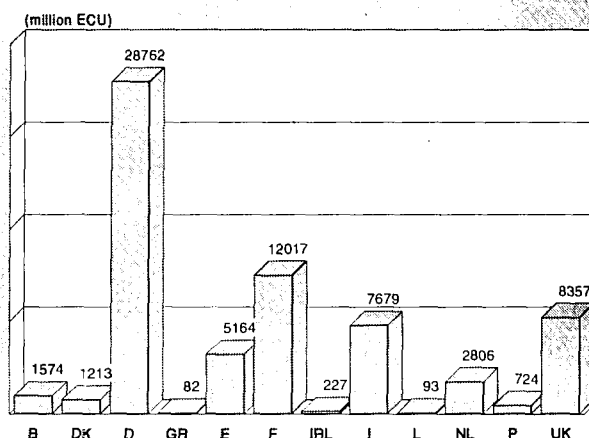
Source: DEBA

followed by secondary transformation (13 %), boilermaking (12 %), foundries (10 %) and forging (8 %). More than 41 % of total value added of the EU metal products industry originates from Germany. Other major producing countries are France (17 %), the United Kingdom (12 %) and Italy (11 %).

#### Recent trends

From 1984 to 1991, the metal products industry demonstrated a growing trend in production and consumption. In 1992 and 1993, however, the industry was confronted with decreases in production and consumption as a result of the recession. Some downstream industries, such as the building and construction sector were severely hit by the recession, resulting in weak demand for metal products. To prevent EU production

**Figure 2: Metal products**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Metal products  
Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Boilermaking	18 526	19 787	1 662
Forging; drop forging, closed die-forging, pressing, stamping	13 927	14 140	597
Foundries	16 385	16 838	1 066
Secondary transformation, treatment and coating of metal products	22 150	22 288	1 213
Tools and finished metal goods	65 238	67 252	8 297

(1) Some country data has been estimated.  
Source: DEBA

**Table 2: Metal products  
Sectoral share of production and employment, 1992 (1)**

(%)	Production	Employment
Foundries	9.9	11.2
Forging, pressing and stamping	8.3	8.0
Secondary transformation	13.1	16.1
Manufacture of structural metal products	16.4	16.2
Boilermaking	11.7	10.3
Tools	39.6	36.6
Other metal workshops	1.0	1.6

(1) Some country data has been estimated.  
Source: DEBA

**Table 3: Metal products  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	105 749	139 593	160 314	172 779	180 325	179 873	164 355	167 221	174 766	181 003	189 937
Production	114 369	145 084	166 335	178 544	185 170	184 520	169 731	172 719	179 736	185 763	194 517
Extra-EU exports	12 789	11 503	13 138	13 362	13 755	14 040	15 255	17 033	17 300	17 700	18 200
Trade balance	8 621	5 491	6 020	5 766	4 845	4 647	5 377	5 498	4 970	4 760	4 580
Employment (thousands)	2 105	2 064	2 153	2 221	2 217	2 163	2 041	1 987	1 973	1 971	1 970

(1) Some country data for apparent consumption, production and employment have been estimated.  
(2) DEBA estimates.  
(3) Rounded DRI forecasts.  
Source: DEBA

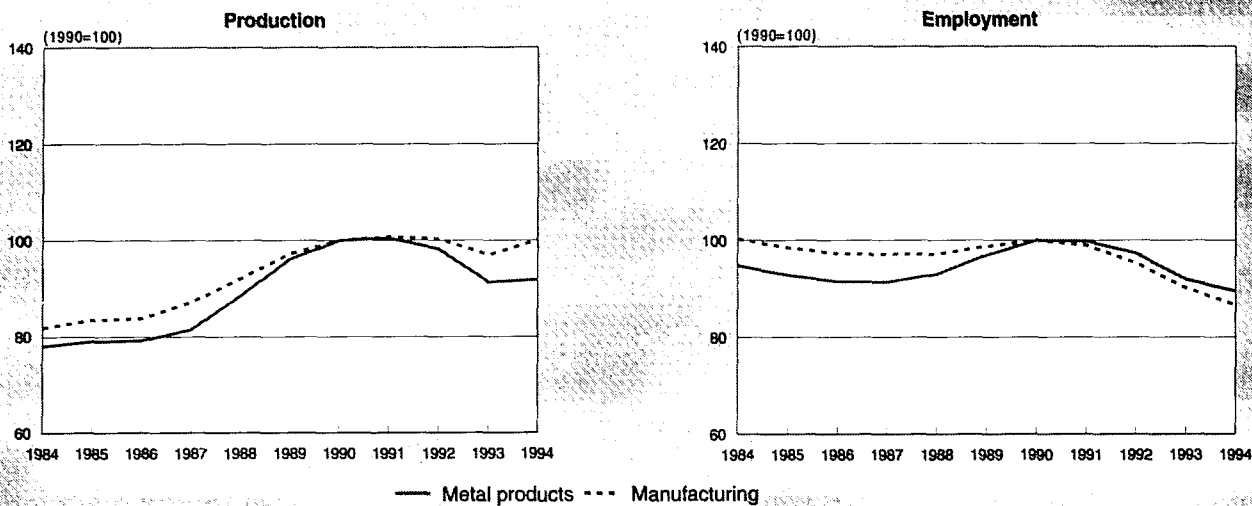
**Table 4: Metal products  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.30	-1.26	1.80	-7.06
Production	4.23	-1.24	1.76	-6.95
Extra-EU exports	0.62	-0.23	0.24	-1.57
Extra-EU imports	-0.51	0.21	-0.19	-0.01

(1) Some country data for apparent consumption and production have been estimated.  
Source: DEBA



**Figure 3: Metal products**  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
Source: DEBA

from declining as much as consumption, the EU industry increased its extra-EU exports.

The trade surplus has decreased since 1984 as extra-EU imports have grown faster than extra-EU exports. However, an increase in extra-EU exports and the simultaneous stagnation of extra-EU imports have stopped this trend. In 1993, the trade surplus grew by 15.7 % against 1992.

During the 1984-1987 period, employment in the metal products industry declined, but was followed by three years of increases. From 1991 on, however, the industry has been faced with a continuously declining workforce. This decrease is due to cyclical movements and the rationalisation of production within the industry.

Overall labour productivity of the metal products industry has increased at an annual average of 2.6 % from 1984 to 1992. Labour productivity differs among the sectors, however, with tools, boilermaking and forging scoring above average

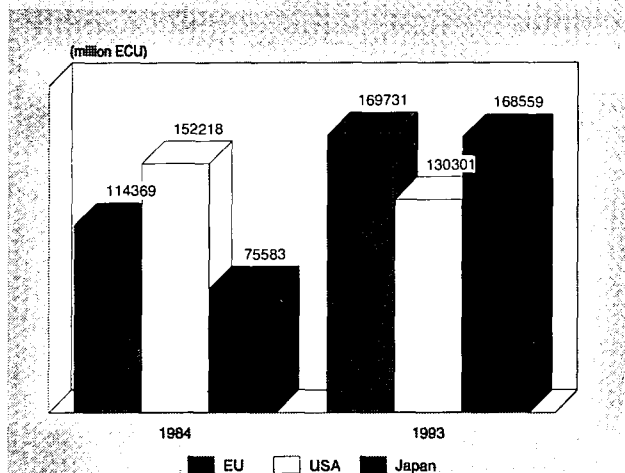
values, and foundries and secondary transformation accounting for relatively low values.

### International comparison

In recent years EU production of metal products (in constant prices) has declined. While US production recovered in 1992 and 1993, EU production has only started to grow again in 1994. In contrast, the Japanese metal products industry has seen production increase by 25 % since 1990. From 1984 to 1993, the average annual growth rate of Japanese production (in constant prices) amounted to 9 %.

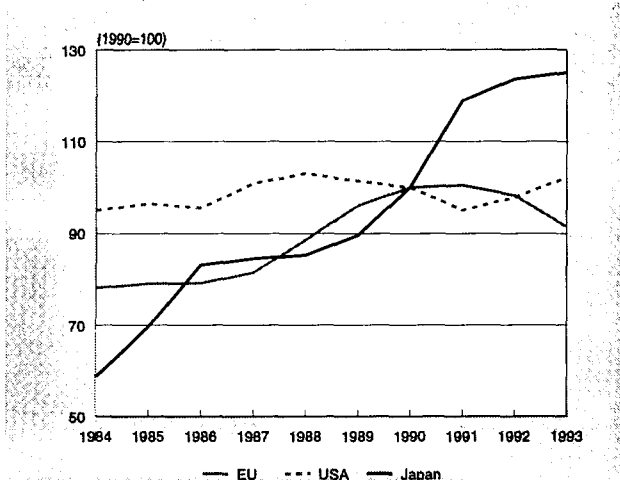
Japanese production in 1993 (in current prices) was almost as high as EU production. The Japanese workforce, however, is only half that of the EU; 963 741 against 2 041 371. If comparing value added per employee, the EU has the lowest value at 3 400 ECU per employee in 1993, while figures for the US and Japan were 5 100 ECU and 7 800 ECU, respectively.

**Figure 4: Metal products**  
International comparison of production in current prices



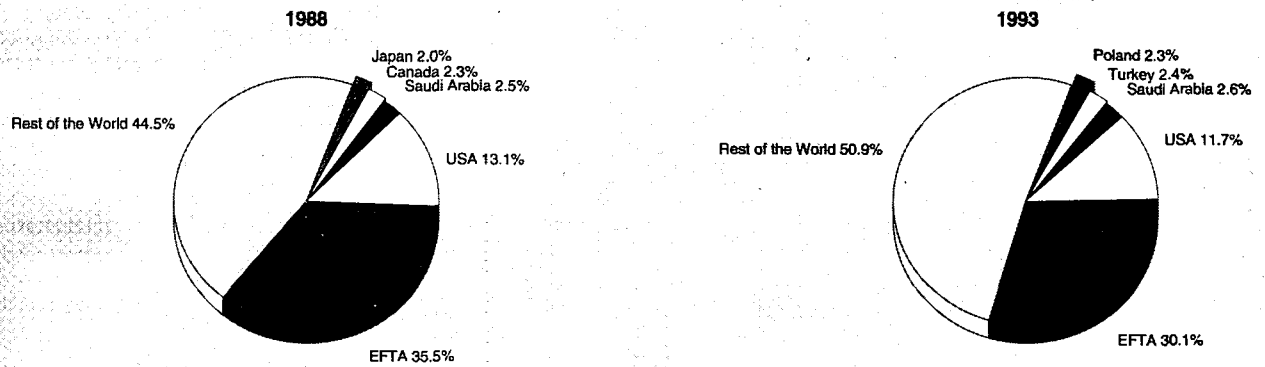
Source: DEBA

**Figure 5: Metal products**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Metal products  
Destination of EU exports**



Source: Eurostat

From 1984 to 1993, the US saw its production, in current prices, decline by 14 %. Consequently, it has lost its leading position on the global market.

### Foreign trade

The EU is a net exporter of metal products, although the trade surplus has decreased during the 1984-1992 period. In 1993, 30 % of total extra-EU exports was destined for EFTA countries. Other major destinations, though much smaller in share, were the US (11.7 %), and Saudi Arabia, Turkey and Poland, together accounting for 7.3 % of total extra-EU exports.

Extra-EU imports mainly originated from EFTA countries (37.6 %) and the US (12.8 %). Far Eastern countries, like Japan, China and Taiwan accounted for 20.7 % of total extra-EU imports.

The trend in trade is to export high value added products and import low value added items. Hence, there is relatively little extra-EU trade in sectors such as foundries and forging, whereas there is much more in structural metal products, boilers and metal containers, and tools and finished metal goods. Since 1985, the import/consumption ratio has increased from 3.94 % to 6.01 % in 1993. The overall export/production ratio

in 1993 was lower than in 1984, although it has been increasing since 1991. The export/production ratio is highest in tools and finished metal goods (12.3 %), while in forging a relatively low share of production is exported (4.2 %).

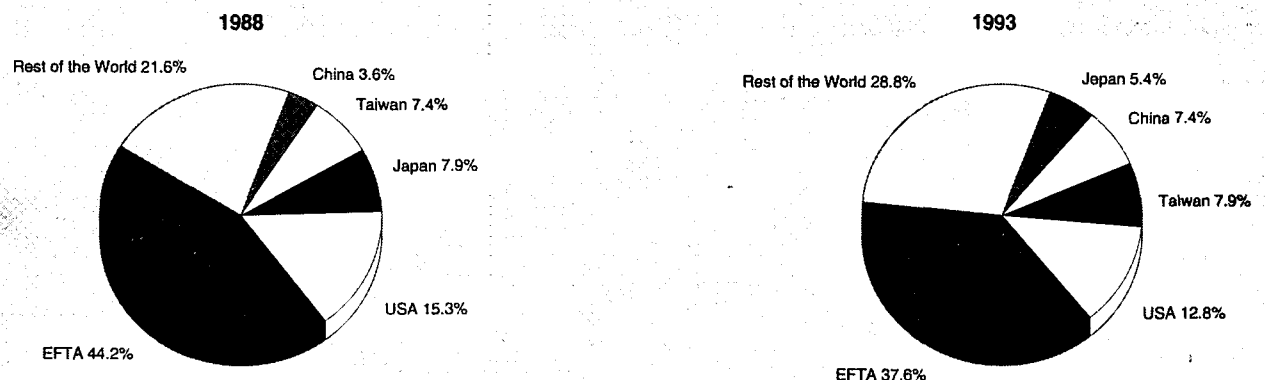
## MARKET FORCES

### Demand

The industry manufactures metal products for a wide range of industries. Important client industries are: the automotive sector; the construction industry; mechanical engineering; energy industries; chemical industries; iron and steel industries; household appliances; electronics; transport industries; and, agricultural and horticultural industries. Due to a downturn in these downstream markets, demand for metal products was weak in 1992 and 1993. However, the relative importance of downstream industries varies between Member States. For example, major client industries of the boilermaking industry in France and Germany are chemical industries, while in Italy and the United Kingdom harbour and shipping industries are major clients.

As product processes in client industries are continuously being technologically improved (e.g. automation and robotisa-

**Figure 7: Metal products  
Origin of EU imports**



Source: Eurostat

**Table 5: Metal products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	12 789	12 944	11 739	11 321	11 503	13 138	13 362	13 755	14 040	15 255	17 033
Extra-EU imports	4 168	4 446	4 642	5 089	6 012	7 118	7 596	8 910	9 393	9 878	11 535
Trade balance	8 621	8 498	7 097	6 232	5 491	6 020	5 766	4 845	4 647	5 377	5 498
Ratio exports / imports	3.07	2.91	2.53	2.22	1.91	1.85	1.76	1.54	1.49	1.54	1.48
Terms of trade index	183.9	178.0	151.2	130.3	107.9	104.5	100.0	87.3	84.8	89.0	N/A

Source: DEBA

tion), demand for standard metal products is increasing. The market has been subject to significant changes in demand, including shifts in the relative importance of major clients. Some of these changes are heavily influenced by environmental developments. With respect to the manufacture of boilers, for instance, demand from the nuclear power industry collapsed, while attention to co-generation or the simultaneous production of power and thermal energy from a common fuel source has grown.

### Supply and competition

There is an ongoing tendency towards concentration in the client industries of metal products. Together with the growing market power of client industries, mutual dependency of the supplier and client industries is increasing.

Due to weak demand in most downstream industries and worldwide overcapacity, prices have come under pressure. Furthermore, competition from former East European countries, where labour costs are relatively low, has intensified. In mass markets with standard products, price competition is fierce. Prices of metal products are somewhat higher, but still competitive, if compared with prices of alternative materials, such as plastic parts, stamping, roll-formed metal and composite components.

The core of EU industry competitive power is sophisticated, high quality, specially designed products. Competitiveness of the EU industry can be further improved if increasing efforts are directed towards R&D. Increased demand for higher efficiency in downstream industries and growing environmental concerns will stimulate manufacturers to direct more efforts

to R&D, which in turn will lead to increasing know-how and comparative advantage in the long run.

### Production process

Production processes in the industry are being technically improved in two ways: rationalisation and specialisation in quality products. Technical criteria are not the only decisive factors in international competition though, products must also be competitive from a cost angle.

Developments in labour productivity, unit labour costs and total labour costs indicate that efficiency increased during 1984-1989. Labour productivity, in current prices, increased at a faster rate than unit labour costs. Weak downstream markets, accompanied by lower capacity utilisation, have caused a stabilisation of labour productivity in the early 1990s. The resulting decline in employment, however, could not prevent an increase of unit labour costs. From 1990 to 1993, these costs rose by 14.7 % against a stabilisation of the labour productivity index. As a result, profitability of the industry has increasingly been put under pressure.

Costs have given rise to a trend for mergers as larger minimum plant sizes are required to cope with necessary investments. Further specialisation is also encouraged by environmental requirements. For example, companies which formerly galvanised their products themselves now leave this to specialised plants. By servicing a number of companies unit costs can be reduced.

## INDUSTRY STRUCTURE

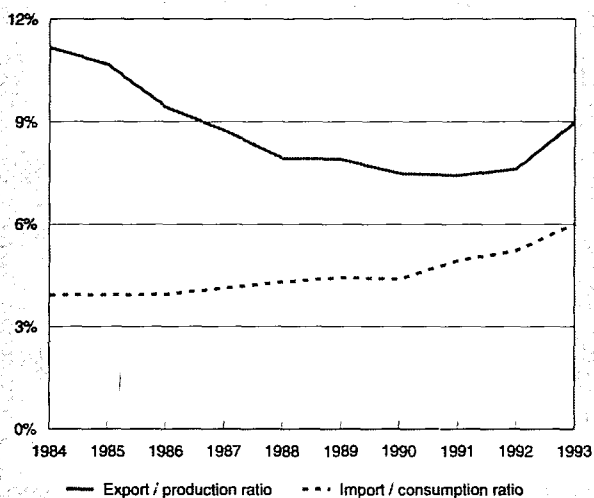
### Companies

In 1990 the EU metal products industry counted 229 087 manufacturers, of which 88 % employed less than 20 employees and 1.8 % employed 100 or more employees. Nowadays, the majority of metal products manufacturers are still small or medium-sized. The large enterprises accounted for 55 % of total turnover and almost 43 % of total employment, while the small firms constituted 19 % of total turnover and employed 28 % of the total industry's workforce.

Among the top ten companies in the world metal products industry four were Japanese, four were US and two were German firms in 1992. Three of the four Japanese companies were involved in structural metal products manufacturing; Tostem, Hitachi Metals and Sanwa Shutter. The US and Japanese companies have subsidiaries in the EU. In terms of turnover, Gillette (US) and Tostem (J) were three times larger than the two top ten German firms (GEA and Buderus). The largest companies in hand tools are Gillette (US) and Stanley (US).

Only one of the ten largest EU firms in the boilermaking industry is located in Germany (Deutsche Babcock). In Germany, there are many medium-sized enterprises. Other large firms involved in the boilermaking industry include: CLN (I); Degremont (F); Saboe Refrigeration (DK); Alsthom (F); Industria Cantieri Metallurgici (I); Dexicon International (UK); Ponticelli (F); and, Aalborg (DK).

**Figure 8: Metal products**  
**Trade intensities**



Source: DEBA

**Table 6: Metal products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.4	85.2	86.6	89.2	95.2	99.0	100.0	100.6	100.8	99.4
Unit labour costs index (3)	88.1	90.8	93.9	95.1	93.0	94.7	100.0	106.5	111.6	114.7
Total unit costs index (4)	83.9	87.4	88.8	89.6	92.1	97.3	100.0	103.6	107.0	107.0
Gross operating rate (%) (5)	9.0	9.1	9.6	9.9	10.8	10.4	10.3	10.1	8.7	7.3

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

The secondary transformation industry is, like the metal products industry as a whole, characterised by many small and medium-sized enterprises. There are only a few companies that could be classified as medium to large enterprises, with sales over 100 million ECU.

### Strategies

In recent years, the metal products industry has: trimmed inefficient capacity, introduced raw material cost-control measures; installed new-technology processors; improved productivity; and, started to emphasise niche-marketing, concentrating either on high-volume work or specialised low-volume products.

Fierce price competition, due to increasing volumes of cheaper imports, urges manufacturers to improve productivity and re-consider their product-mix. In addition, saturation of the EU market urges manufacturers to look for new markets, possibly to be found in Eastern Europe.

Rationalisation of production processes and establishment of production capacity in low wage countries will enable manufacturers to lower production costs. Quality improvements and after-sales service are particularly important in high-income Western industrialised countries. In a recessive economy, in which consumers tend to concentrate on prices, rationalisation is increasingly being used as a strategic tool to remain competitive.

### Impact of the Single Market

The overall impact of the Internal Market programme on the metals products sector has been globally positive. The main positive effects have been from the necessary reorganisation of the sector and from the fact that firms have started to act more globally. The other positive effects which were aimed for are, however still to come. Technical harmonisation according to international standards, the clarification of directives and the transposition of the EU legislation into national laws are considered to be the next priorities in this sector.

### REGIONAL DISTRIBUTION

The industry has local, regional and global aspects. Manufacturers who operate on a small scale and depend on demand from downstream industries, tend to be located in areas where these industries are concentrated. Because of the small scale of many firms, long distance transport is not viable in general. Furthermore, to lower transportation costs, most metal parts industries are located near their clients; e.g. near major industrial centres. At the same time, however, large firms in the industry, for example in the hand tools industry, have a global orientation.

### ENVIRONMENT

The European Union's (EU) Working Party on the Definition of Waste has endorsed a proposal stating that if a material may be used by a third party after a transformation, it can be considered a product. Industry groups in Europe, however, are still concerned that the EU's regulation for implementing the Basle Convention will hinder the trade of scrap metal and other materials.

In technology development, the metal products industry pays a lot of attention to environmental issues, such as reduction of emissions. For recycling metals out of waste disposal, most small and medium-sized enterprises use third party firms. Regarding intra-EU competition, a coherent approach in ecological issues is necessary, otherwise distortions in competitive power will arise. The EU has become more active in this area with the carbon tax proposal and, more general, its fifth action programme on the environment: "Towards sustainability. A European Community programme of policy and action in relation to the Environment and sustainable development".

Some environmental issues especially apply to downstream industries and, therefore, indirectly affect the upstream metal products market. In an attempt to meet the needs of their clients, manufacturers of metal products put efforts in to product innovations concerning safety and environmental issues.

**Table 7: Metal products**  
**Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of enterprises	Share of employment	Share of turnover
Less than 20 employees	202 085	88.2	28.5	19.0
20-99 employees	22 819	10.0	28.9	26.0
100 or more employees	4 183	1.8	42.6	55.0

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

**Table 8: Metal products**  
**Production in constant prices and employment by Member State (1)**

	Production (million ECU)		Employment (thousands)	
	1984	1993	1984	1993
Belgique/België	3 030	3 776	44.8	45.9
Danmark	1 888	2 574	24.6	29.3
BR Deutschland	46 631	59 296	634.9	710.2
España	11 223	13 346	234.7	225.2
France	27 256	28 172	407.1	358.5
Hellas	744	656	17.4	12.2
Ireland	498	695	8.3	8.2
Italia	21 559	25 898	268.6	297.1
Luxembourg	249	420	2.1	3.0
Nederland	4 854	6 805	58.2	68.6
Portugal	929	1 595	47.0	47.4
United Kingdom	20 548	19 908	357.4	295.7

(1) Some country data has been estimated.  
 Source: DEBA

**Table 9: Metal products**  
**The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Pechiney	F	9 159	590	59.2
Deutsche Bebbcock	D	4 219	-72	39.5
Carnaudmetalbox	F	3 676	482	31.9
Marine-Wendel (1)	F	2 360	172	37.4
Schmalbach-Lubeca	D	1 844	139	13.2
Van Leer	NL	1 767	166	16.9
Rheinmetal Berlin	D	1 623	-37	15.5
Buderus	D	1 424	109	10.7
Industrivarden	S	1 307	167	10.3
Celsius Industrier	S	1 277	78	15.2

(1) 1992 figures.  
 Source: DABLE

**Table 10: Metal products**  
**Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.65	0.68
Danmark	0.86	0.99
BR Deutschland	1.15	1.22
Hellas	0.71	0.58
España	1.11	1.06
France	1.02	0.93
Ireland	0.42	0.35
Italia	0.99	0.96
Luxembourg	1.04	1.30
Nederland	0.69	0.95
Portugal	0.62	0.87
United Kingdom	0.93	0.78

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
 Source: DEBA

The Machine Directive (89/392/EEC) will attain its definite character in 1995. In response to customer requirements for a safer working environment, the industry has put much effort into R&D for improvement of safety conditions of equipment. This Directive defines essential requirements concerning machine safety, health provisions for people and the environment. Manufacturers that comply with the provisions of the Directive may affix the CE-mark on their products.

## REGULATIONS

Standardisation is important to this industry. DIN standards, a German quality standard, and ISO standards are used to indicate quality. Most companies in the metal products sector support the initiative to make ISO 9000 standards compulsory, not only for EU manufacturers but also for importers.

EU energy policy will have a major impact on upstream industries of the energy sector, like the metal products industry. The debate on the introduction of a carbon tax in the EU is an issue which deals with EU energy policy. In the long run, such a tax might affect total energy consumption and could, therefore, lower demand for metal products. At the same time, however, the metal products industry could also benefit from

a growth in demand for more efficient processing techniques in downstream markets.

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## OUTLOOK

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In the downstream industries of the metal products industry a further recovery of demand is expected. At the same time, structural measures (rationalisation and quality improvement) will have a favourable impact on the industry's competitiveness and performance. Therefore, in the short and medium term, EU production and consumption in the metal products industry are expected to grow. Extra-EU imports will benefit from an upswing of EU demand and are expected to grow slightly faster than extra-EU exports, which will result in declining net trade.

It is further expected that despite the upswing, the workforce in the EU metal products industry will continue to decrease. Despite favourable prospects in the short and medium term, future risks for the industry include: too much dependence on downstream industries and intensifying international competition. However, an expected increase in demand for innovative equipment will stimulate the industry to retain a comparative advantage against other countries resulting from better know-how.

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# Foundries

## NACE 311

The EU is one of the world's largest producers of castings with an annual output valued at about 20 billion ECU. The greater part of this output is supplied as components to the motor and machinery manufacturing industries.

The structure of the foundry industry is characterised by small and medium-sized enterprises. Many foundries are part of a larger company and produce castings for internal requirements. The substantial fall in employment while output has largely remained constant clearly shows the rise in labour productivity over the past ten years.

The EU's trade balance is in surplus. Up to 1992, however, imports rose faster than exports. Only in 1993 was there a reversal of the trend.

### INDUSTRY PROFILE

#### Description of the sector

Foundries are industrial suppliers. The castings they produce are normally used as intermediate products in other industrial companies. Cast end-products remain the exception.

Castings obtain their shape from the pouring of molten metals into a mould to solidify. This leaves the designer basically free to determine their shape, with the result that both the surface and the cavities may be very complex. Depending on whether the molten metal is given the shape corresponding to the desired product under the influence of gravity, centrifugal force or pressure, in other words, depending on the technique used for making the mould, the following types of casting are distinguished: sand casting, shell moulding, gravity die casting, pressure die casting, centrifugal casting, continuous casting, investment casting, precision casting, and art casting.

Another possible classification is to make the distinction in terms of the materials used. This classification forms the basis of this paper and also of NACE. A distinction is made in NACE 311, foundry products, between:

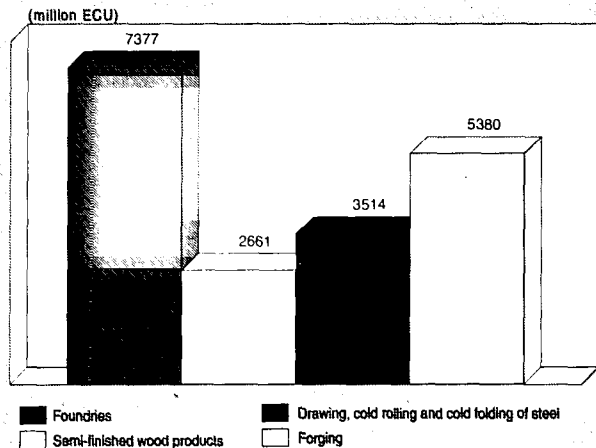
- ferrous metal castings (NACE 3111): grey cast iron, ductile cast iron (nodular cast iron/malleable cast iron), steel castings and stainless steel castings;
- non-ferrous metal castings (NACE 3112): mainly aluminium, copper and zinc.

For each group there are innumerable alloys. Some are standardised. Many are specially developed to meet the customer's specific requirements. Foundries quite often offer up to 200 different qualities or alloys.

The availability of statistical data and their degree of detail vary greatly among individual EU countries. Particularly unsatisfactory is the foreign trade data. Many foundry products do not have a commodity number of their own in the foreign trade statistics. They are grouped together with other products under "miscellaneous products". This applies particularly to components supplied to the automobile industry.

In the past, many foundries were established in the vicinity of coal mines or close to iron and steel production locations. In other words, the locations of the foundry industry were raw-material-oriented. Over the course of time, the raw-material orientation has been increasingly replaced by customer orientation. Concentrations of foundries are now found in areas near the locations of their major customers, the automobile and mechanical engineering industries.

**Figure 1: Foundries**  
Value added in comparison with related industries, 1993



Source: DEBA

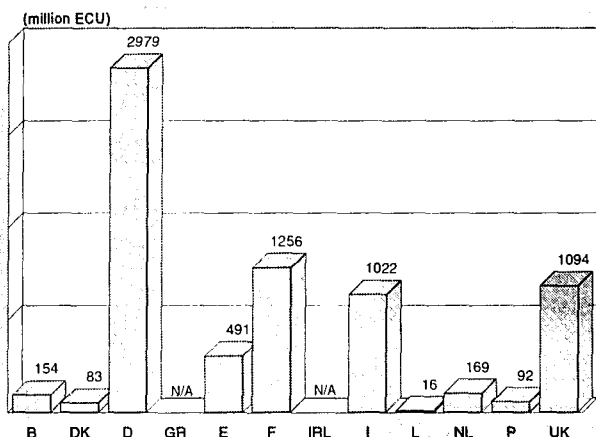
#### Recent trends

As manufacturers of intermediate products and components, foundries depend to a great extent on the business conditions in the markets of their (most important) customers. For example, in the late eighties the strong growth in the automotive and mechanical engineering manufacturing industries resulted in an equally strong growth performance of the foundry industry. On the other hand, the drop of demand for cars and machinery at the beginning of the nineties caused a sharp decline in foundry production, by as much as 40 % in some cases. Since 1994 production has been rising again and this trend should continue in 1995.

This should also bring an end to the shedding of labour. However, even in the case of a sustained recovery only a very small number of new jobs can be expected. Most of the almost 60 000 jobs that have been cut since 1990 - around 20 % of the total - have probably been lost permanently.

The deep recession and the time lags inherent in all employment restructuring measures have obscured long-term trends

**Figure 2: Foundries**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Foundries**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	14 351	16 901	19 484	19 927	19 287	19 028	16 385	17 859	18 945	19 898	20 603
Production	14 905	17 432	19 996	20 381	19 677	19 394	16 838	18 354	19 455	20 428	21 143
Extra-EU exports	844	919	963	960	976	991	1 066	1 204	1 230	1 270	1 290
Trade balance	553.6	531.1	511.9	453.4	390.8	366.3	453.2	494.5	510	530	540
Employment (thousands)	300.1	269.9	276.8	276.2	263.4	253.2	227.9	218.8	221.6	225.6	229.5

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DGV forecasts.

Source: DEBA

**Table 2: Foundries**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.44	-5.88	-1.35	-12.22
Production	2.23	-5.81	-1.42	-11.44
Extra-EU exports	-0.74	0.44	-0.22	5.86
Extra-EU imports	4.65	3.77	4.26	-7.91

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Foundries**  
**Breakdown of production by main European producers**

(thousand tonnes)	D		F		I		UK		E	
	1988	1993	1988	1993	1988	1993	1988	1993	1988	1993
Ferrous metals	3 407	2 939	1 928	1 771	1 608	1 334	1 256	1 082	715	488
- Gray iron	2 229	1 799	980	833	1 287	1 075	745	597	437	256
- Ductile iron	974	975	823	821	227	183	399	404	191	170
- Steel	204	165	126	118	95	76	112	81	87	62
Non ferrous metals	593	537	290	256	544	508	208	157	122	120
- Cu-base	79	72	23	22	85	95	42	35	16	16
- Al-base	443	393	225	200	392	348	122	89	81	84
- Other non ferrous	71	72	43	35	67	64	44	34	26	20
All castings	4 000	3 476	2 218	2 028	2 152	1 841	1 464	1 239	837	608

Source: CAEF, "Modern Casting"

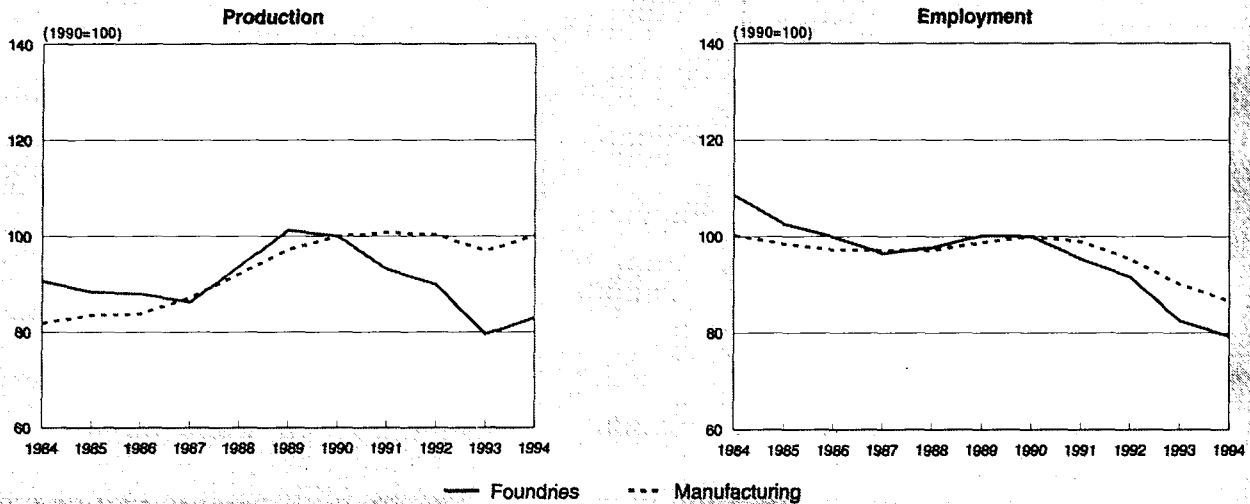
**Table 4: Foundries**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	844	897	866	826	919	963	960	976	991	1 066	1 204
Extra-EU imports	290	333	341	353	388	451	507	585	625	613	709
Trade balance	554	564	525	473	531	512	453	391	366	453	495
Ratio exports / imports	2.91	2.69	2.54	2.34	2.37	2.14	1.89	1.67	1.59	1.74	1.70
Terms of trade index	106.6	105.3	108.7	110.3	105.4	101.9	100.0	98.7	99.2	94.6	N/A

Source: DEBA



**Figure 3: Foundries  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

if production and employment. The available data suggest, however, that over the past ten years the volume of output per employee has risen by 20 %, and the value added per employee even by 30 %.

This highlights the trend towards higher-quality castings. Firstly, the share of non-ferrous metal castings in the total output has risen from 13.1 % to 16.8 %. Secondly, the castings have become increasingly thin-walled, lighter and more complex to manufacture.

The EU's foreign trade balance is positive. In the years up to 1992, however, the surplus has shrunk steadily. In 1984, the quantity of cast products exported was 2.9 times as great as that of imports. In 1992 the corresponding figure was only 1.6. In 1993 export/import ratio rose again to 1.7, and will in all probability stabilise at this higher level.

Regionally, the industry is strongly concentrated within the EU. Germany alone accounts for 40 % of the value added

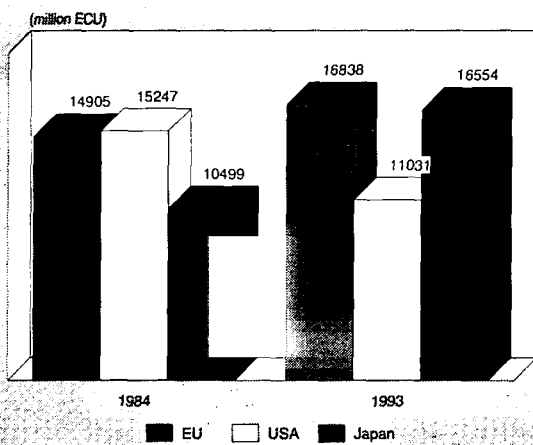
of the European foundry industry. It is followed by France with 17 %, the UK with 15 %, Italy with 14 % and Spain with 7 %. The five largest manufacturing countries account for 93 % of total EU production.

Personnel costs in the foundry industry represent 50 % of production costs. The ratio of the sector's value added to the value of its output is correspondingly high.

**International comparison**

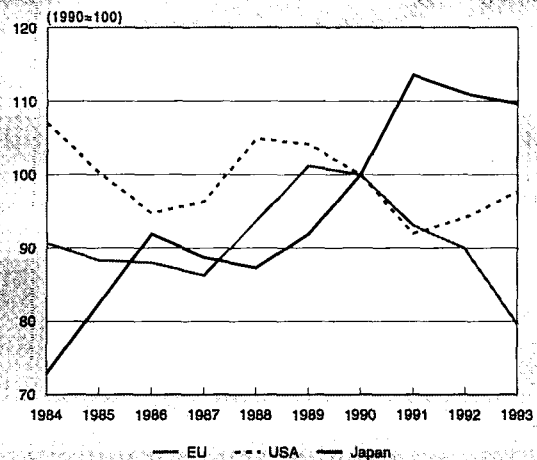
There have been and still are great uncertainties concerning production in the former USSR and its successor states. According to the latest publications, the output of the Commonwealth of Independent States in 1992 was 14.3 million tonnes. 60 % of this was accounted for by Russia alone. There are equally great uncertainties about the production of the People's Republic of China, which is said to have risen from 8.9 million tonnes in 1990 to 11.6 million tonnes in 1992. Even the es-

**Figure 4: Foundries  
International comparison of production in current prices**



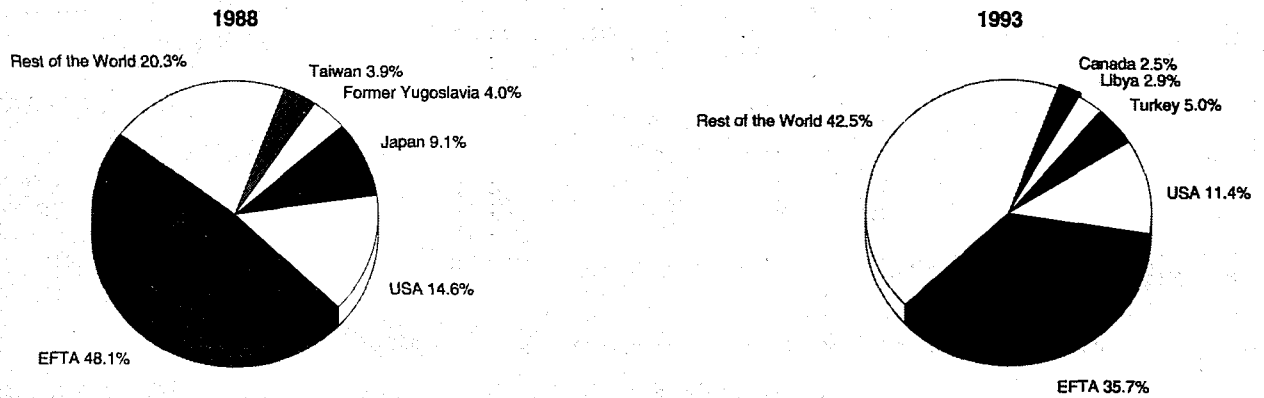
Source: DEBA

**Figure 5: Foundries  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Foundries  
Destination of EU exports**



Source: Eurostat

timates for the production of the USA show considerable variation depending on the source.

Consequently, any statements about the world ranking of EU production must inevitably be imprecise. At 10.7 million tonnes in 1992 the production of the EU was approximately equal to that of the USA. Japan produced 7.2 million tonnes in that year. It is certain that the shares of the individual materials are similar in these three economic areas. This applies especially to the share of non-ferrous-metal castings in total production, which is between 14 and 17 %. This share is expected to increase over the next few years.

#### Foreign trade

Cast products are made to order according to the customer's specifications and on his behalf. Furthermore, they have to meet increasingly stringent demands. Both these factors necessitate close co-operation and intensive communication between the foundry and the customer. In addition, consideration of the high specific and sometimes absolute weight of castings and their value to weight ratio, together with "just in time" delivery difficulties greatly restricts transportation possibilities (or trade, for that matter) over great distances.

The importance of foreign trade is correspondingly slight in comparison with other branches of the economy. In the five most important EU countries, exports represent barely 15 % of the value of output. The share of imports in consumption is less than 5 %. By far the largest proportion of foreign trade takes place with neighbouring countries: either EU Member States, EFTA countries, and, since recently, Poland and the Czech Republic.

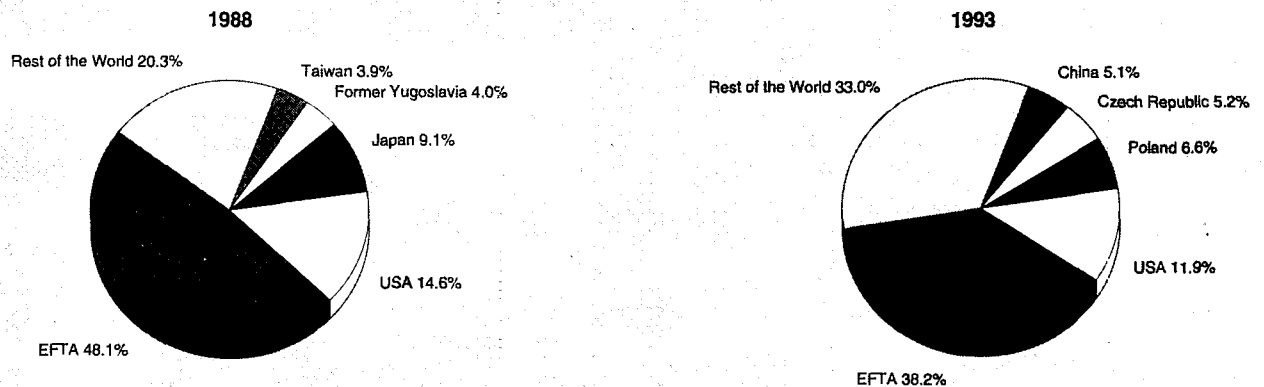
Shipments to distant countries are the exception. They chiefly consist of components or spare parts for plant construction and their value is, as a rule, very high.

#### MARKET FORCES

##### Demand

By far, the largest customer of the foundry industry is the automobile industry. Over 70 % of the output of light-metal castings (chiefly aluminium alloys) become components for road vehicles. In the case of ferrous metal castings, the percent of total EU production shipped to the automobile industry is approximately 35 %. In Germany the corresponding figure is even 42 %.

**Figure 7: Foundries  
Origin of EU imports**



Source: Eurostat

**Table 5: Foundries**  
**Breakdown of production by product line (1)**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Ferrous metals	9 350	9 452	9 070	8 786	9 374	9 900	9 683	9 535	8 912	8 040
Non ferrous metals	1 408	1 425	1 556	1 637	1 800	1 915	1 898	1 843	1 795	1 624
All castings	10 758	10 877	10 626	10 422	11 174	11 815	11 571	11 378	10 707	9 664
% ferrous metals	86.9	86.9	85.4	84.3	83.9	83.8	83.7	83.8	83.2	83.2
% non ferrous metals	13.1	13.1	14.6	15.7	16.1	16.2	16.3	16.2	16.8	16.8

(1) Excluding Greece, Ireland and Luxembourg; from 1991 onwards, including East Germany; from 1989 onwards including Denmark.

(2) DGV estimates.

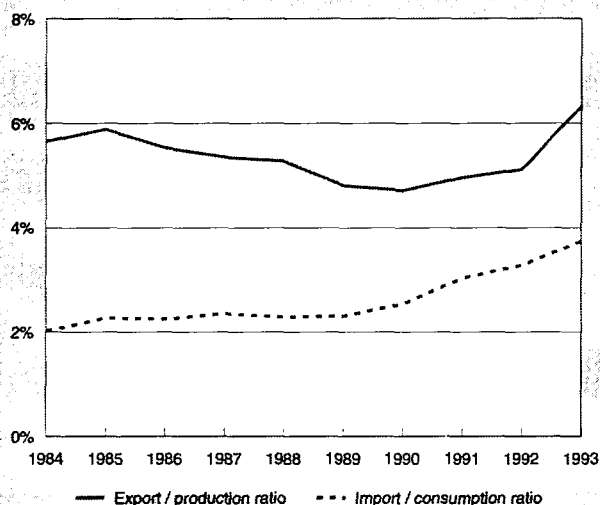
Source: CAEF, "Modern Casting"

Next, is the mechanical engineering industry. Due to the strong world positions of the German mechanical engineering and plant construction industries, supplies of castings to these industries attain their highest levels in Germany. In 1993, 750 000 tonnes of grey cast iron and spherical graphite cast iron, representing 28 % of all deliveries, went to the mechanical engineering industry; at the end of the 1980s this share was over 30 %. In Italy the share of deliveries to the mechanical engineering industry in total deliveries by the foundry industry also equalled 28 %, but represented here a lower absolute volume than in Germany.

Pressure pipes, pipes and castings are the most important end-products of the foundry industry. They played the greatest role in France where they accounted for 30.1 % of total output of grey iron and of nodular iron. Their value (ECU/kg) is, however, fairly low.

The foundry industry cannot actually be said to be a growth industry. If business cycle influences are eliminated, hardly any change has taken place in the tonnage produced during the past ten years. The fact that the value of production has risen during the same period reflects the shift towards higher-value, through lighter, thinner-walled, and complex cored component castings and towards lighter alloys, especially aluminium-based ones.

**Figure 8: Foundries**  
**Trade intensities**



Source: DEBA

Casting, as a basic forming process, is in direct competition with sintering. In practice, however, particular competitive processes are those of metal reshaping, specifically: forging (hammer forging or drop forging), rolling, pressing (extrusion), drawing and deep drawing. There are also the processes of connection technology comprised of welding, bonding, riveting and bolting.

By far the most important factor in recent years, has been the competition between metals and substitutes such as plastics. The proportion of the latter in motor vehicle manufacture, the making of household articles, pipes or connecting pieces has grown steadily in recent years at the expense of metals demand. The reasons which are leading to the replacement of one material by another include: weight, tensile strength, resistance to pressure and wear, resistance to heat or to rust and acid, ageing behaviour, price and recycling possibilities.

In the future, mineral products such as ceramics or composite materials appear likely to gain market share held by foundry products. Whether they can become generally acceptable will depend chiefly on their price and whether their ability to meet stated specifications.

### Supply and competition

As material intensity is decreasing in practically all branches of the economy, specific consumption of castings is also declining, as evidenced in the automobile and mechanical engineering industries. The growth rates of the foundry industry are lower than those of their main customers (as became evident, for instance, at the end of the 1980s) and resulted in an appreciable decrease in the long run quantity produced when compared to the quantities produced in 1970 or 1980.

Accordingly, the existing melting, moulding or fettling capacities are more than sufficient to meet demand. This leads to intense competition between foundries, and also makes their market position weak in relation to their main customers. Because of the overcapacity and strong buying power of the major customers, foundries do not have much leeway in price setting, thus creating a low profit to sales ratio.

In view of the EU's single market, the most important repercussions are likely to result from international calls for tender for public contracts. They affect, in particular, manufacturers of pipes, pressure pipes and moulded conduits. Furthermore, liberalisation in the transport sector may lead to lower freight rates. Both of these factors not only widen the foundries' range of action, but also shift the competition between foundries from the national to the international plane. To ensure that this competition takes place under fair conditions environmental protection regulations and non-wage labour costs must be harmonised.

Most of the production of the foundry industry is delivered directly to customers. This is particularly true in the case of mass-produced castings for the motor industry, where just-

**Table 6: Foundries**  
Major customer industries of gray and nodular iron, 1993

(%)	D	F	I (1)	UK	E
Pipes, fittings	13.3	32.1	29.2	26.9	20.9
Building, domestic	3.6	5.4	N/A	4.8	16.8
Ingot moulds, rolls	1.8	0.5	3	3.3	0.5
Machine building	27.7	15	28.2	21.6	20
Vehicle industry	41.6	32.2	32.8	24.9	28.6
Others	11.9	14.6	6.7	18.5	13.2

(1) Pipes and fittings include building and domestic.  
Source: CAEF

in-time deliveries on the basis of long-term contracts are common. In this case the marketing costs, measured as a proportion of the cost of production, are relatively low. On the other hand, marketing costs are far higher in the case of single-piece production or short production runs for the mechanical engineering industry (unless assembly and conversion take place in-house, within the same firm). The foundry must then maintain its own field sales force, and sometimes even branch offices. Usually in distant regions and abroad sales representatives are employed on a commission basis.

### Production process

The making of castings continues to be very labour-intensive. Even where the production process is highly mechanised, for example in large-scale series production, the proportion of personnel expenses in the production costs is 40 %. In the case of hand casting, i.e., individual production, the proportion of personnel expense to total cost is as high as 55 %. As a result, efforts made to step up labour productivity and reduce personnel expenses have been correspondingly great.

Metal materials account for 15 to 25 % of production costs. The range is due to the differing nature of the materials to be produced, as well as to the ore mix, which in turn depends on the melting equipment. Factors affecting the proportion of raw material costs in the total production costs are: whether an initial melt is being produced; whether a material is merely being re-melted; and the proportion of scrap, pig iron, (ferrous) alloys or high-grade pure metals contained in the melt. Lastly, the influence of market prices should not be underestimated. Between 1989 and 1993 the foundries benefited from a decline in raw materials prices, but they are now confronted again with rapidly rising raw material prices.

The proportion of capital costs, depreciation and interest costs fluctuates between 10 % and 15 % of total production costs. It depends chiefly on the production technique and is naturally larger in the case of highly automated large-series production than in that of hand-moulded individual parts.

Finally, energy costs must be discussed. Here, foundries still operating with cupola furnaces are the most economical since coke is the main source of energy. Rising quality demands, the decline in the share of grey iron castings and, conversely, the increase in the amount of cast iron using nodular graphite are, however, causing many foundries to switch to electric furnaces. The share of energy costs for foundries using electric furnaces can rise 15 % of total production costs.

## INDUSTRY STRUCTURE

### Companies

The foundry industry has been able to retain its character as a sector mainly composed of small and medium-sized firms. More than half of all foundries still have fewer than 50 employees, and many are still family-owned. Some of them, as jobbing foundries, work only for other companies. Often, however, they are also part of a larger undertaking, which predominantly produces castings "to meet its own requirements", for instance for use in mechanical engineering and plant construction.

There is no observable trend towards larger company units. Investment in recent years has been mostly for the purpose of increasing labour productivity. A breakdown between iron, steel and malleable-iron foundries and non-ferrous-metal foundries reveals that on average, the former have an appreciably larger number of employees than the latter.

Nevertheless, technical progress has led to the emergence of a few large companies in the foundry industry. For instance, the production of large series has become much more economical due to the development of automatic moulding plants. The increase in capital-intensity, however, has necessitated two or even three-shift operations. This has led to the creation of production plants with up to a thousand employees. These usually specialise in making castings for the automobile industry.

**Table 7: Foundries**  
Labour productivity, unit costs and gross operating rate (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	83.4	86.0	88.1	89.3	95.9	100.9	100.0	97.6	98.1	96.5
Unit labour costs index (3)	84.0	88.0	91.0	93.4	91.5	92.7	100.0	109.1	112.0	113.3
Total unit costs index (4)	83.2	86.8	87.0	87.2	91.0	96.9	100.0	103.8	106.0	105.2
Gross operating rate (%) (5)	6.99	7.38	9.49	10.02	10.29	9.32	8.98	9.00	8.33	6.17

(1) Some country data has been estimated.  
(2) Based on index of production / index of employment.  
(3) Based on index of labour costs / index of production.  
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.  
(5) Based on (value added - labour costs) / turnover.  
Source: DEBA, Eurostat

**Table 8: Foundries  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.48	0.60
Danmark	0.53	0.59
BR Deutschland	1.23	1.18
Hellas	N/A	0.24
España	1.02	0.96
France	0.95	0.95
Ireland	N/A	N/A
Italia	1.24	1.20
Luxembourg	2.38	1.34
Nederland	0.33	0.45
Portugal	1.10	1.19
United Kingdom	0.86	0.89

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

### Strategies

Rationalisation and automation has brought about, among other things, automation of sand preparation, the development of automatic casting plants and the development of induction and holding furnaces. In the future, the greatest successes will probably be achieved by the use of CAD/CAM in pattern making and fettling.

The demands made of castings are becoming increasingly high and varied. This will necessitate the development of new materials with ever-narrower dimensional tolerances. Castings are becoming thinner-walled, lighter and harder to core with the cavities and surfaces becoming more complex. Other castings are required to be made in ever-increasing size and thus of ever-greater weight. The result is that foundries, too, are specialising more and more and that the industry is steadily becoming more heterogeneous.

Therefore, one cannot speak of general or uniform foundry strategy. An important current topic is the extension of the value added chain from the raw material phase to the end product. The enterprises involved in production (in different industries) may be faced with the need to restructure the distribution of functions within the chain. For foundries, this could mean taking over research and development functions, taking over mechanical processing operations and, via the supply of ready-to-fit components, increasing their own value added.

Where foundries are taken over by other companies, they typically continue to be operated as profit centres of the new owner. The size and equipment of the production plant does not usually change much. That being the case, there are two main reasons for a take-over: the acquiring company's need for castings for their own production to make them independent of other suppliers; and the need to offer customers the complete range of the foundry sector's products, from light-metal to

fine-steel castings, from hand-moulded to automatically moulded castings, and from small to large castings, etc.

### Impact of the Single Market

The impact of the creation of the Single European market on the foundries industry has been rather limited, and certainly not as high as in other industries as most companies in this sector are mainly regionally oriented. Only a few operate internationally, and those which do have been doing this for many years. The industry mainly consist of SME's and is very flexible. The SME's are being threatened by low-priced imports from Eastern European countries, however, as these countries have access to cheaper raw materials (the EU supply of steel is not enough for self-sufficiency). Wages are also much lower in these countries. In spite of these competitive advantages, dumping has been observed in some cases. The industry has high expectations with respect to the application of the new anti-dumping directive. Priorities to be addressed include the end of state aid for operational losses.

### ENVIRONMENT

Great importance has always been attached to recycling in the foundry industry. This applies particularly to the most important materials used, namely sands and metals. Sands are reconditioned, and metals re-melted. Used castings are returned to the production circuit as cast scrap via trade channels.

Even so, total avoidance of waste is not possible. Certain residual materials, especially thermally exhausted moulding sands, which have to be disposed of at tips, will always accumulate. Nevertheless, the foundry industry is in the process of devising economically defensible methods of further reducing the quantities of such residual materials.

Keeping the air clean, particularly dust removal, is presently the foremost environment protection measure for many foundries. Strict regulations have to be met. In most cases this will require substantial investments.

All foundries may not have sufficient financial resources to afford the requisite investment. These companies may have to stop production after the regulation phase-in period. For most foundries, earnings will deteriorate further if the costs entailed by environmental protection cannot be passed on to customers. In this respect, the regulations should be well considered and balanced, at least within the EU to curtail the loss of competitiveness of foundries located in countries with stricter environmental policy.

### REGULATIONS

There are no specific EU directives or regulations which apply exclusively to foundries. Foundries are, however, affected by all provisions relating to: protection of the environment, non-wage labour costs, trade with associated countries in Eastern Europe, energy prices and public charges (e.g., for waste disposal) and taxation (local business taxes, property tax, corporation tax).

**Table 9: Foundries  
Number of enterprises, 1993**

(production units)	D (1)	F	I	UK	E
Ferrous metals	423	182	357	290	183
Non ferrous metals	429	356	N/A	N/A	86

(1) Former West Germany for non-ferrous metals and re-unified Germany for ferrous metals.

Source: CAEP



**Table 10: Foundries  
Employment, 1993**

(units)	D (1)	F	I	UK	E
Ferrous metals	56 251	33 432	21 170	32 500	15 750
Non ferrous metals	37 026	18 528	N/A	N/A	5 650

(1) Former West Germany for non-ferrous metals and re-unified Germany for ferrous metals.  
Source: CAEF

## OUTLOOK

The recession from 1990 to 1993 hit the foundry industry hard. In 1994 prospects for the industry finally improved. During the recession radical measures were taken to restructure capacity and employment, and capital investments were made to rationalise production processes and improve environment protection. As a result the industry looks ahead with a fair degree of optimism. Nevertheless, the volumes reached in 1989, the peak of the last cycle, will probably not be attained. Moreover, 20 % of employment in the industry has been permanently lost since 1989.

The performance of the foundry industry will remain very dependent on the performance of downstream industries, particularly the automotive and mechanical engineering industries.

In the future, it will be important for foundries to further improve quality and develop new materials and production processes. The distribution of functions between individual enterprises participating in the value added chain from the basic product to the finished article present foundries with additional opportunities. For example, they could focus on increasing their value added by supplying ready-to-fit components.

Against the background of the labour-intensive production, investment will aim towards rationalisation, further raising the productivity of labour. Progress can be expected to result from the use of CAD/CAM systems in pattern making and fettling since both remain very labour-intensive manufacturing stages.

**Table 11: Foundries  
Expected real annual growth rates**

(%)	1993-94	1994-97
Apparent consumption	2.2	0.1
Production	2.0	0.1
Extra-EU exports	-0.3	1.0

Source: DGV

Reducing the production cycle length, minimising production rejects, attainment of "just in time" delivery and quality improvement will be important for the future international competitiveness of EU foundries.

Written by: Deutsche Glessereiverband (DGV)

The industry is represented at the EU level by: Committee of European Foundry Associations (CAEF). Address: Rue de Bassano 2, F-75783 Paris Cedex 16; tel: (33 1) 47 23 55 50; fax: (33 1) 47 20 44 15.

# Forging

## NACE 312.1

The forging industry is a typical sub-contracting industry consisting largely of medium-sized businesses. Important customers for these firms are the motor industry, mechanical engineering, electrical engineering, aircraft constructors, etc. With a production volume of just over 2.7 million tonnes the forging industry in the EU surpassed both the United States and Japan in 1993. From 1990 to 1993 a drop in the forging industry's output was recorded due to the economic situation in Europe. At the end of 1993, and especially during 1994, not only was the downward trend halted, but it was possible to increase the output of forged parts once again as a result of strong demand. Comparing 1994 with 1993, we can expect an increase in output of at least 10 % for forges in the EU. Prospects for 1995 indicate further upward movement.

### INDUSTRY PROFILE

#### Description of the sector

The majority of forges are sub-contracting firms. In addition to their own products, such as crankshafts, tensioning systems for the construction industry and shaped components for pipelines, they usually offer finished products based on customers' drawings on the free market. Hammer forges are, in some instances, production departments of larger enterprises such as steel works. Drop forges and manufacturers of extruded parts, flanges and shaped components for pipelines are mostly medium-sized undertakings. Only where the repetitive manufacture of very large quantities is involved do some motor vehicle and bearing manufacturers produce individual items in their own production shops.

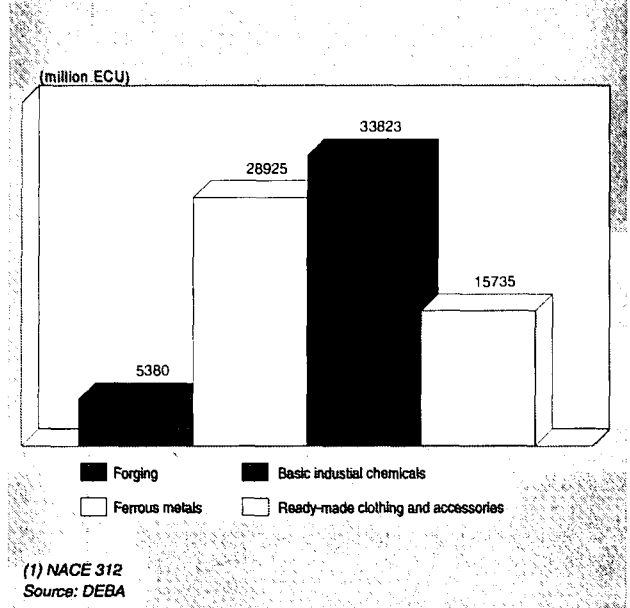
The following groups of products are included under the heading of "forged parts": hammer forgings; drop forgings, including hot extruded and upset parts; flanges and shaped components for pipelines; and, cold extruded parts. In most cases, forgings are semi-finished products which still require further processing such as heat treatment, surface treatment or machining. When special forming processes are used, items ready for installation can also be manufactured.

Forgings are manufactured with or without preheating of the blanks (usually sections of rectangular or round bars or shaped parts from thick sheets) by means of shaping tools that are brought together. Hammer forgings can be produced with simple, flat or round tools and incorporate a machining allowance of several millimetres. With drop forgings, flanges, shaped components for pipelines, and extrusions an attempt is made to get as close as possible to the final shape of the workpiece by means of a correspondingly high expenditure on tooling. Working surfaces or forged products ready for installation can, in many instances, be produced by a combination of manufacturing processes.

A wide range of steels and also non-ferrous metals (Al, Mg, Cu, brass, Ni alloys, etc.) can be shaped by forging. Differences in the deformability of the various materials determine the type of manufacturing process to be used and also set limits on the shapes and precision that can be achieved. The desired characteristics of the products with regard to strength, structure, ease of machining, etc. are obtained either through the production process itself (heat treatment from the heat of forging, strain hardening, etc.) or through subsequent processing (annealing, quenching, strengthening shot-blasting, etc.).

The forging industry manufactures products of high quality which offer substantial advantages for users, particularly from

**Figure 1: Forging**  
Value added in comparison with related industries, 1993 (1)



the point of view of weight, resistance to breakage, service life and consistently high quality.

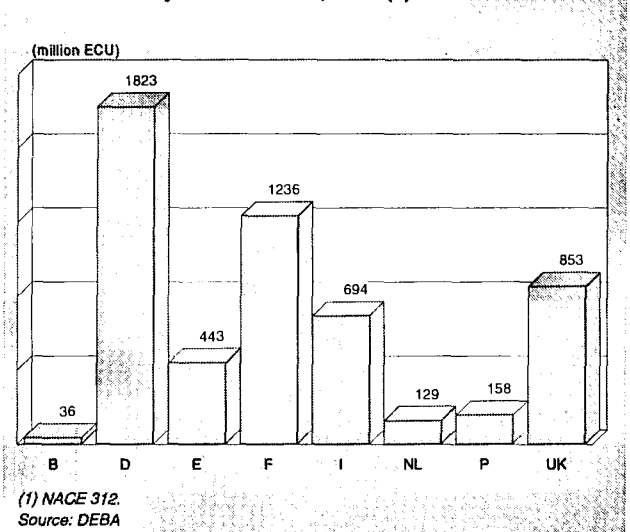
### MARKET FORCES

#### Demand

Countries belonging to EUROFORGE produced over 2.6 million tonnes of steel forgings in 1993 and were the largest producers of forged parts, ahead of Japan and the USA. By far the largest share of forged products (67 %) consisted of drop forgings. Since 1990, however, the trend in the volume of production has been downward in most Member States (see Figure 4). The reasons behind this are, essentially, the poor economic situation in mechanical engineering and the decline in motor vehicle production.

In 1994, thanks to the general economic revival in the EU, output of forged parts has been able to increase. Comparing 1994 with 1993 we can expect an increase in output of at least 10 %. For 1995, there are also indications of a further

**Figure 2: Forging**  
Value added by Member State, 1993 (1)



**Table 1: Forging**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (2)	1996 (2)	1997 (2)
Apparent consumption	1 547	1 765	1 861	1 777	1 671	1 566	1 350	1 563	1 641	1 682	1 724
Production	1 605	1 820	1 918	1 831	1 722	1 612	1 389	1 563	1 641	1 682	1 724
Net exports	150.0	171.0	169.0	170.0	171.0	127.0	143.0	160.9	170.0	170.0	170.0
Employment (thousands)	58.0	55.0	57.0	54.0	51.0	46.0	39.0	N/A	N/A	N/A	N/A

(1) NACE 312.11, steel forging; Germany, Belgium, Spain, Italy, France and the United Kingdom.

(2) Rounded DRI forecasts.

Source: Euroforge

**Table 2: Forging**  
**External trade in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	415	451	352	345	440	541	545	553	545	597	686
Extra-EU imports	143	171	160	137	194	260	311	342	405	384	428
Trade balance	272	280	191	209	245	280	234	212	141	214	259
Ratio exports / imports	2.90	2.64	2.19	2.53	2.26	2.08	1.75	1.62	1.35	1.56	1.61

(1) NACE 3120; forging, drop forging, closed die-forging, pressing and stamping.

Source: Eurostat

**Table 3: Forging**  
**Breakdown by major product line, 1993 (1)**

	Production (thousand tonnes)	Sales (million ECU)
Open die forging	502	840
Drop forgings, of which:	1 763	3 373
Drop forging industry	1 289	2 682
In-house forging	374	691
Flanges	251	554
Extrusions	202	575
Total	2 718	5 342

(1) NACE 3120.

Source: Euroforge

rise in output in the forging industry. This outlook is based on the favourable economic forecasts issued by its main customers, the motor vehicle, mechanical engineering, and electrical industries.

## INDUSTRY STRUCTURE

### Companies

The structure of the forging industry is predominantly based on medium-sized companies. However, it is apparent that concentration and cooperation activity across national borders is increasing.

About 150 forging companies are active in the Federal Republic of Germany. They account for about 55 % of the EU's output and are the top producers in the Western world. The companies are based in: North Rhine-Westphalia (75 %), Baden-Württemberg (11 %), with the remaining 14 % divided equally between the West German Länder and the former East German Länder. These companies exhibit the following size structures: 36 forges employ over 200 people, 31 have

between 100 and 200 employees, 32 between 50 and 100, and 51 employ fewer than 50 people. The large companies include Thyssen, Gerlach and Peddinghaus.

In Italy, which accounts for 20 % of EU output, most companies are based in the North. In particular, Piedmont, the Turin area, Lombardy, the Como, Varese and Brescia regions, Veneto and Emilia Romagna. The most important firms are Teksid, a Fiat subsidiary (90 % of its production goes to the motor industry), the Erber Group, Riganti and Casartelli. In Lombardy, 10 % of the companies produce 50 % of the total output. Apart from Teksid, most of the forging companies are family businesses.

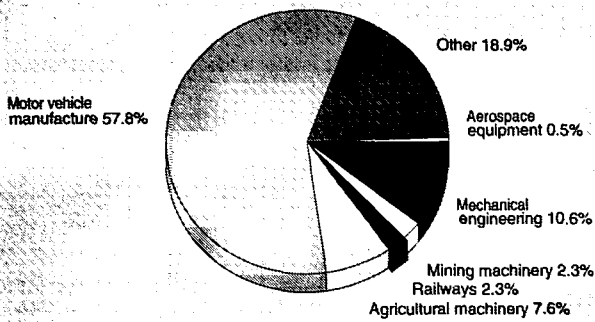
In the United Kingdom, which represents 8 % of EU output, the majority of the manufacturers of smaller forgings are based in the Midlands and the Birmingham area. Large forgings are mostly manufactured in the Sheffield area in South Yorkshire. The largest undertaking is the forging business of United Engineering Steels Ltd which produces about 45 % of UK output. Other important forging companies are Firth-Rixson, the INCO Group and Wyman-Gordon Ltd.

In France, 72 companies are active in this sector and they represent 11 % of EU output. The forging companies are distributed among the regions as follows: 25 in the Ardennes, 6 in the Loire region, 14 in Eastern France and 27 in other regions. Three groups dominate the sector: Ascometall, Forges Stéphanoises and Forges de Courcelles.

In Spain, 37 companies are engaged in this sector and account for 5 % of EU output. Most of them (about 30) are based in the Basque country, while the others are distributed among Catalonia, Aragon, Madrid and Galicia. Eight companies employ over 150 people, 5 between 100 and 150, 9 between 50 and 100, and the remainder have fewer than 50 employees. The most important companies are: P. Echeverria SA, La Forge Casanova SA, Forgas de Villalba SA (Gekanor Group) and Forges de Galicia SA which together produce about 60 % of Spain's total output volume.



**Figure 3: Forging Sales by end market, 1993 (1)**



(1) NACE 312.11.  
Source: Euroforge

In Belgium, which only accounts for 1 % of EU output, there are eight companies working in the forging sector. All the companies are small or medium-sized businesses. Drop forgings in steel are produced by four companies, while two forges specialise exclusively in non-ferrous metals forgings and two are engaged only in hammer forging.

No account is taken of the Netherlands, Ireland, Denmark, Greece or Portugal in this report, as they do not have significant forging industries.

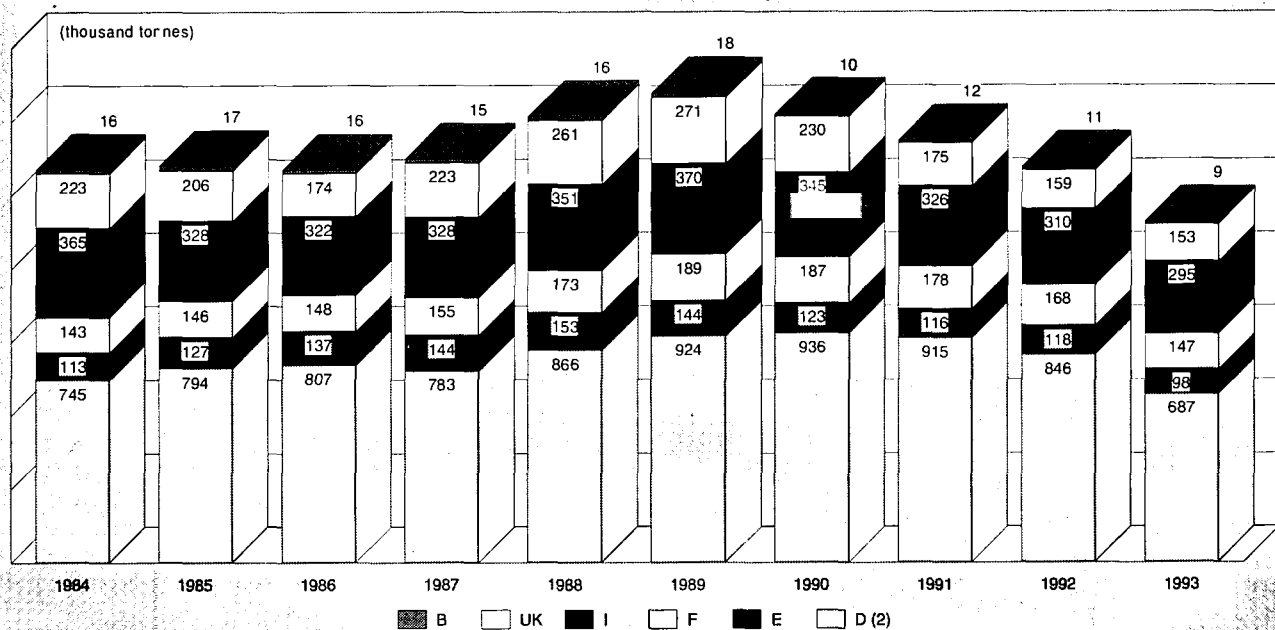
### Strategies

The severe pressure of competition, brought about by excess capacity, price reductions demanded by customers, and substitution forced the forging companies, early on, to develop strategies that would ensure the competitiveness of their products even in an enlarged market. These include, among other things: strengthening their export activities, while specialising and concentrating on particular segments of the market; reducing the multiplicity of products, combined with optimisation of the products using computerised methods (CAD/CAM/CAQ, FEM, etc.); increasing productivity by rationalising production with the aid of linked or automated plants; developing new materials with the aim of reducing the cost of the starting material or simplifying further processing operations (e.g. heat treatment, machinability); producing more precisely dimensioned workpieces in order to reduce the cost of finishing work; increasing the added value, e.g. by manufacturing completely finished workpieces or producing assemblies; and, improving and safeguarding the level of quality through the use of modern methods of quality assurance geared to the forging industry (FMEA, SPC, etc.).

Cooperative work plays an important part in the achievement of these aims. For the forging industry, which is predominantly structured around medium-sized companies, this is an essential measure to secure their continued existence. The financial strength of an individual company would not be sufficient to enable it to finance several fairly large projects at the same time on its own. Examples of such projects are CAD/CAM/CAE and quality assurance projects for the forging industry, as well as, numerous activities of an industrial administration nature.

With the increase in "just in time" deliveries, proximity to the customer is an important aspect when selecting a supplier. Consequently, the trend for forging companies to establish branches abroad or to enter into cooperation agreements will intensify.

**Figure 4: Forging Production by country (1)**



(1) NACE 312.11.  
(2) Including former East Germany from 1991.  
Source: Euroforge



Competition in the markets for forgings will also be affected by substitution. To a limited extent, cast products, sintered parts, composite materials and sheet metal constructions (or combinations of these) are offered as substitutes. Which product is ultimately used depends on a number of factors related to its purpose. Reliability, safety, weight, service life and environmental compatibility are all important criteria for decision making, as well as price.

### Impact of the Single Market

The impact of the Internal Market programme on the forging industry has been limited so far. Intra-EU trade has always been substantial in this industry. Therefore, any positive impact of the Single Market on trade is difficult to quantify. Still, the enlargement of both the European and the global market has led to strategies that ensure the competitiveness of forging products. One of these strategies is cooperation. Medium-sized enterprises in particular increasingly co-operate, notably concerning financing matters, to enable engagement in large projects.

Apart from the limited direct impact of European integration on the forging sector, more indirect and in most cases positive impacts derive from the effects of the Single Market on client industries (the motor vehicle, mechanical engineering and electrical industries).

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### ENVIRONMENT

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A substantial proportion of investments in the forging industry have been applied to environmental protection measures. The emphasis has been on measures to reduce noise, necessitated by legal constraints, to save energy, e.g. by equipping furnaces with recuperation apparatus, replacing the expensive compressed-air drives on power hammers with electro-hydraulic systems and using waste heat in the forging process. Expenditure on environmentally compatible waste disposal has also substantially increased.

An important advantage of forged products is the excellent opportunity for the recycling of forging materials. This is just one factor that has enabled substitution by plastics to be reduced, which was increasing markedly a few years ago.

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### OUTLOOK

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Despite the strategies that have been developed, dependence of forges on their main customers will continue unchanged. Unfortunately, the level of production achieved in the EU in the boom year of 1990 is unlikely to be reached again in the foreseeable future. But, the trend towards larger corporate units will continue and intensify. Measures taken by the forging industry to secure their competitiveness in the market will ensure that forgings will continue to make up an important proportion of industrial production in future years. Areas of opportunities for the industry are in: innovative product development; high quality standards; flexibility; and service.

As customers for forged components open production plants outside the EU, questions of location will have to be addressed. In addition, future risks for the forging industry include: dependence on the cyclical fortunes of the main customer industries and increased competition from Eastern Europe and non-member countries.

Written by: EUROFORGE

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# Secondary transformation of metals

## NACE 313

After a period of high growth during the 1980s, accompanied by high investments in new plants, worldwide stagnation in demand has resulted in overcapacity and pressure on prices. In 1993, production output in the secondary transformation industry dropped back to 1989 levels, leading to a decline in total employment. In 1994, however, some signs of recovery can be observed. Prospects for the near future are favourable, although growth rates will not reach their averages of the 1980s.

### INDUSTRY PROFILE

#### Description of the sector

The products of this industry are highly diversified and can be divided into the following categories:

- manufacture of articles on turning machines or lathes, including the manufacture of turned screws (NACE 313.11);
- nuts, bolts, rivets, screws and related products (NACE 313.12);
- springs, except furniture and watch springs (NACE 313.2);
- sintering of metals (NACE 313.3);
- chains, except articulated link chains (NACE 313.4);
- treatment and coating of metals, including zinc coating, aluminising, anodising, enamelling etc. (NACE 313.5); and
- general mechanical engineering on a subcontract basis (NACE 313.6).

In general, the most important subsectors are the fasteners industry (the first two categories) and the treatment and coating industry (galvanising).

Fasteners can be further divided into two main categories: those which are used for construction purposes, and those which are used for assembly purposes. From a market point of view, fasteners can be divided into common fasteners and special fasteners. In the first category price is important, in the second, quality, marketing and delivery time are important.

The purpose of zinc coating is to improve the qualities of the metal. This can be done by several techniques, such as electrolysis. Galvanising, formally "hot-dip" galvanising, involves coating steel with zinc by immersion in molten zinc metal.

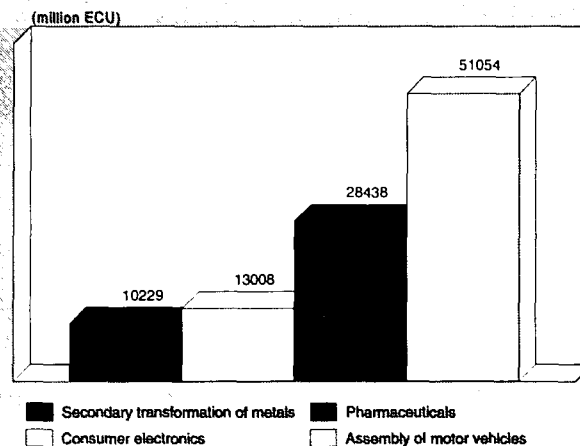
In terms of value added the secondary transformation of metals is a relatively small industry. In 1993, the industry's value added was 10 229 million ECU against a corresponding figure of 51 054 million ECU for the assembly of motor vehicles.

Within the EU, France and Germany together accounted for 62.5 % of total value added in the secondary transformation of metals industry. They are followed, at a distance, by Italy, Spain and the United Kingdom, who together constituted 32.5 % of total value added in 1993.

#### Recent trends

Over the period 1984-1991 the industry's production increased by an average rate of 9.2 % per annum. In the same period, apparent consumption of secondary transformed metals demonstrated a similar annual growth rate of 9.5 %. The steady

**Figure 1: Secondary transformation of metals**  
Value added in comparison with related industries, 1993



Source: DEBA

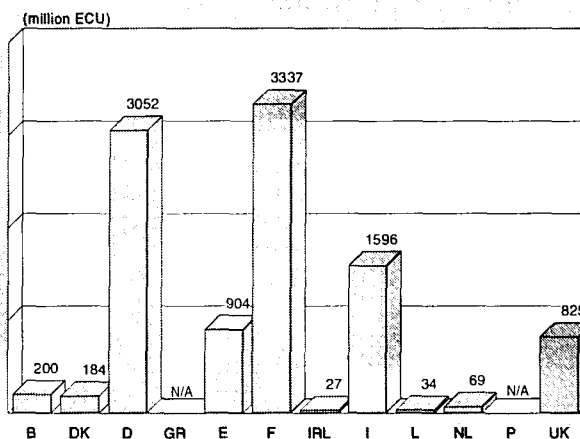
growth in production and consumption was accompanied by a 21 % increase in employment during the same period.

In 1991, the first signs of stagnating markets could be detected. These signs were followed by declines in both production and consumption in 1992 (4 % and 4.2 %, respectively) and 1993 (10.4 % and 10.7 %). In the EU, the strongest declines were seen in Belgium, Denmark and Italy. However, the market declined in other parts of the world as well. Production decreased in Japan by 3 %, in South Africa by nearly 7 % and in Australia by 14 % during 1993.

#### International comparison

The EU and Japan are of equal size if production value is measured in ECU. If compared with the situation in 1984 though, Japan's production has increased more rapidly than EU production. The USA, on the other hand, has suffered a decline in production since 1984. These figures are, however, strongly influenced by changes in exchange rates of the ECU against the Japanese yen and the US dollar.

**Figure 2: Secondary transformation of metals**  
Value added by Member State, 1993



Source: DEBA



**Table 1: Secondary transformation of metals**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	13 827	20 081	23 723	25 505	25 905	24 810	22 150	23 495	24 100	24 600	25 100
Production	14 082	20 236	23 801	25 562	25 923	24 889	22 288	23 631	24 250	24 760	25 270
Extra-EU exports	789	1 027	1 177	1 134	1 126	1 167	1 213	1 407	1 450	1 540	1 540
Trade balance	255.2	154.4	78.0	56.6	18.1	79.1	138.3	136.2	150.0	160.0	170.0
Employment (thousands)	295.7	323.8	344.8	355.2	357.1	346.1	329.3	322.8	320.0	319.0	318.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Secondary transformation of metals**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	8.24	-1.63	3.74	-7.17
Production	7.88	-1.46	3.62	-6.73
Extra-EU exports	2.89	-0.11	1.55	1.46
Extra-EU imports	10.15	-3.76	3.73	-8.43

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Secondary transformation of metals**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	789	874	838	815	1 027	1 177	1 134	1 126	1 167	1 213	1 407
Extra-EU imports	534	606	615	634	872	1 099	1 077	1 108	1 088	1 075	1 271
Trade balance	255	268	223	181	154	78	57	18	79	138	136
Ratio exports / imports	1.48	1.44	1.36	1.28	1.18	1.07	1.05	1.02	1.07	1.13	1.11
Terms of trade index	101.4	97.9	103.8	106.2	108.9	103.3	100.0	97.1	98.8	93.8	N/A

Source: DEBA

**Table 4: Secondary transformation of metals**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	78.6	82.3	83.2	86.8	94.0	98.6	100.0	100.3	99.3	97.3
Unit labour costs index (3)	89.0	91.1	95.5	94.8	90.7	93.4	100.0	104.8	111.3	115.2
Total unit costs index (4)	85.9	89.0	91.0	90.5	91.7	96.3	100.0	100.1	104.8	103.1
Gross operating rate (%) (5)	10.9	11.9	12.2	12.6	13.3	13.0	12.1	12.4	8.7	5.7

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

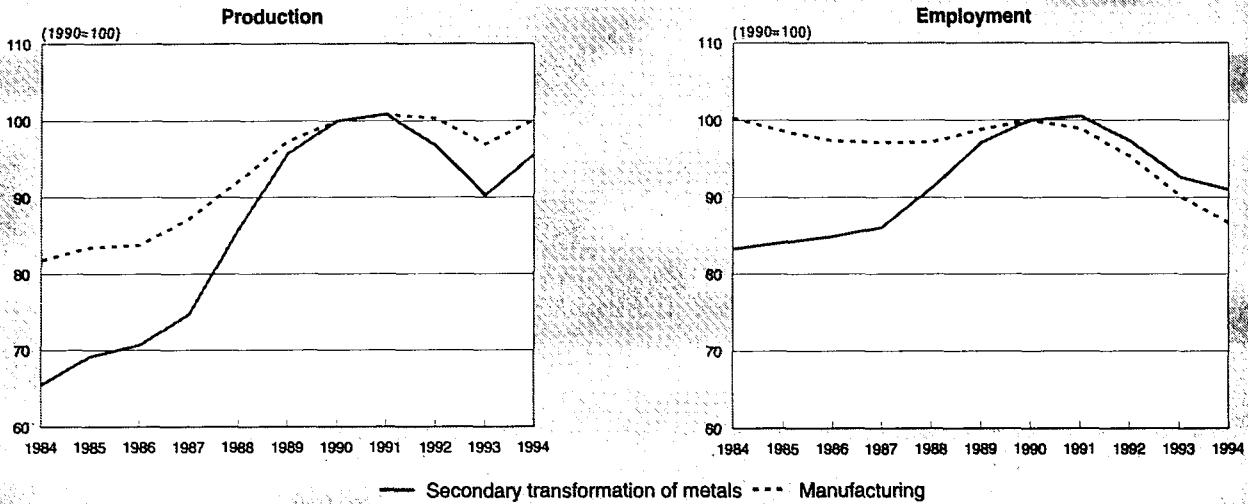
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Secondary transformation of metals  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

In 1993 approximately 18 million tonnes of metals, in 2 100 to 2 500 plants, were galvanised worldwide after fabrication. In the same year, Japan's hot-dip galvanising amounted to nearly 1.9 million tonnes. In comparison with Japan, the German galvanising industry is of minor importance. Within the EU, however, Germany is by far the largest country in tonnes galvanised with more than 1.1 million tonnes. Italy ranks second with 729 000 tonnes, followed by France (602 000 tonnes) and the United Kingdom (together with Ireland constituting nearly 600 000 tonnes).

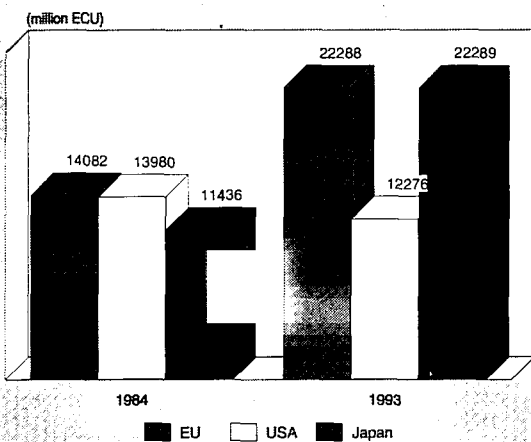
If the consumption of zinc is viewed separately, Germany retains its leading position within the EU with nearly 86 000 tonnes or 30 % of the total zinc consumption used for galvanising. The average percentage of zinc used per tonne of galvanised steel has decreased in all countries observed. Still, large differences exist among countries, especially in non-Member States where relatively larger amounts of zinc are used for hot-dip galvanising. Within the EU, the percentages range from 6.03 % in Spain to 7.90 % in the Netherlands.

whilst percentages exceed 13 % in Switzerland and come close to 10 % in some Scandinavian countries.

**Foreign trade**

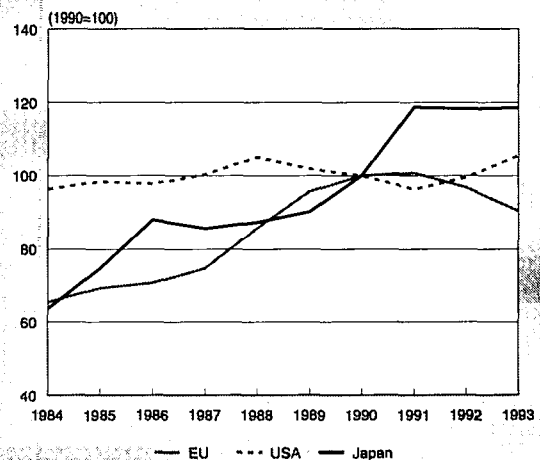
During 1984 to 1991 extra-EU imports grew at a faster pace than extra-EU exports. Imports increased by an annual average rate of 11.8 %, whilst exports only grew by 5.8 %, annually. Consequently, the EU trade balance has been negatively affected by these developments. During this time, the trade surplus went from 255.2 million ECU in 1984 to 18.1 million in 1991. From 1991 on, however, the surplus has increased again as weakening EU demand has resulted in a stabilisation of imports. At the same time, weak domestic demand has forced EU manufacturers to increase their efforts to penetrate foreign non-EU markets. This latter development has resulted in a renewed increase of extra-EU exports of 7.7 % since 1991.

**Figure 4: Secondary transformation of metals  
International comparison of production in current prices**



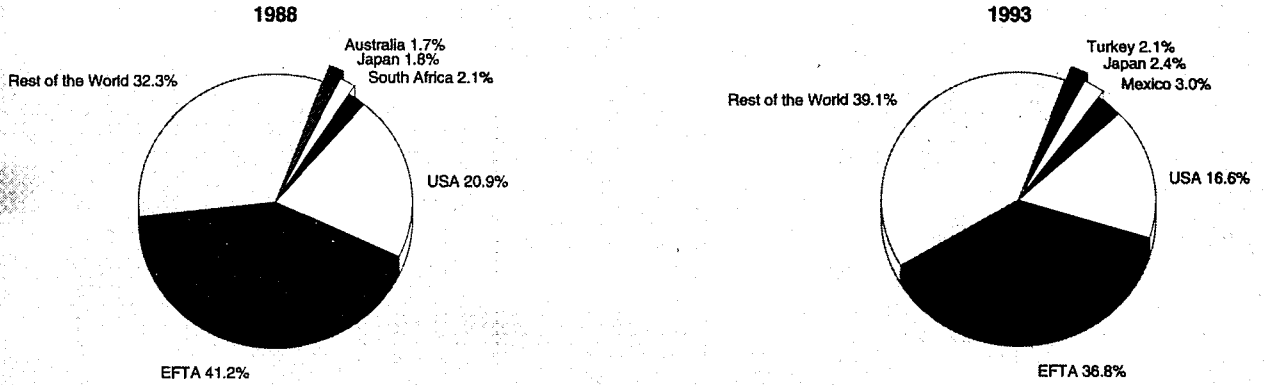
Source: DEBA

**Figure 5: Secondary transformation of metals  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Secondary transformation of metals  
Destination of EU exports**



Source: Eurostat

In 1993, the USA and Switzerland were the major suppliers of secondary transformed metals representing 21.2 % and 16.7 % of total extra-EU imports. Both countries have seen these shares decline though if compared with 1988. In contrast, Taiwan, Japan and Austria have recorded growing exports to the EU, increasing their market shares on the internal market.

Extra-EU exports for 1993 mainly found their destination in EFTA countries (Switzerland, Austria and Sweden) and the USA. If compared to 1988, however, a substantial decrease (10.7 % and 20.6 %, respectively) in both countries is observed.

## MARKET FORCES

### Demand

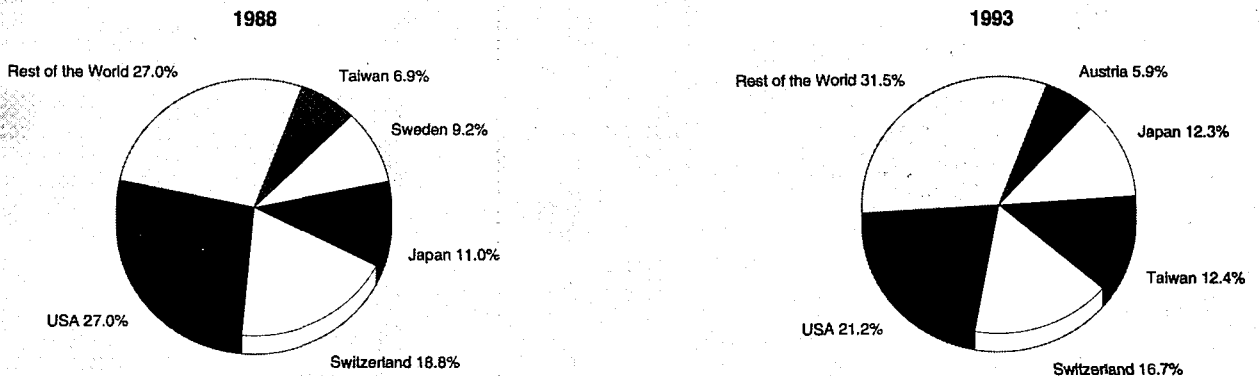
The primary client of the fastener industry is the automotive sector. Other important sectors are mechanical engineering, furniture, household appliances, construction and electronics. The EU galvanising industry serves more or less the same branches. Looking at demand for galvanised products, the construction industry appears to be the largest consumer, with 39 % of total sales. Street furniture follows at a distance with nearly 17 %, followed by the power industry (12 %), the

agricultural and horticultural industry (9 %), transport (5 %) and fastenings (5 %). A comparison of demand originating from these industries demonstrates rather stable shares. Overall bad performance of the galvanising sector is reflected in weak demand in all client industries.

In most EU countries the construction industry is the largest client industry. Only in Spain does the construction industry rank third after street furniture and power. In Germany, the leading galvaniser in the EU, the construction industry is by far the largest client industry constituting 48 % of total demand. In Belgium this industry is also of great importance to the sector with a 48 % share. Although, the relatively large share of the agricultural and horticultural client industry in France (19 %) is also worth noting. In France and the United Kingdom the construction sector is relatively less important with shares of only 31 % each. In both these countries street furniture scores above EU average percentages of market share with 21 % in France and 26 % in the UK and Ireland.

Technical and logistical developments in the client industries have a strong impact on the fastener industry. Technologically, the ongoing automation and robotisation of production processes has influenced demand for speciality and high quality fasteners, often in a negative way. Most of the standards for

**Figure 7: Secondary transformation of metals  
Origin of EU imports**



Source: Eurostat

screws, for example, are designed for manual fastening. These standards are widely used and producers can take advantage of economies of scale. Therefore, the price is relatively low. This has led to the use of these screws in automated production systems, even though in terms of quality of the end-product, the use of specially designed screws would be preferable.

### Supply and competition

Besides the fall in production, a major concern for the EU industry is the significant number of new plants which have been or are still being built following the successful expansion of the industry in the late 1980s. The exceptional growth during this period was mainly due to a boom in the non-residential construction sector and partly to an increase in the installation of street furniture. However, the sharp fall after 1989/1990 in construction across Europe, except for Germany, and a resulting modest production growth in galvanising in recent years has resulted in overcapacity in the new plants, which are also confronted with high costs due to increasing legislative requirements.

The market power of the main clients of the secondary transformation industry continues to increase. This is particularly true for the automotive industry, where Japanese competition requires more security, just-in-time delivery and increased quality from their subcontractors and suppliers. As an upstream market, the EU industry of secondary transformation of metals has to cope with developments in the automotive industry such as the growth of Japanese car production and the increasing use of single-sources by motor vehicle manufacturers. Japan's increasing production of cars within the EU will also force EU fastener manufacturers to cooperate with Japanese motor-vehicle producers, who have different design specifications than the European automobile industry. The increasing use of single-sources by motor vehicle manufacturers means less utilisation of subcontractors and fewer suppliers. Combined with the ongoing tendency towards concentration in the client industries, mutual dependency of the supplier and client industries is growing.

Due to weak demand in most downstream markets and the resulting overcapacity, prices have come under pressure. At the same time, competition from East European countries has intensified, where labour costs are relatively low.

With respect to the mass market of fasteners, strong competition from the Far East and Eastern Europe exists, especially

in standard screws, nuts and bolts. In this area, there is severe price competition and worldwide overcapacity. Both EU and non-EU fasteners seek high volume markets, such as Germany. Standard nuts and bolts from outside Europe are usually destined for the consumer market. The core of the competitive power of the EU industry, in contrast, is sophisticated, specially designed fasteners. The trend in trade is to export high value added products and to import low value added items.

The growing share of imports in total EU consumption reflects the growing supply of non-European fasteners. In 9 years time, the penetration ratio increased from 3.86 in 1984 to 4.9 in 1993. In contrast, the export to production ratio has only improved the last two years reaching 5.4 in 1993, almost back to the 1984 level of 5.6.

### Production process

In spite of the general economic slow-down, hot-dip galvanising capacity increased in the early 1990s. Between 1988 and 1992, average production increased by 5.8 % per year. The production process has also become more efficient. The average throughout Europe in 1993 was 13.6 tonnes of steel galvanised for every tonne of zinc consumed, while the average in 1970 was 11 tonnes of steel per tonne of zinc.

The galvanising industry is facing increasing costs due to higher wage increases than productivity growth. Unit labour costs have increased by 15 % from 1990 to 1993, whilst labour productivity has declined 3 %. This development has resulted in a drop in industry gross operating rates from 12.1 in 1990 to 5.7 in 1993. Cost increases not only stem from wage inflation but also from growing legislative requirements.

These cost increases give rise to a trend for mergers; larger minimum plant sizes are required to cope with the necessary investments. Environmental requirements also encourage specialisation; companies which formerly galvanised their products themselves now leave this to specialist hot-dip galvanising plants. By servicing a number of companies the unit cost can be reduced.

## INDUSTRY STRUCTURE

### Companies

The galvanising industry can roughly be subdivided in to three areas:

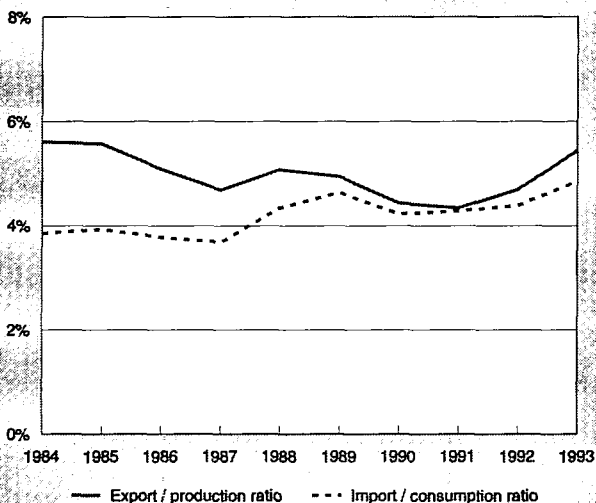
- small enterprises, using primarily hand-skilled labour;
- larger enterprises, operating more on a manufacturing scale, including in-house production of galvanised metal as part of the production process; and
- supply of zinc, machines, chemicals, etc., for the galvanising process.

The fastener industry follows a similar pattern, with many small and medium-sized enterprises. There are a few, however, that could be classified as medium to large enterprises, with sales over 100 million ECU. The largest companies and dealers are German, which is not surprising given the importance of the German machinery and motor vehicle industries in Europe. Italian, French and British manufacturers are not far behind, however. In the galvanising and electroplating sector, Metaleurop (D) had sales of approximately 140 million ECU in 1990, and in continuous galvanising of steel sheet, Galvanage (L) had annual sales of around 140 million ECU in 1989.

### Strategies

Rising costs and decreasing prices have forced producers to seek ways to lower production costs, especially through rationalisation. However, in certain segments of the mass market, price reductions would not restore competitiveness, as competitors can use cheap labour. In addition to rationalisation,

**Figure 8: Secondary transformation of metals  
Trade intensities**



Source: DEBA

therefore, a switch is made in the product-mix towards quality products. Further, measures have been taken to meet logistic requirements such as just-in-time delivery. All these factors lead to increased investment in new equipment.

In the subsector of speciality products, Computer Numerical Control (CNC) machines decrease the time and cost of change-overs. The trend toward orders for smaller lot sizes at more frequent intervals and with shorter lead times leads to increased change-overs for machinery. The use of CNC machinery partially alleviates the shortage of skilled labour as well.

The above factors have resulted in increased specialisation and product development in both fastener and galvanising sectors. Subcontracting of galvanising will also become more important, despite the preference of some client industries for single-sourcing. Forced by a need for more cost efficiency in the value chain and also by increasing legislative requirements, the need for close cooperation between galvanisers, zinc producers and the steel industry is growing.

### Impact of the Single Market

The impact of the Single Market on the industry of secondary transformation of metals has been positive, but limited. A reason for the limited impact is the low international trade intensity of the sector. Due to high transportation costs, most companies in the industry are regionally oriented. The sector is still characterised by many small and medium-sized enterprises, although due to environmental directives (e.g. environmental control measures; Integrated Producer Control (IPC) regulation, water purity) the minimum efficient plant size has been increasing. Among the remaining problems for the sector is the fact that some products, which can be used as secondary raw materials for the zinc oxide and zinc chemicals industry, are classified as "waste" by the EU, so that special regulations apply to its trade. A change of this classification and of the legislation concerned is considered a priority.

### REGIONAL DISTRIBUTION

Characteristic of the industry is its regional dimension. In general, enterprises in the secondary transformation of metals sector are located near major industrial centres of Europe. Because of the small scale of many of the firms, long distance transport is not usually viable. To decrease transportation costs, firms must be located near their clients. For instance, in Germany centres of the galvanising industry are in Nordrhein-Westfalen and in Baden-Württemberg.

### ENVIRONMENT

The electroplating industry is looking for ways to reduce the amount of waste created, in particular the metal content of the effluent. The metals concerned are copper, chromium, nickel and zinc. Efforts are underway to develop production processes which generate less effluent by regenerating it and by extending the dipping time. Also, the use of techniques, such as ultra filtration and electrolysis, have the advantage that they do not use additional chemicals. The cascade-washing technique, in combination with the recycling of metals, could reduce the metal concentration in the effluent from 300 g/l to 0.3 g/l.

Furthermore, recycling of metals out of galvanic waste disposal is an option, but only if the waste has a high enough metal content, preferably of a single metal. Currently, this is not very practical. Most of the small and medium-sized enterprises use third party firms for recycling metals. Also, the traditional technique of the galvanic bath is being replaced by showering the metal plates. The main waste products of hot-dip galvanising, zinc dross and zinc ash, are essential raw materials for the zinc chemicals industry.

**Table 5: Secondary transformation of metals  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.50	0.52
Danmark	0.45	0.90
BR Deutschland	0.96	0.90
Hellas	0.14	0.03
España	1.61	1.28
France	1.66	1.72
Ireland	0.28	0.26
Italia	1.06	1.24
Luxembourg	3.79	5.24
Nederland	N/A	0.17
Portugal	N/A	N/A
United Kingdom	0.54	0.49

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

### REGULATIONS

Standardisation is very important to fasteners. Standards specify dimensions and physical characteristics. German standards (DIN) are normally used.

The use on a voluntary basis of the ISO 9000 (EN 29000) quality management and quality assurance standards series should be encouraged.

In the galvanising industry the possibility of standardisation of hot-dip galvanising of fabricated products has been studied. A draft based on ISO 1461 has been made. After a period of comment this initiative will presumably lead to generally accepted standards. With respect to hot-dip galvanising, EU legislation is further directed towards the reduction of what is typified as 'waste products'. These so-called waste products, however, happen to be the secondary raw materials for zinc oxide and the zinc chemicals industry.

### OUTLOOK

Future development for the industry as a whole depends heavily on the evolution of the building and construction market and on developments in the automotive market and the mass market for fasteners. Most of these downstream markets have proven to possess a cyclical character. Therefore, resulting from the expected further economic recovery in the EU, production and consumption within the secondary transformation of metals industry are forecast to increase in the coming years. Although demand in some markets is close to saturation, the need for the products is expected to persist as galvanising after fabrication remains the most economical and effective way to protect steel from rusting. In the near future, growing demand is also expected from Eastern Europe.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European General Galvanizers Association (EGGA). Address: London House, 68 Upper Richmond Street, Putney, London SW15 2RP; tel: (44 181) 874 2122; fax: (44 181) 874 3251; and

European Industrial Fasteners Institute (EIFI). Address: c/o BIFF, Units 5 & 6 Armoury Trading Estate, Armoury Road, Small Heath, Birmingham, B11 2RJ; tel: (44 121) 766 7308; fax: (44 121) 773 2902.



# Constructional steelwork

## NACE 314.1

*With an annual production ranging between 6 and 7 million tonnes of steelwork, the European constructional steelwork industry is among the basic industrial activities within the European Union. Its output over 8 billion ECU per year and a direct employment of 200 000 people highlight the economic role the steelwork industry plays within the European economy.*

### INDUSTRY PROFILE

#### Description of the sector

The main activity fields for the steelwork industry are single-storey buildings and multi-storey buildings (both industrial and residential), masts towers and pylons, bridges and applications for agriculture.

The European steelwork industry is comparable (in volume terms) to that of the United States (with about 5 to 6 million tonnes per year) and of Japan (about 7 to 10 million tonnes per year).

In Europe, the United Kingdom had for a long time the largest tonnage with 1.3 million tonnes. Nowadays, the re-unified Germany is the largest producer in Europe with over 1.6 million tonnes.

The steelwork industry remains strongly cyclical. In most European countries, the growth rates of the steel construction industry peaked at the end of the eighties. In 1989, the tonnage was highest in the UK, Belgium, Sweden, Switzerland, Croatia and Norway. In 1990, Austria, Denmark, Finland, France, Italy and Spain all reached their peak. Finally, Western Germany and the Netherlands reached their highest production levels in 1992.

Since 1992, there has been a continuous decline in production except for Germany's Eastern Länder: in 1993, the fall in production in Europe reached on average 17 %, with a maximum fall of 39 % for the UK and a minimum of 10 % for Norway. A tonnage recovery has taken place for most European countries as of 1994.

The low inflation which should limit the rise in interest rates, the progressive absorption of the excess capacity in the building industry and the continuous technological progress made in the steelwork construction industry, such as widespread use of CAD/CAM, increased productivity and just-in-time delivery are all positive factors encouraging to see the future of that industry with a quite reasonable optimism.

#### Recent trends

##### Austria

In Austria, the market share for steelwork is low: 5 % of the market in multi-storey building, and 20 % in single-storey factories and warehouses. Building with steel is still very much influenced by public contracts. The new focal point, residential buildings, shows positive signs. Other positive prospects are for investment in infrastructure, especially bridges for the "New Railway" and for car parks.

Beside small electric power stations, a big Danube power plant is under construction in Vienna. Waste deposits are also increasing, as well as other components for environmental protection.

In the private sector, the decline of the commercial building sector is estimated to be over. The positive trend in refurbishment works is continuing as well as residential building demand in big township.

##### Croatia

Croatia became a sovereign state on May 30th 1991 following the break up of former Yugoslavia, but since then has suffered tremendous economic hardships because of war. The production of constructional steelwork has fallen down from 53 500 tonnes in 1989 to 29 600 tonnes in 1991. Reliable data from 1992 onwards are not available, but there is no doubt that they are still lower.

The basic prerequisite for normal development is the cessation of hostilities and the political stability, which would enable economic recovery based on foreign capital invested in accordance with international criteria and conditions.

The constructional steelwork industry will play a major role in the post-war reconstruction, a task which will be eased by the availability of cheap labour force.

##### Denmark

The recession of the Danish construction industry started in 1990, and the activity level has been falling for three consecutive years. The upturn in tonnage started at the turn of the year 1993/94, and in Spring 1994 the prices were somewhat better though still unprofitable.

All the market sectors have been depressed during recent years, but the Danish steel industry could smooth the negative effects by strongly increasing exports, which have grown from 11 000 tonnes in 1987 to 23 000 tonnes in 1994.

A good recovery of the market is foreseen in the industrial building sector and power stations from 30 000 tonnes in 1993 to 34 000 tonnes in 1994.

However, from 1994 onwards a decrease of the tonnage used in towers is foreseen, both because the high voltage system is complete and because in the future new sections will be built underground in order to meet environmental requirements. The tonnage for pylons and towers is estimated at 11 000 tonnes in 1994 (against 18 000 tonnes in 1989). The tonnage of steelwork for agriculture has been continuously decreasing since 1987 because of uncertainty about future government requirements for environmental protection and the level of subsidies.

##### Finland

In 1993, the volume of construction in Finland was about 50 % lower than the peak year of 1990, and the total steelwork output fell down from 150 000 tonnes in 1990 to 90 000 in 1993.

Exports have unfortunately followed and even amplified the decreasing trend, falling from 43 000 tonnes in 1990 to 30 000 tonnes in 1993, mainly because of the fall in imports from the Russian Federation and the Baltic countries and in spite of a strong increase in imports from the EU countries. In fact, Russia and the Baltic countries account nowadays for about 53 % of total Finnish exports of constructional steelwork, against about 36 % for the EU.

Exports remain of great importance to the Finnish structural steel industry, and the exported tonnage is estimated to have risen again in 1994 to 35 000 tonnes, close to 40 % of the total output.



**Table 1: Constructional steelwork Production**

(thousand tonnes)	1989	1990	1991	1992	1993	1994 (1)
Belgique/België	258.0	255.0	235.0	198.0	196.0	205.0
Danmark	100.0	105.0	97.0	92.0	78.0	92.0
BR Deutschland (2)	1 102.0	1 215.0	1 621.0	1 706.0	1 637.0	1 605.0
España	1 106.0	1 269.0	1 184.0	1 014.0	860.0	900.0
France	685.9	751.2	696.8	641.0	545.0	530.0
Italia (3)	957.0	1 200.0	1 120.0	920.0	801.0	790.0
Nederland (4)	455.0	516.0	561.0	583.0	503.0	528 (5)
United Kingdom	1 323.0	1 101.0	861.0	781.0	809.0	894.0
Austria	66.9	71.6	67.5	65.0	60.5	61.0
Finland	150.0	150.0	125.0	95.0	90.0	95.0
Norway	44.4	42.3	40.2	39.1	40.0	42.0
Sweden	96.0	83.0	78.0	72.0	64.0	65.0
Switzerland	73.1	68.2	76.0	65.5	50.4	55.4
Croatia	53.5	45.9	29.6	N/A	N/A	N/A
Turkey	30.3	32.1	36.4	34.4	N/A	N/A

(1) Estimates.

(2) Including former East Germany from 1991 onwards.

(3) Consumption.

(4) Excluding Dutch "Green Houses".

(5) Provisional data.

Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

The market share of constructional steelwork in Finland is relatively high in 1993: 47 % in single storey industrial buildings, 23 % in agriculture and 15 % in multi-storey buildings.

The greatest progress has been made in multi-storey office buildings where the market share went from less than 5 % in 1988 up to 15 % in 1994.

### Germany

Compared to most European countries, in 1992 the German structural steel industry was still enjoying very favourable production conditions, mainly in Western Germany where the production peaked to nearly 1.4 million tonnes. Since then, the production has declined by 7 to 8 % in Western Germany, but it has increased by 18 % in former Eastern Germany. The estimate for 1994 is an additional fall by about 4 to 5 % in Western Germany and an additional increase by 8 to 10 % in the Eastern Länder.

The total 1994 production of 1.6 million tonnes can be compared with the other European countries' as the content of this production figure is similar to that of other countries. Indeed, the production figures provided by the Federal Statistical Office and by DSTV usually include about 0.8 to 1 million tonnes of steelwork used in building elements, which generally is not considered to be part of the structural steelwork sector.

From April 1994 onwards, the incoming orders are higher in volume and value than they were the year before. This should have a positive impact on the production not only in 1994 but also in 1995.

At present, the constructional steelwork sector in Germany is characterised by two contrasting trends:

- the production volume seems to stabilise, but prices are still too low because of the existence of an overcapacity estimated at between 15 to 20 %.
- in the Eastern Länder there is a progress in production, but in the Western part there is a sharp decrease in production except for bridges.

Concerning the employment in Western Germany - in Eastern Germany, no statistics are available - there has been a certain

stability after a continuous increase in employment since 1987: in 1993, the sector accounted for about 89 000 employees.

### France

Since 1991, the French economy has fallen into recession and the structural steel production which had peaked at 750 000 tonnes in 1990 has fallen in successive steps down to 545 000 tonnes in 1993. The year 1994 has at last put an end to that fall of production, and 1995 should show the first small increase. This more optimistic view of the future is based on three facts :

- The economy is growing again and the general feeling is that this movement should last until the end of 1995 at least.
- Even during the recession, the export of constructional steelwork could be kept at the high level of about 50 000 tonnes, compared with 35 000 tonnes five years before.
- The fall in production of constructional steelwork from 1991 on was largely due to the collapse of the market for industrial buildings which traditionally constitutes the main sector of activity for the structural industry. Today, it is precisely in that sector that a strong recovery is foreseen for the coming years, mainly due to strong activity in the car manufacturing and aircraft industry.

### Italy

In 1993, the construction industry faced its worst year since the end of the 1970s. The tonnage of about 800 000 tonnes is the result of a fall of about 13 % after two negative years (-7 % in 1991 and -18 % in 1992).

The reasons include a considerable worsening of prospects in the public works sector and a continued fall in private non-residential construction output, both for manufacturing and service sector. The measures to contain public spending as well as the investigations into bribe taking had a negative impact on the timing and the awarding of public sector contracts.

The specific situation of Italy is overlapping a general recessionary trend Europe-wide. The industrial production declined

**Table 2 : Constructional steelwork**  
**Constructional steelwork used in industrial buildings**

(thousand tonnes)	1988	1989	1990	1991	1992	1993(1)	1994(1)
Belgique/België	158.0	172.0	170.0	192.0	179.0	168.0	163.0
Danmark	20.0	22.0	24.0	22.0	21.0	18.0	20.0
BR Deutschland (2)	659.0	699.0	741.0	928.0	952.0	890.0	900.0
España	410.0	445.0	511.0	477.0	408.0	346.0	360.0
France (3)	333.5	391.6	445.6	393.4	330.0	280.0	270.0
Italia	330.0	330.0	401.0	380.0	277.0	225.0	210.0
Nederland	79.0	86.0	89.0	96.0	101.0	96.0	98.0
United Kingdom	658.0	745.0	620.0	425.0	398.0	420.0	470.0
Austria	39.6	39.7	41.7	37.5	35.5	33.0	30.0
Finland	35.0	42.0	50.0	44.0	25.0	17.0	18.0
Norway (4)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sweden	48.0	46.0	40.0	34.0	30.0	28.0	28.0
Switzerland (5)	42.5	45.1	40.2	42.7	37.1	28.0	32.0
Croatia	5.6	5.3	5.2	3.0	N/A	N/A	N/A
Turkey	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Estimates.

(2) Includes steelwork used in commercial and agricultural buildings.

(3) Industrial buildings and industrial complexes

(4) See table 3

(5) Single and multi-storey buildings for manufacture and warehouses.

Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

in 1992 and also in 1993 despite the boost given to the export industries through devaluation.

If the production of 1993 is compared sector by sector with that of 1989, there is still a sharp fall in the industrial and public sectors like bridges, power stations and towers but there is a good, constant level in the non residential and non domestic sectors.

The consumption of constructional steelwork in the non-residential sector is very high compared with many other European countries. This may be explained by the very large demand in Italy for steel beams for refurbishment purposes. Italy has nearly half of all Europe's historic buildings. Italian building law forbids complete demolition of these buildings behind a retained facade and so, with steel beams replacing timber beams, the refurbishment is very steel intensive.

Concerning 1994, the table shows a level of production amounting to 790 000 tonnes similar to 1993. The estimated production in 1994 should represent the lowest point and also the starting point for recovery in 1995.

#### The Netherlands

The Netherlands have experienced a very favourable situation in the past years, as production of constructional steelwork has been continuously increasing until 1992 included. Whereas most countries experienced their peak point of production in 1990 or 1991, in the Netherlands the drop occurred only in 1993 with a fall of 14 % .i.e. from 583 000 to 503 000 tonnes.

The statistics are different from those given last year, since for practical reasons the greenhouses are no longer included. Indeed it was not possible to separate in weight the glass from the steel frame. The problem will however be analysed in the future as the agricultural sector represents a very important market for steel in the Netherlands.

The positive evolution of production and also of steelwork consumption until 1992 in the Netherlands has induced a continuous increase in employment in this sector, ranging from 13 481 in 1986 to 17 670 in 1992. In 1993, however, the employment had to be reduced to 17 000 units.

The Netherlands are also the country in Europe where the steelwork production per capita is the highest. The reason

for this is that besides very developed markets like agriculture, greenhouses, bridges and hydraulics, the steelwork has also a good market share in multi-storey building (26 %), and single storey factories and warehouses (80 %).

#### Norway

In Norway the production level of constructional steelwork has been relatively constant during the last years: 40 200 tonnes in 1991 against 40 000 tonnes in 1993 and an increase by 5 % estimated for 1994 which bring the production up to 42 000 tonnes. The decrease in the offshore activity in Norway has been more or less compensated by an increase in the building activity.

In Norway, the use of wooden structures is widespread (recent examples are the Lillehammer Olympic Arenas or the new Gardemoen Airport, where the roof of the main building will be made of a laminated wooden structure). In spite of that, the overall market share remains reasonably high: 20 % of the market in multi-storey buildings and 50 % of the market in single storey factories and warehouses.

#### Spain

The steelwork production in Spain is among the highest in Europe. In 1992 its total production was only exceeded by that of Germany.

The production peaked in 1990 with 1.27 million tonnes but fell by 30 % down to 860 000 tonnes in 1993. However, a production increase by 5 %, i.e. up to 900 000 tonnes was expected for 1994.

The market share for steel is quite high within Spain, except in agriculture and bridges amounting to 15 and 10 % respectively. For the other sub-sectors, the market share reaches 30 % for the multi-storey buildings, 85 % for single storey factories and warehouses, and 55 % for single storey non industrial buildings. Spain is also very active in exporting steelwork and is for many European countries a tough competitor.

#### Sweden

In Sweden, at the beginning 1994 it looked like the country had reached the bottom in 1993, but a turbulent situation

**Table 3: Constructional steelwork**  
**Constructional steelwork used in non-residential buildings (1)**

(thousand tonnes)	1988	1989	1990	1991	1992	1993(2)	1994(2)
Belgique/Belgie (3)	12.0	10.0	11.0	13.0	13.0	12.0	12.0
Danmark (3)	7.0	7.0	9.0	9.0	7.0	5.0	7.0
BR Deutschland (4)	275.0	290.0	361.0	201.0	215.0	185.0	180.0
España (5)	489.0	532.0	610.0	569.0	487.0	414.0	432.0
France (6)	144.7	143.8	150.2	162.2	152.0	148.0	133.0
Italia (3)	416.0	440.0	660.0	588.0	490.0	450.0	430.0
Nederland (7)	N/A	270.0	328.0	360.0	365.0	322.0	N/A
United Kingdom (3)	428.0	453.0	350.0	305.0	255.0	250.0	248.0
Austria (8)	14.1	11.9	12.1	11.0	10.0	10.0	10.0
Finland (9)	30.0	39.0	37.0	33.0	25.0	21.0	22.0
Norway (10)	35.0	28.0	25.0	23.0	21.0	22.0	25.0
Sweden (8)	30.0	36.0	29.0	27.0	22.0	16.0	13.0
Switzerland (11)	27.5	18.3	20.0	20.4	20.7	17.4	20.8
Croatia (12)	37.0	40.2	32.6	19.9	N/A	N/A	N/A
Turkey	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Offices, shops, leisure, public administration, health, education, etc. See also individual country definitions below.

(2) Forecast.

(3) Commercial, education, health and other public.

(4) Other public and other (prefabricated buildings and parts for constructions).

(5) Commercial, education, health, other public and other.

(6) Other buildings and other.

(7) Commercial, other public (frames and components for buildings) and other, excluding greenhouses.

(8) Commercial and other.

(9) Commercial, public buildings and other buildings.

(10) Industrial, agricultural, residential and other buildings.

(11) Commercial, education and other.

(12) Other public, which includes commercial, education and health.

Source: European Convention for Constructional Steelwork, 1993 Statistical Bulletin (Construction Forecasting and Research Ltd, 1993)

with bullish interest rates in the 1994 Summer may have induced a further decline of the building industry.

In 1993, the steel industry tonnage declined for the fourth year. The production reached a peak of 96 000 tonnes in 1989, but continuously fell down to 64 000 tonnes in 1993. The 1993 and 1994 tonnage is expected to be the bottom line.

Only 15 % of the steelwork industry companies work at 100 % of their capacity. Despite the bad overall situation the steelwork industry could however produce some positive news:

- The general economic recession did not modify the steel market share, which was even consolidated to 50 % in multi-storey buildings, 80 % in single storey factories and warehouses and 40 % in bridges.
- The typically Swedish slim floor system, which allows a quick, cheap and safe building, is experiencing an increasing success inside and outside Sweden.

#### Switzerland

In Switzerland, a restrictive monetary policy succeeded in reducing inflation from 5.5 % by the end of 1991 to about 2 % by the end of 1993, coupled however with stagnating consumer demand and falling investment.

The construction output fell for the third successive year in 1993 and in all construction sectors orders were down. The consequence of the collapse of production is that the free capacity of the steelwork industry is increasing. For the fabricated and erected steelwork, sale prices have fallen severely but also the delivery delays. Constructional steelwork's market share should increase in the coming years all the more since the market share of steelwork in Switzerland is on the low side for multi-storey buildings (15 %) and on the very low side for single storey factories and warehouses (20 %), which is far below the European average.

#### United Kingdom

The production of constructional steelwork peaked in 1989 with 1.3 million tonnes, which was by far the highest in Europe, as the production statistics of Germany were still limited to those of Western Germany only. After that peak, the production has fallen for four years consecutively and the 1993 production level was about 40 % below the maximum of 1989.

However the GDP data for the second quarter of 1993 confirmed that the recession was over and that the UK economy had finally emerged from its longest recession since the 1930s. An upturn in retail sales and a rise in consumer credit have supported the view according to which the recovery is under way. However housing, whose confidence had been shaken by declines in house prices, remains depressed. The volatility of debt service costs and uncertain employment prospects have made consumers maintain a cautious stance in the short term.

Prospects for other construction sectors look less bright and 1993 has shown no recovery in steelwork production, the total tonnage levelling at 809 000 tonnes without exports and 871 000 tonnes exports included. It is worth highlighting the fact that during the recession, the exports could regularly be raised : from 49 000 tonnes in 1989 to 65 000 tonnes in 1993.

For the future, two elements allow to be more optimistic :

- During the recession, many companies went bankrupt and had to stop their activity. Many of the surviving companies have become more and more efficient and in the last five years have fully automated their production facilities. Most of the companies in this sector have now full CAD/CAM facilities and are moving to just-in-time production. This has led to a dramatic increase in productivity which has easily taken up the capacity lost when the bankrupt companies closed down. As a consequence, the time limits are

shortened, cost prices are lower and the time limits better respected.

- Despite the recession, the market share remained very high and has even increased in two basic sectors: - multi-storey buildings where the market share for steelwork is amounting to 62 % and single-storey factories with a market share of 90 to 95 %. For the other sectors, single-storey, agriculture and bridges, the market shares are also among the highest in Europe with 61 %, 85 % and 40 % respectively.
- An upturn at least for single-storey factories is already becoming evident during 1994 and the sector of multi-storey buildings looks far less critical than it was previously.

### **Impact of the Single Market**

So far, the Internal Market programme has not had much impact on the constructional steelwork sector. The achievement of free movement of goods added up to the already existing technical harmonisation to increase trade flows within the EU. More importantly, the opening up of procedures for awarding public works and supply contracts has enlarged market opportunities for EU firms.

Among the remaining internal barriers to trade, the industry feels that although public procurement procedures have become more transparent, the pre-qualification rules for bidding still differ widely from country to country: this obstacle should be removed by introducing appropriate harmonisation measures. Further harmonisation (without total assimilation) is also needed in the field of rules on workers' rights and social security, as well as safety and quality standards.

Another priority should be the achievement and application of the so-called Eurocodes, to replace existing national standards in the construction industry.

**Written by: ECCS**

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# Boilers and metal containers

## NACE 315

Economic recession has resulted in weak intra-EU demand for boilers and metal containers. At the same time, the EU industry is experiencing increased competition from non-EU countries. In response, EU manufacturers have started to diversify into related segments and have increased their R&D efforts in order to meet increasing customer requirements for more efficient and environmentally friendly production processes. The focus on these elements is expected to lead to comparative advantages in the long run. In the short run, slight production increases are expected.

### INDUSTRY PROFILE

#### Description of the sector

The products of this industry can be divided into the following categories: steam generators and boilers; nuclear boiler construction; fitting for steam generators and boilers; flat and nuclear heat exchangers and condensers for nuclear reactors; water tanks, containers and cisterns; distillation; refining and similar equipment; pipework; and miscellaneous activities, including installation and maintenance.

EU production of boilers and metal containers is concentrated in Germany, France, the United Kingdom and Italy. These four countries together account for nearly 89 % of total EU production of boilers and metal containers.

Compared with other related industries, such as iron and steel and consumer electronics, the manufacture of boilers and metal containers is relatively small in terms of value added. The industry's size is compatible with the size of the manufacturing industry of machine tools.

#### Recent trends

Over the period 1984-1993 production in current prices increased at an annual average growth rate of 4.0 %, while apparent consumption recorded a marginally higher average of 4.3 %. Extra-EU exports, in contrast, remained relatively stable until 1991.

In real terms, the corresponding annual growth figures for production and consumption for the same period only reached 0.73 % and 0.99 %, respectively and extra-EU exports recorded a negative growth rate. Extra-EU imports, in contrast, demonstrated relatively high growth rates over the 1984-1993 period, with real average annual growth reaching 7.24 %.

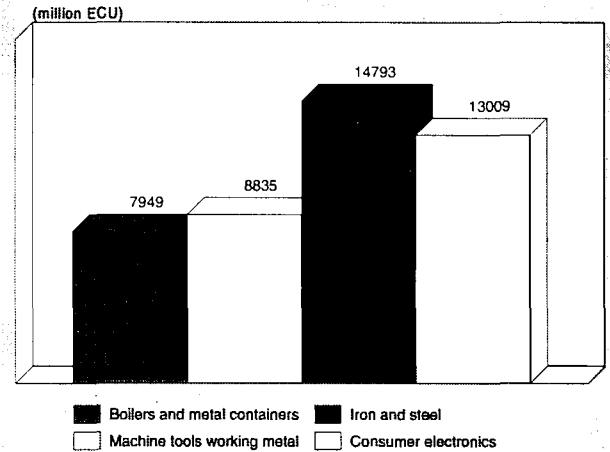
In 1992 and 1993 the economic recession negatively affected consumption and production of boilers and metal containers. In two years time, consumption dropped by 6.2 %. Consequently, EU manufacturers started to look for other non-EU markets, increasing exports in order to obtain a reasonable capacity utilisation. As a result, the production decline was limited to a drop of 4 % from 1991 levels.

This production decline, in combination with a drive towards more efficient operations and cost savings, has resulted in a reduction of employment as well. From 1991 to 1993, employment has dropped by 15 100 people or 6.7 %.

#### International comparison

In 1993 the EU was the leading manufacturer of boilers and metal containers. With production totalling 19.8 billion ECU, the EU was far ahead of the USA and Japan with production figures of 7.2 and 4.9 billion ECU, respectively. If compared

Figure 1: Boilers and metal containers  
Value added in comparison with related industries, 1993



Source: DEBA

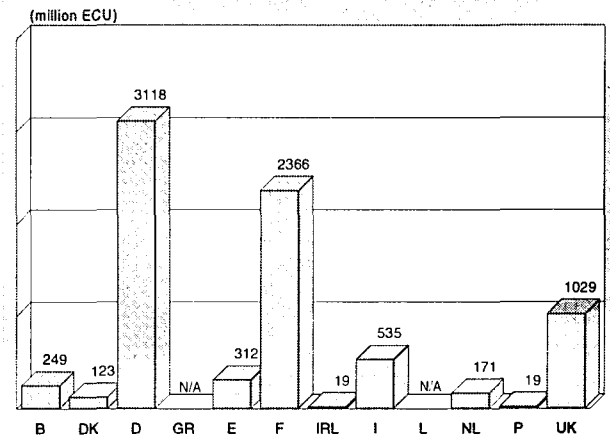
to 1984, the EU has recorded production growth of 41 % against a decline in US production of 12 % and a drastic increase in Japanese production of 385 %. However, growth figures for the USA and Japan are influenced by differences in exchange rates, although in volume terms production trends also point in the same directions.

In 1993, Germany was the largest single producing country in the world. With a production value of 7 375 million ECU, Germany was 159 million ECU ahead of the USA. Other major manufacturers are the EFTA countries of Austria and Switzerland. Recently, former COMECON countries, such as Poland and the Czech Republic have also become important suppliers of boilers and metal containers.

#### Foreign trade

With export rates in the range of 6 % to 9 % and import penetration of 1.2 % to 2.2 %, foreign trade is of relatively minor importance for boilers and metal containers. Trade is, however, gaining some importance as both export rates and

Figure 2: Boilers and metal containers  
Value added by Member State, 1993



Source: DEBA

**Table 1: Boilers and metal containers**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	12 906	15 200	16 785	18 523	19 746	19 349	18 526	17 891	18 650	19 200	19 800
Production	14 039	15 974	17 746	19 482	20 610	20 372	19 787	19 206	19 900	20 700	21 500
Extra-EU exports	1 298	956	1 200	1 232	1 252	1 426	1 662	1 762	1 800	1 840	1 880
Trade balance	1 133	774	961	959	864	1 022	1 261	1 315	1 250	1 500	1 700
Employment (thousands)	233.5	212.7	216.6	222.7	226.0	220.5	210.9	208.2	206.0	204.0	202.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DFI forecasts.

Source: DEBA

**Table 2: Boilers and metal containers**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.79	-0.01	0.99	-4.04
Production	1.25	0.08	0.73	-3.28
Extra-EU exports	-4.33	3.19	-1.06	6.33
Extra-EU imports	6.23	8.51	7.24	-6.34

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Boilers and metal containers**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 298	1 264	1 205	1 120	956	1 200	1 232	1 252	1 426	1 662	1 762
Extra-EU imports	166	179	184	212	183	239	273	388	404	401	447
Trade balance	1 133	1 085	1 021	908	774	961	959	864	1 022	1 261	1 315
Ratio exports / imports	7.84	7.08	6.56	5.28	5.23	5.02	4.51	3.22	3.53	4.15	3.94
Terms of trade index	96.6	91.9	96.8	95.5	108.1	104.4	100.0	99.5	101.9	105.4	N/A

Source: DEBA

**Table 4: Boilers and metal containers**  
Production in constant prices and employment by Member State (1)

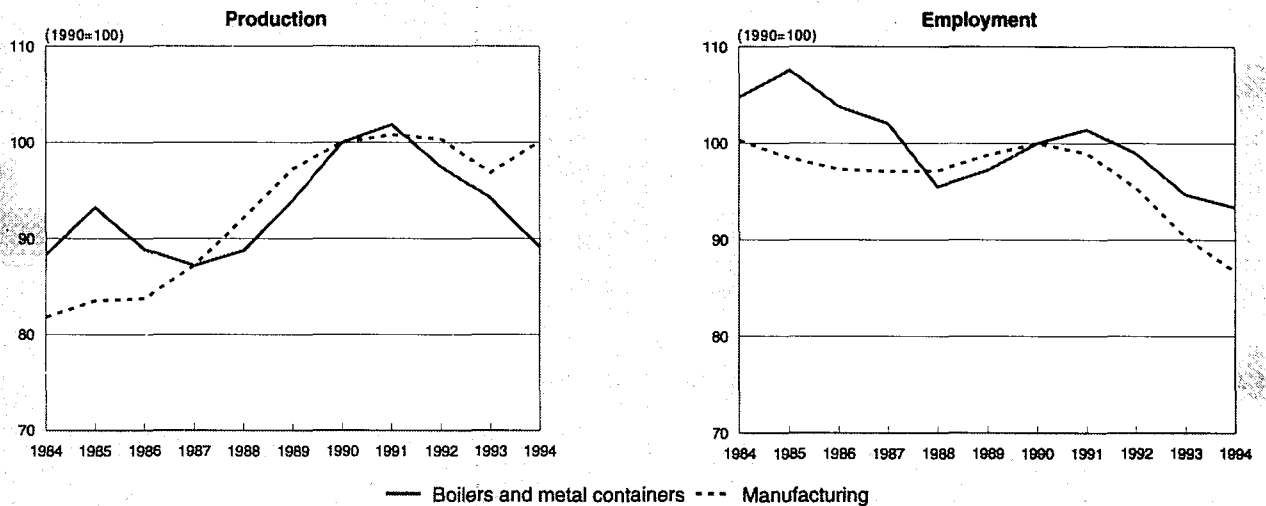
	1984	Production (million ECU)	1993	1984	Employment (thousand units)	1993
Belgique/België	271.5		494.1	4 882		7 222
Danm�rk	131.5		351.9	2 036		3 446
BR Deutschland	5 712.9		6 224.2	62 281		66 324
Espa�a	524.8		743.4	11 041		10 693
France	5 628.3		5 683.7	71 207		68 178
Hellas	N/A		14.9	N/A		407
Irland	42.7		62.7	708		778
Italia	1 252.9		1 739.7	20 217		16 297
Nederland	N/A		407.8	N/A		4 994
Portugal	77.2		34.1	5 426		1 015
United Kingdom	3 260.3		2 597.3	51 073		31 512

(1) Estimates are used if country data is not available, especially in 1993.

Source: DEBA



**Figure 3: Boilers and metal containers  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

import penetration have been growing since 1991. Extra-EU exports, in absolute terms, increased by 74 % over the 1988-93 period.

The EU has always been a net exporter of boilers and metal containers. However, the declining export/import rate shows that imports grew significantly faster than exports until 1991. As a result of export-induced growth efforts by EU manufacturers and weak demand within the EU though, this ratio has started to increase again.

Major destinations of extra-EU exports are the USA, Austria and Switzerland. Other important destinations are leading developing countries in North Africa and South America and newly industrialised countries in the Far East. Although exports to EFTA countries have increased in absolute terms since 1988, their share in total extra-EU exports has declined from one-quarter to somewhat less than 19 %. The very modest share of exports to Japan increased too, while exports to the USA became relatively less important in 1993.

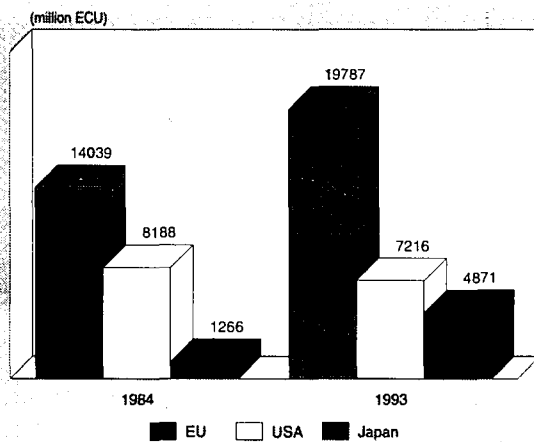
The industrialised world is still the major origin of extra-EU imports, although its share dropped from nearly 80 % in 1988 to just over 60 % in 1993. The share of the EFTA countries, by far the main origin of EU imports, declined from 51 % to 40 %. The decline in imports from the EFTA countries and the USA have been to the benefit of such countries as Poland and the Czech Republic, which together accounted for 23 % of total extra-EU imports in 1993.

## MARKET FORCES

### Demand

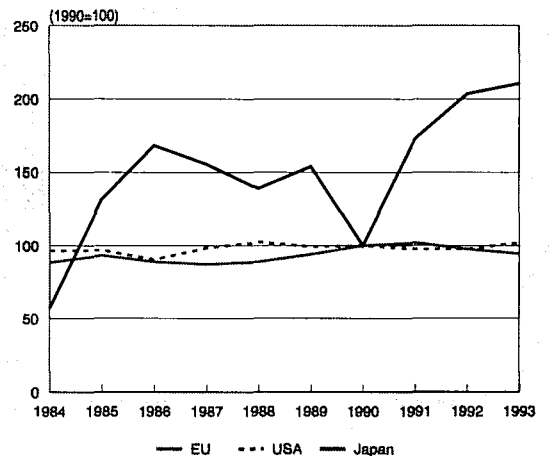
The boilermaking industry supplies equipment to many branches of other industries. It produces a variety of capital investment goods for the following purposes (in decreasing order of importance): the production of thermal and nuclear power; the oil and gas industry; the chemical, petrochemical and pharmaceutical industries; the food and drink industry; the construction industry; the iron and steel and metalworking

**Figure 4: Boilers and metal containers  
International comparison of production in current prices**



Source: DEBA

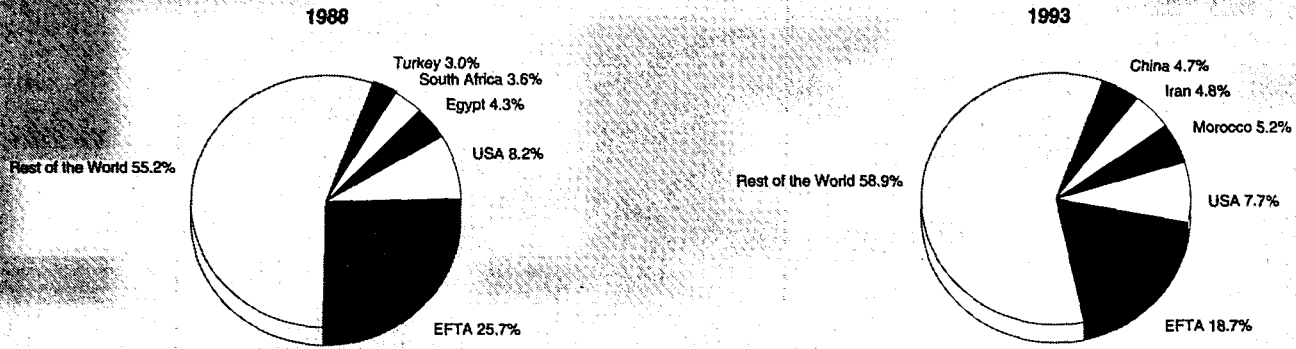
**Figure 5: Boilers and metal containers  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Boilers and metal containers**  
**Destination of EU exports**



Source: Eurostat

industries; the paper industry; and various other industries including automobiles, textiles, mechanical engineering, cement, rubber and electronics.

The importance of customer industries varies by Member State. In France, the major downstream industries are energy (nuclear and classical), the chemical industry, the food and drink industry, building and construction, and oil and gas; accounting for 70 % of the sector's output. Major client industries in Germany are the chemical, automotive, engine construction and energy industries. In the United Kingdom primary outlets include oil, energy, harbour and shipping, and iron and steel, while in Italy, energy, automobile, harbour and shipping and ventilation industries are major clients.

The market has been subject to significant changes, including shifts in the relative importance of the main clients. Changes in demand, of most downstream industries, are heavily influenced by environmental developments. For instance, demand for the nuclear power industry collapsed due to sharp cutbacks in investments resulting from negative publicity about nuclear risks. As concern about global warming and future energy supplies intensify, some downstream industries are demanding more from fossil fuel-driven energy systems. This has resulted in growing attention for co-generation or the

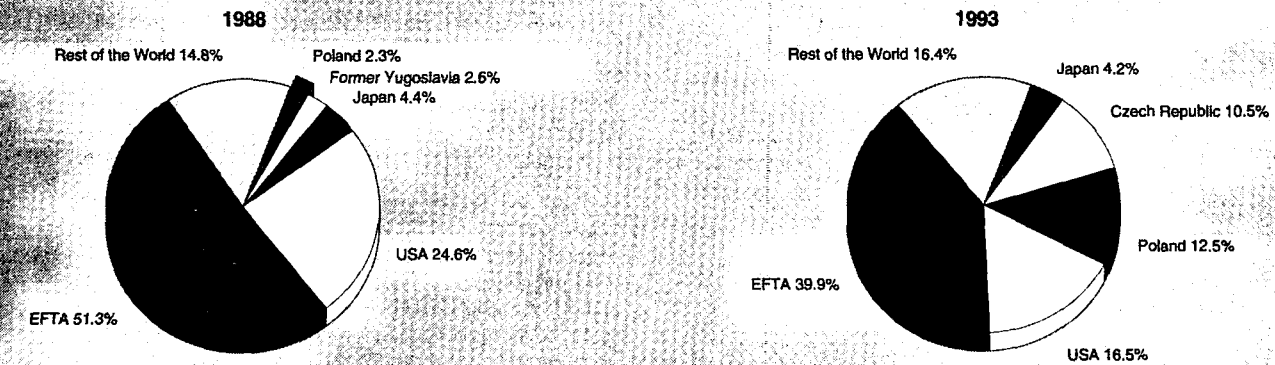
simultaneous production of power and thermal energy (usually steam) from a common fuel source. Some major chemical companies see co-generation as an opportunity to save on investment in new boilers. Also, demand of power producers has changed, increasingly using combustion turbine techniques for the construction of combined cycle plants, instead of the more expensive boiler-fired steam plants of equal capacity.

Large cyclical and structural swings are significant features of the market for boilers and metal containers. Energy prices have a substantial impact on industry demand for boilers and in energy-saving equipment (heat exchangers), since they affect investment decisions. Relatively low oil prices since the end of 1985 have been an important determinant of recent demand trends. Another significant factor influencing demand is the industry's sensitivity to general economic developments. Postponement of investments in downstream industries affects the position of the boilermaking industry. Enterprises specialising in large boilers for heavy industry, such as power stations, are particularly vulnerable to these swings.

**Supply and competition**

Increased competition in export markets from emerging East Asian and East European boilermaking firms, together with declining investments in domestic markets and a slow down

**Figure 7: Boilers and metal containers**  
**Origin of EU imports**



Source: Eurostat



**Table 5: Boilers and metal containers**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	84.2	86.6	85.6	85.4	92.9	96.6	100.0	100.4	98.4	99.5
Unit labour costs index (3)	86.3	89.1	94.3	97.9	95.3	95.0	100.0	106.6	113.6	116.2
Total unit costs index (4)	80.2	85.2	87.8	90.8	91.9	97.0	100.0	104.3	109.1	109.4
Gross operating rate (%) (5)	9.02	7.65	6.76	5.47	7.45	6.50	7.01	6.67	5.70	4.97

(1) Some country data has been estimated.  
 (2) Based on index of production / index of employment.  
 (3) Based on index of labour costs / index of production.  
 (4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.  
 (5) Based on (value added - labour costs) / turnover.  
 Source: DEBA, Eurostat

of investments in developing and OPEC countries, affected the EU industry very badly. In most cases, manufacturers of boilers and metal containers also supply other investment goods. Most downstream markets of the manufacturers of this equipment and other investment goods have a high degree of capital asset utilisation. This is the major reason why these manufacturers are concentrated in countries with an emphasis on the production of investment goods: Germany, France, Italy and the United Kingdom. Except for the United Kingdom, these countries were able to increase production of boilers and metal containers throughout the 1980s, but have been suffering from weak downstream markets since 1991. Estimated profitability (non-labour income in value added) declined significantly and overcapacity emerged, urging manufacturers of boilers for heavy industry to reconsider their activities. Companies are trying to become less dependent on their traditional clients, such as the heavy industry by switching to new but related areas, for example civil engineering. Prospects in the short and medium term, however, seem to be more favourable.

The competitiveness of the EU industry can be further improved if increasing efforts are directed towards research and development (R&D) and towards complete tailor-made solutions. Induced by growing environmental concerns and ever increasing demand for higher efficiency by the downstream industries, manufacturers of boilers and metal containers are increasingly stimulated to direct more efforts to R&D. This

will lead to increasing technological know-how and to comparative advantages in the long run.

EU competitiveness not only depends on a high level of technological knowledge, but also on other product and service features such as high quality, product innovation, reliability and flexibility, which means adaptability to the needs of the market. Due to the high demands of European downstream industries, EU manufacturers have been stimulated to give high priority to these features. This has resulted in a technological lead throughout the world.

### Production process

Technical criteria are not the only decisive factors in international competition. Products must also be competitive from a cost perspective. Developments in labour productivity, unit labour costs and total labour costs indicate that the efficiency of the production processes has increased over the period 1984-89. Labour productivity, in current prices, increased at a faster rate than unit labour costs. Weak downstream markets, accompanied by lower capacity utilisation, have caused a stabilisation of labour productivity in the early 1990s. The resulting decline in employment, however, could not prevent an increase of unit labour costs. During 1990-93, these costs increased by 16.2 % against a stabilisation of the labour productivity index. As a result, the profitability of the industry has increasingly been put under pressure.

Looking at trade figures, the competitiveness of the EU industry does not seem to have been seriously affected by these developments. Although extra-EU imports are still of minor importance, in absolute terms, the penetration rate demonstrates an increasing trend. In contrast, fast growing extra-EU exports in 1992 and 1993 reflect improving competitiveness of the EU industry. However, the competitiveness of the industry can only be maintained if production costs are controlled.

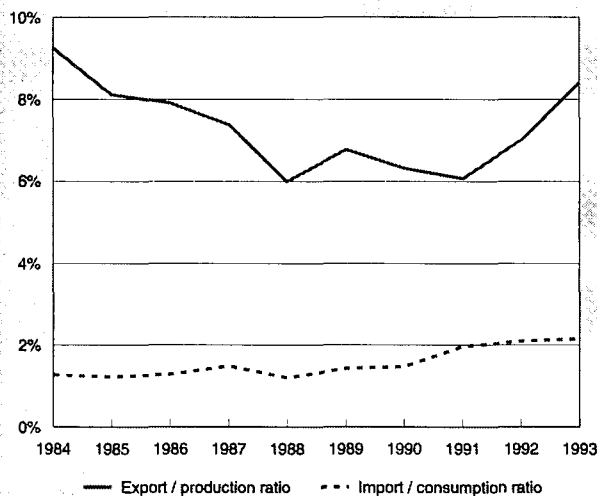
### INDUSTRY STRUCTURE

#### Companies

In the boilermaking industry three types of firms can be distinguished: system integrators; product specialists; and activity specialists.

System integrators are the smallest, but most powerful group. They are usually medium-sized firms or divisions of large diversified industrial groups installing systems. They focus on three activities: design and engineering, manufacturing and on-site installation. The principal feature of system integrators is the high value added content of their activities. Raw material input represents about 20 % of turnover, whereas labour costs are about 45 % due to large design and engineering departments with highly-qualified technical staff. System integrators also offer a wide range of maintenance services, which are no longer lengthy and infrequent. The ageing of machines

**Figure 8: Boilers and metal containers**  
**Trade intensities**



Source: DEBA

and concern regarding the financial viability of the installations makes quick, frequent maintenance necessary. In areas which require a high level of skill, such as nuclear energy, firms are tending to broaden the scope of their services. System integrators further concentrate their activities on design, contracting and on-site installation. Much of the intermediate assembly work is contracted out to small local firms.

Product specialists supply equipment such as vessels, boilers and heat exchangers. Due to low unit costs of production, they have a good international competitive position for specific products. The enterprises, however, tend to be domestically oriented and are normally medium-sized. Raw material input represents over a third of total turnover and the value added content is less than that for system integrators.

Activity specialists are firms which manufacture particularly specialised items, mostly from client blueprints. This is the most common type of firm within the boilermaking industry. They are subcontractors of the system integrators and operate on a small scale. Their rather weak basis, due to specialisation, hinders export activity.

Enterprises in this sector have regional or national rather than an international orientation. The largest companies tend to be located in countries which dominate the Single market, although only one of the ten largest EU firms is located in Germany; Deutsche Babcock, the largest EU firm. Babcock is a special case, however, as many German enterprises are medium-sized. Other large firms involved in the industry include: CLN (I); Degremont (F); Sabroe Refrigeration (DK); Alstom (F); Industria Cantieri Metallurgici (I); Dexion International (UK), which is a subsidiary of Interlake (USA); Ponticelli (F); Aalborg (DK); Cockerill Sambre (B); and Stork (NL). Both US and Japanese firms have subsidiaries in the United Kingdom.

### Strategies

Successful firms in the boilers and metal containers industry are mostly demand oriented, rather than innovative. The relatively weak development of demand, as well as the changing roles of the diverse outlets of the industry and growing environmental concerns have forced enterprises to reconsider their key activities. Many companies are attempting to lessen their dependence on heavy industry as the main outlet and turn to related areas of work, such as mechanical engineering, electricity and civil engineering. Furthermore, the industry is increasing R&D efforts in order to offer complete tailor-made and environmentally friendly solutions. The changing economic environment of the boilermaking industry and the need to improve productivity, increases the need for more skilled labour. Consequently, personnel training is a major concern.

The opening up of markets in Eastern Europe and China will have a positive influence on EU manufacturers of boilers and metal containers. The enhancement of safety for nuclear power reactors in Eastern Europe means a high market potential for EU manufacturers. The cost of making safe or replacing Soviet designed nuclear power reactors is estimated between 10 and 30 billion ECU. In addition, strong demand for energy efficient technology and equipment for power plants and other heavy industries, not only in Eastern Europe but also to an increasing extent in China, will further stimulate EU production.

### Impact of the Single Market

Through the free movement for goods and capital, the liberalisation of services, and the harmonisation of technical standards, competition has become fairer, but more intense. Internal barriers, however, continue to exist as national testing bodies are still able to refuse machinery and equipment from other Member States which comply with EU standards but not with national standards. These barriers prevent fair competition. Another barrier relates to the lack of a single European currency instead of the different national currencies which can

lead to market imbalances and inefficiencies. The removal of all these barriers should have the highest priority. Another priority is the thrive towards more flexibility in labour, which could lead to cost

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## ENVIRONMENT

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The industry itself does not seriously threaten the environment. Environmental issues usually apply to downstream industries. Client industries, however, are becoming more aware of safety and environmental issues also induced by developments in the industry's regulatory environment. In an attempt to meet the needs of their clients, manufacturers of boilers and metal containers put efforts in to product innovations concerning both issues. For example, the industry is addressing the environmental problem concerning the danger of leakage of tanks for underground storage of chemicals and oil products. Much research has been done in the field of corrosion containment and substitute raw materials for tanks. In the USA, about 90 % of all new tanks for oil stocking are made of plastic. The discovery that metal tanks corrode not only from outside but from inside as well, stimulated the use of plastic tanks. Installation of underground plastic tanks is very different from metal tanks though, and demands a completely different organisation of the work. For instance, the use of a special glue allows only a limited amount of time to connect the pipework.

The market for environmental products, such as for cleaning industrial waste water or air pollution, is becoming increasingly important. This creates opportunities for the boilermaking industry. Enterprises are likely to have a competitive edge in countries where environmental regulation is already very strict (e.g. Germany and the Netherlands).

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## REGULATIONS

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In 1995 the EU Directive 89/392 will attain a definite character. This Directive defines essential requirements concerning machine safety, health provisions for people and the environment. Provisions relate to the design, the materials used, the way in which machine operations should be illuminated, machine operation itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. Machines complying with the EU regulations will obtain the CE mark. Machine safety is of relevance to boilers. In anticipation of this EU Directive, but also in response to customer requirements for a safer working environment, the industry has already put much effort in R&D for the improvement of safety conditions of equipment. In new technology development, the industry also pays a lot of attention to environmental issues such as reduction of emissions.

The liberalisation of public procurement in the power plant markets is expected to generate significant changes in electrical power equipment supplier firms. More generally, EU energy policy will have a major impact on the upstream industries of the energy sector. But, harmonisation of the laws of Member States concerning pressure equipment is still required to establish an internal market for boilers and containers (vessels) subject to a pressure greater than 0.5 bar. A proposal for a directive on this subject has been made.

Another issue which deals with EU energy policy is the debate on the introduction of a carbon tax. Such a tax might affect total energy consumption leading to lower demand for boilers and metal containers in the long run. It might also lead to a growing demand for more efficient processing techniques in downstream markets. This last development is expected to have a positive influence for the manufacture of boilers and metal containers. The industry will not only benefit from an increase in demand for new innovative equipment, but will

**Table 6: Boilers and metal containers  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.50	0.78
Danmark	0.49	1.16
BR Deutschland	1.07	1.17
Hellas	0.12	0.10
España	0.41	0.53
France	1.72	1.60
Ireland	0.29	0.27
Italia	0.52	0.59
Luxembourg	N/A	N/A
Nederland	N/A	0.45
Portugal	0.42	0.16
United Kingdom	1.22	0.88

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

also retain a comparative advantage against other countries resulting from know-how.

## OUTLOOK

The economic recession has resulted in weak intra-EU demand for boilers and metal containers. At the same time, EU industry is experiencing increased competition from non-EU countries. In response, EU manufacturers will continue to diversify and increase their R&D efforts in order to meet customer requirements for more efficient and environmentally friendly production processes. Growing environmental concerns are expected to lead to more EU legislation which will especially apply to downstream markets. The ability to meet present and future legal requirements is expected to lead to comparative advantages against other non-EU suppliers of all kinds of process equipment. In the short run, the recovery of EU demand and continued growth of extra-EU export, especially in Eastern Europe and the Far East, will stimulate EU production of boilers and metal containers. Growth rates, however, will be limited.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Comité Européen de la Chaudronnerie et de la Tuyauterie (CECT). Address: c/o VSM Société Suisse des Constructeurs de Machines. Address: Kirchenweg 4, CH-8032 Zürich; tel: (41 1) 384 4844; fax: (41 1) 384 4848.

# Hand tools

## NACE 316.11

The general economic slowdown during 1991-1993 caused production to fall in the EU hand tool industry an average of 4.5 % per year in current prices. Due to increasing competition from outside the EU, demand was increasingly covered by imports, turning the EU in 1991 and 1992 from a net exporter into a net importer of hand tools. However, in 1993 a small trade surplus was recorded.

EU manufacturers try to cope with increased competition by rationalising their production process and by changing their product-mix towards the production of high-quality products. For the short term the outlook is cautiously optimistic; future prospects for the medium term are more positive.

### INDUSTRY PROFILE

#### Description of the sector

The hand tools industry comprises four principal segments: hand tools, tools for joinery, fixing tools for construction and metal saws. The sector manufactures such products as axes, screwdrivers, saws, files, rasps, pliers, shears, spanners, tools for drilling, taps and dies, hammers, planes, chisels, etc.

Although some hand tools perform the same function as power tools, they are increasingly being replaced by electrically driven tools, which are different products and produced by different manufacturers. Likewise, they are subject to different regulations. Some hand tools more related to the industry are also treated in the chapter on electrical equipment for industrial use (NACE 343.1).

#### Recent trends

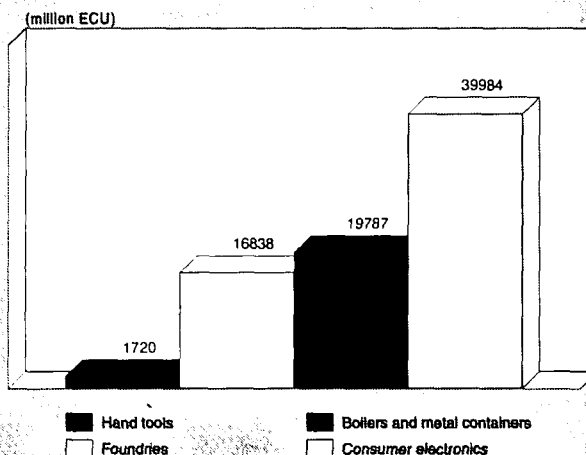
EU demand for hand tools, in current prices, declined in 1993 by 14.4 % while production decreased by 6.7 %. However, extra-EU exports recorded a 3.4 % increase while extra-EU imports stagnated (-0.5 %) during 1993. International trade is playing an increasingly important role in the EU hand tool market. In 1993, approximately 48 % of production was exported, while 48 % of the consumption needs came from imports; in 1992 it was 44 % and 45 %, respectively.

Germany was by far the largest EU producer of hand tools in 1993 producing 44 % of total production, followed by the United Kingdom (21 %) and France (20 %). These countries are also the major consumer markets of hand tools (e.g. Germany's share is roughly 40 %).

With the exception of the United Kingdom, all Member States reported a decline in the production of hand tools for 1993 (data refer to six EU countries). For the second consecutive year Italy suffered the greatest production loss: with a 22.4 % decline (in 1992 they had a 13.2 % decrease). Spain's production declined by 15.2 % in 1993 while in Germany and France the reductions were 5.1 % and 6.8 %, respectively.

From 1984-1989 production in current prices grew at an average rate of 4.6 % per year for hand tools. In contrast, due to the general economic slowdown during 1990-93, the industry recorded an average drop in production of 4.5 % per year. However over the entire period from 1984 to 1993, the average growth rate for production was positive at 2.1 % per year. Consumption showed similar development patterns of growth from 1984 through 1991 and reductions in 1992 and 1993. But, the average annual growth rate for consumption from 1984 to 1993 was twice as high as that for production; namely, 4.0 % per annum. Since demand is increasingly being met by imports (48 % in 1993 versus 38 % in 1984), EU production is not fully benefiting from the rise in demand.

**Figure 1: Hand tools**  
Production in comparison with related industries, 1993



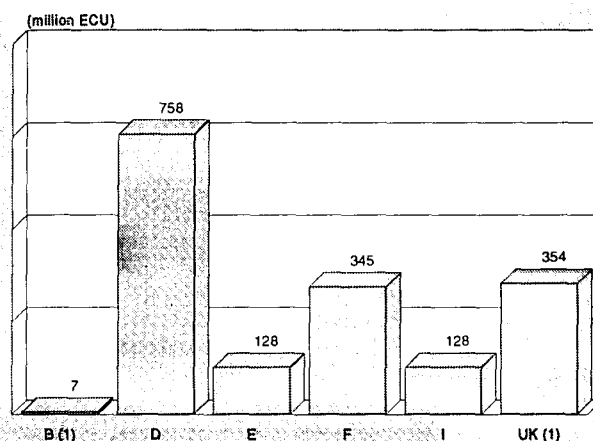
Source: DEBA, CEO

Practically all products in the hand tool market have to cope with weak demand, including screwdrivers, spanners (mostly used for home car repair) and wrenches which are the most important sectors of the do-it-yourself (DIY) hand tool market. The spanner sector was by far the most important sector until the mid 1980s. It has since suffered a decline due to a reduction in the sale of socket sets. Likewise, the screwdriver sector has been adversely affected by rising substitute sales of cordless drills, which double as cordless screwdrivers.

#### International comparison

The EU is the world leader in the production of hand tools. The rise of import rate and the increase in the export rate, however, reflect continued emergence of international competition but also considerable efforts made to penetrate extra-EU markets. In particular, China, other East Asian countries and the East European countries are becoming more productive. These countries are especially competitive through pricing.

**Figure 2: Hand tools**  
Production by Member State, 1993



(1) Estimates.  
Source: CEO

**Table 1: Hand tools**  
**Main indicators in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	1 162	1 240	1 270	1 419	1 620	1 714	1 902	1 920	1 867	1 713
Production	1 449	1 562	1 526	1 563	1 676	1 809	1 974	1 913	1 843	1 720
Extra-EU exports	732	792	732	708	718	827	804	805	808	835
Trade balance	287	322	256	144	56	95	72	-7	-24	7

Source: CEO, Eurostat

## Foreign trade

With an import ratio and an export ratio of 48 % in 1993, it is obvious that extra-EU trade plays a major part in the EU hand tool market. Between 1984 and 1993 the average annual growth rate for imports was substantially higher than that for exports: 9.6 % versus 1.6 %, ultimately creating a negative trade balance in 1991 and in 1992. However, in 1993 the trade balance became slightly positive, due to a growth rate of 3.4 % for extra-EU exports, while extra-EU imports fell by 0.5 %.

In 1993 roughly 12 % of EU exports of hand tools were destined for the USA, which are the most important single destination for hand tools exports since the accession of most EFTA countries. The developing countries account for more than half of extra-EU exports of hand tools.

The countries of origin of extra-EU imports of hand tools have changed considerably during the 1993 period. In 1993, Taiwan and China accounted together for about 40 % of EU imports, against 15 % in 1988. Since the accession of the new Member States, Taiwan has become by far the largest exporter of hand tools to Europe; the share of the USA has grown moderately over the 1988-93 period, while the Japanese share has actually decreased.

## MARKET FORCES

### Demand

Hand tool manufacturers operate in both the industrial and private markets. Although there are differences between Member States and according to the type of tool, industrial demand is more important than private demand. Demand for hand tools for industrial use depends on the propensity to invest in the downstream industries. In the case of saws and tools for joinery machines and metal saws, demand depends almost entirely on investments made by industries such as furniture manufacturers, sawmills, and mechanical engineering firms. For the building and construction industry anchor bolts, masonry drills and power tools are most relevant. The propensity to invest depends on the activity level and strength of the downstream industries, which largely depends on the general economic climate.

Private demand for hand tools is also determined by the general economic situation. Tools for private use, in general, have a long economic life. These tools have a high price elasticity. As a result, when the economy is strong and disposable income is growing, there is greater demand for the more expensive high-quality tools at the top of the product range. However, declining disposable income is a strong factor in pushing demand towards the cheaper end of the product range. Private demand is especially important to the DIY sector. With rising home ownership levels the DIY sector boomed in the 1980s. As people became more confident about tackling DIY jobs, they tended to buy higher quality tools. Manufacturers have introduced more advanced products, such as hardpoint saws, to the DIY market in response to this change in demand.

Poor economic conditions in the EU during 1990-1993 largely explain the declining consumption of hand tools both for industrial and private use.

### Supply and competition

Depending on the size and maturity of the market, the EU countries can be categorised into three market types: 'leaders', 'developing' and 'small'. The leading countries include France, Germany, Italy and the United Kingdom. Although imports are important, these countries are major producers of hand tools, accounting for some 70 % of the EU market. Several extensively used distribution channels also exist in these countries and they have a long tradition of tooling and DIY activities.

The second market type consists of Greece, Ireland, Portugal and Spain and accounts for an estimated 15 % of the market. Greece has the least developed market and is almost entirely dependent on imports for its supply of hand tools. Besides some simple, mostly agricultural hand tools no hand tools are manufactured in Greece. The remaining countries also rely overwhelmingly on imports, as their production covers only a restricted number of segments of the hand tool market. This applies particularly to Ireland and Portugal. Further, modern distribution networks from the leader countries are establishing themselves in the 'developing' countries.

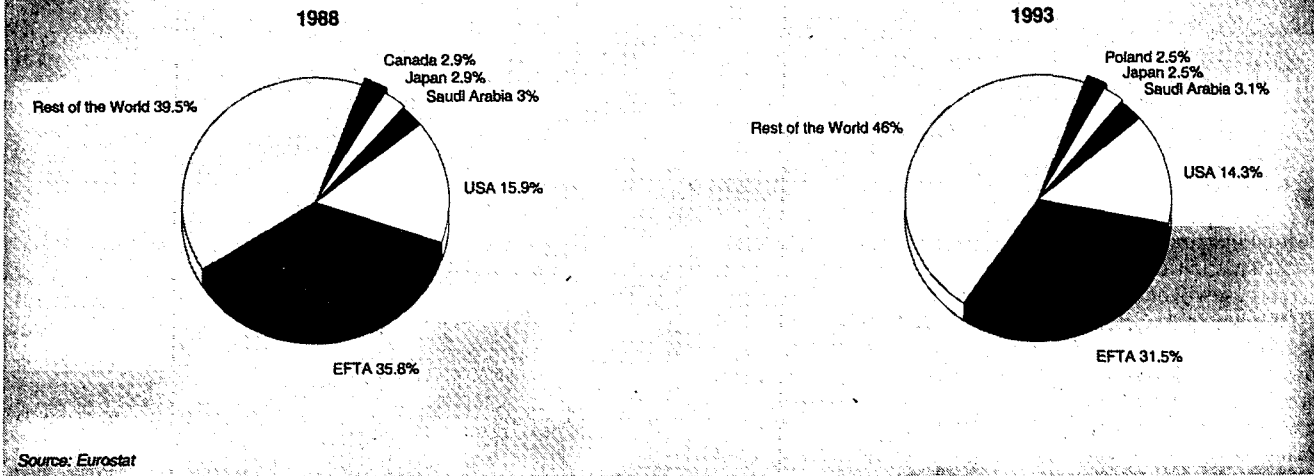
The small EU countries of Belgium, Denmark, Luxembourg and the Netherlands comprise the remaining 15 % of the market. They have distribution channels comparable to those in the leading countries, but, like the 'developing' countries, they rely largely on imports as the size of their markets does not justify a complete domestic product range.

In the leading countries some 50-60 % of sales of hand tools are accounted for by DIY superstores/multiples. These stores are characterised by wide product ranges, accessible presentation and competitive offers. Another 15 % or so of sales go through independent DIY stores, while speciality hardware stores account for a further 18 %. Tools for joinery machines and metal saws are partly distributed by retailers and partly sold directly to manufacturers of plant and machinery. However, in the last few years a stagnation in the DIY market has led to alterations in the distribution system. Due to the stagnation and a continuous flow of low priced products from East Asia and East Europe competition has become particularly fierce in this market segment, putting prices under continuing pressure. As a result, retail prices for the main hand tools in the United Kingdom decreased by 1 % in the multiples last year.

### Production process

During the period 1985-1993 labour costs increased at an average rate of 5 % per annum. By Member State this rate varied from 2.5 % in the Netherlands to over 7 % in Italy and the United Kingdom. The continuous rise in costs, together with a recessive market at the beginning of the 1990s, has encouraged manufacturers to rationalise their production processes. At the same time, growing supplies of cheap hand tools

**Figure 3: Hand tools  
Destination of EU exports**



from East Asia and East Europe has caused EU producers to change their product-mix, and to switch to the manufacturing of products with a higher value added content.

The rationalisation process in the sector has been continuing in 1994, as a result of continued pressure originated by cheap imports.

## INDUSTRY STRUCTURE

### Companies

In the EU the bulk of the companies engaged in the production of hand tools are small. About two-thirds of the firms have less than 20 employees. In individual Member States this share varies from 45 % in France and Spain to 70 % in Germany. The principal reasons for the abundance of small-sized companies are the low value added nature of the products, the wide diversity of the products and the small production runs per item. Moreover, many companies are family-owned, which can limit the acquisition of capital.

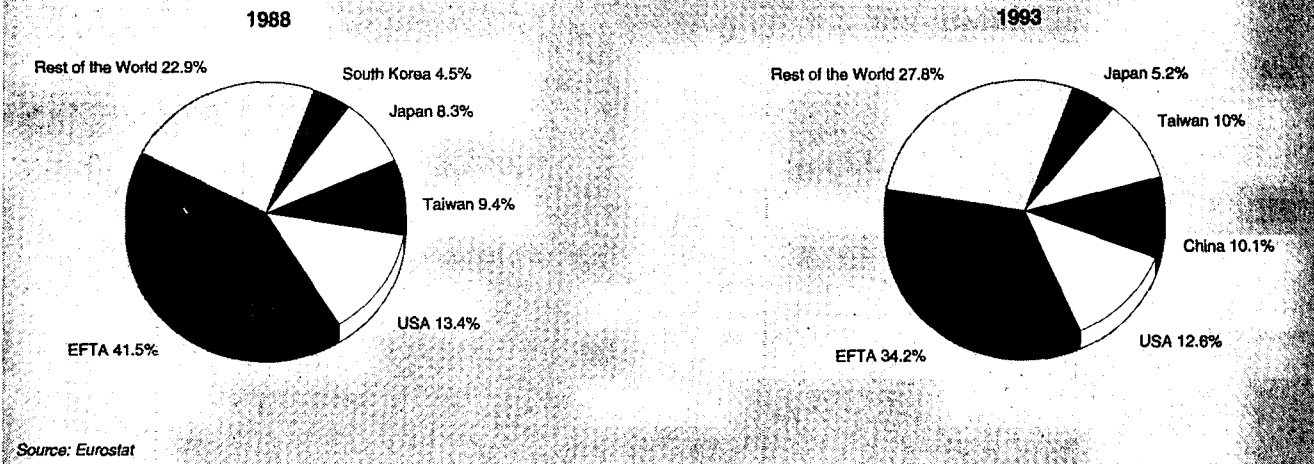
The few medium to large, sometimes internationally operating, firms account for the largest portion of production. These

include Sandvik AB (S) and Bahco (S), Stanley (UK/F), FA-COM (F), Rotherberger (D) and Hilti (CH). The Swedish manufacturers Sandvik and Bahco have several production facilities in the EU. This applies also to the US-based Stanley Works, which in the United Kingdom is known as Stanley Tools. In the leading countries, major manufacturers often have a large market share. For instance, 50 % of the UK DIY market for screwdrivers is supplied by Stanley and Draper (an importer/packager), while 75 % of the DIY market for hand drills is covered by Stanley, Draper and Record Ridgeway, which is part of Record Holdings.

### Strategies

Fierce price competition, due to the increasing volumes of cheaper imports, has forced many manufacturers to improve their productivity and to reconsider their product-mix. Lowering production costs and making a switch to quality products are prerequisites for remaining competitive. Further, the saturation of a number of EU markets particularly in the 'leading' and 'small' countries is causing manufacturers to look for new markets and new production opportunities.

**Figure 4: Hand tools  
Origin of EU imports**



**Table 2: Hand tools**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	732	792	732	708	718	827	804	805	808	835
Extra-EU imports	445	470	476	564	662	732	732	812	832	828
Trade balance	287	322	256	144	56	95	72	-7	-24	7
Ratio exports/imports	1.64	1.69	1.54	1.26	1.08	1.13	1.10	0.99	0.97	1.01

Source: Eurostat

Rationalisation of production processes and the establishment of production capacity in countries with lower levels of (labour) cost will enable manufacturers to lower production costs. At the same time, these countries usually have underdeveloped markets allowing for market extensions. Such new markets are possibly to be found in Eastern Europe, provided the worst economic developments can be overcome in those countries, and in the 'developing' markets within the EU. As an example, Stanley Works (USA) has set up a joint venture with the Polish Fabryka Narzedzi Kuznia near Krakow. This deal works in two ways. The new company takes over Kuznia's hand tools manufacturing capacity and makes further investments in new equipment and facilities later on. And, in return, Stanley is allowed to manufacture Stanley branded products cheaply and sell them throughout Europe. Another example is Sandvik AB (S), which produces files and rasps in Portugal through its subsidiary Sandvik Obergue.

With the upgrading of the product-mix, after-sales services will become increasingly important. Quality improvements and after-sales service are particularly important in the high-income West European countries. However, these factors are of greater importance in a booming economy because in a recession the customers tend to concentrate on price.

Growth among market leaders in these largely satiated markets will be through the acquisition of smaller rivals rather than through greenfield investments.

### Impact of the Single Market

The overall impact of the Single Market on the hand tools sector is considered to have been positive. The enlargement of the market has stimulated trade and has resulted in an

intensifying competition. The intensifying competition, however, has also resulted in a declining number of companies (through mergers and acquisitions) and has not necessarily led to a fairer competition. In order to achieve fair competition, EU regulations should be unified in all Member States and clarified to third countries outside the EU. Further harmonisation of technical and safety standards at world level should be a next priority. A level playing field in terms of social legislation, both within the EU and with respect to non-EU countries, should also be a future priority.

### REGIONAL DISTRIBUTION

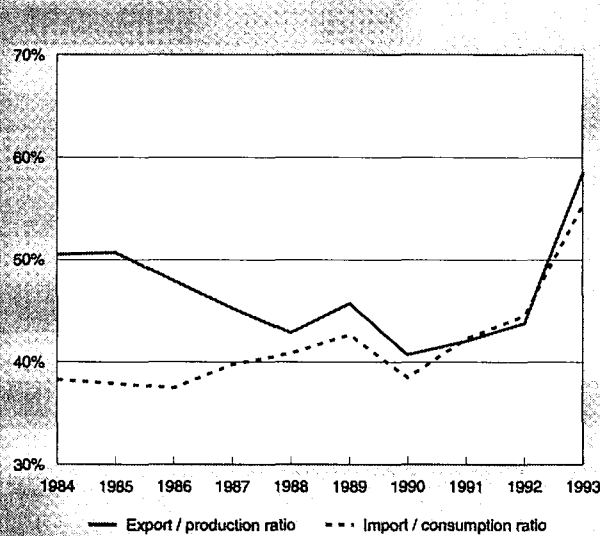
The sector has local, regional and global aspects. Manufacturers who are operating on a small scale, and who depend on the demand from downstream industries like mechanical engineering, tend to be located in the area where these industries are concentrated. For instance, in Germany and Spain manufacturers are concentrated geographically. At the same time however, the big firms in the industry and those engaged in the production of DIY products have a global orientation.

### OUTLOOK

Demand for hand tools is closely linked to the general level of economic activity. Due to the economic slowdown the industry faced declining production and consumption levels during 1991-1993. One of the main downstream industries, the building and construction sector, was severely hit by the recession, as well as the mechanical engineering and private household sectors. Although one can argue that poor economic conditions encourage demand for DIY products, as people tend to renovate and repair themselves, declining disposable income also pushes demand for DIY products towards the cheaper end of the product range. Thus, this negative impact of the recession on demand outweighed the positive one as seen by the overall decline on retail sales.

Besides cyclical factors, structural influences played a role in the deterioration of the market for hand tools. Fierce competition from outside the EU was relevant in this regard as the drop in sales was partly due to the increase in imports of cheap tools from the Far Eastern and East European countries. In order to enable the sector to maintain its position in the future, structural changes are required. More rationalisation to reduce costs is expected to take place, probably by way

**Figure 5: Hand tools**  
**Trade Intensities**



Source: CEO, Eurostat

**Table 3: Hand tools**  
**Expected real annual growth rates**

(%)	1994-95	1994-98
Apparent consumption	1.0	2.0
Production	1.5	2.5
Extra-EU exports	2.0	2.5

Source: NEI



of take-overs, mergers and other forms of alliances. At the same time, a switch to quality products is occurring.

Recently, signs of recovery in the hand tool market have been observed. In the United Kingdom, where economic conditions improved first, the hand tool market is heading for recovery, which is reflected by the stabilisation of the production level in 1993. In addition, the sale of hand tools in DIY outlets increased some 20 % between February 1993 and February 1994. There is also some evidence of trading up on the part of the consumer. These developments are considered to be indicative for the EU as a whole, with the recovery encouraging demand for hand tools from private households and from the industrial sector. Hence, the developments in the United Kingdom justify some cautious optimism for the short term. However, adverse structural factors, in particular fierce competition from outside the EU will continue.

The economic outlook for the medium term is better. Regarding the industrial market, a recovery in the downstream industries is expected. At the same time, structural measures (rationalisation and quality improvement) will have a favourable impact on demand. In the private market the economic recovery will bring about a rise in demand, particularly for quality products.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Tool Committee (CEO). Address: 39/41 rue Louis Blanc, F-92400 Courbevoie; tel: (33 1) 47 17 64 53; fax: (33 1) 47 17 64 55.

# Light metal packaging

NACE 316.42

The light metal packaging industry has enjoyed slow but regular growth over the last few years. Substantial production cost savings and significant productivity increases have been achieved, principally due to technological advances. The sector, as a whole, is characterised by a high degree of competitiveness, due to a broad range of alternative processing and packaging options currently in existence or under development. The impacts of environmental regulations and recycling are particularly important in this sector.

## INDUSTRY PROFILE

### Description of the sector

The term "light metal packaging" is applied to all metal packaging less than 0.49 mm thick, with a capacity below 40 litres. By contrast, the term "heavy metal packaging" applies to packaging manufactured from cold-rolled sheet steel with a surface thickness equal to or greater than 0.5 mm and used in the fabrication of casks, cans and drums, with a capacity of 30 to 220 litres.

The distinction between "light" and "heavy" metal packaging is by no means arbitrary. Not only does it reflect the use of different raw materials, as well as, different manufacturing technologies, it also relates to entirely distinct consumer markets.

Within light metal packaging, further distinctions apply to specific product groups:

- packaging for foodstuffs, particularly cans for food and beverages;
- various types of light multi-purpose packaging (called general line cans), notably removable-lid cans for paints and varnishes, oil cans, cans for cleaning agents, non-sealed cans for foodstuffs, decorative cans, aluminium dishes, and metal containers for specific industrial applications (e.g. electric battery cases);

- aerosol cans for use as containers for a mixture of gas and liquid, used primarily in the cosmetics, pharmaceutical and cleaning agents subsectors; and
- lids and caps, including crown corks and other types of metal closures (especially for glass bottles), and screw-on caps and lids.

### Recent trends

In 1993, the light metal packaging sector produced 6.8 billion ECU worth of packaging, a drop of 4.3 % compared with 1992. Net exports totalled 349 million ECU (an increase of 3 %) in 1993, while apparent consumption fell by 4.7 % to 6.5 billion ECU.

Current estimates suggest that light metal packaging accounts for around 16 % of the European packaging market, as a whole, ranking it third in terms of packaging industry materials. By way of comparison, paper and board account for 30 % of the packaging industry's current requirements, with plastic packaging accounting for a further 30 %. The percentages for glass, heavy metal and wood are: 7 %, 4 % and 4 %, respectively.

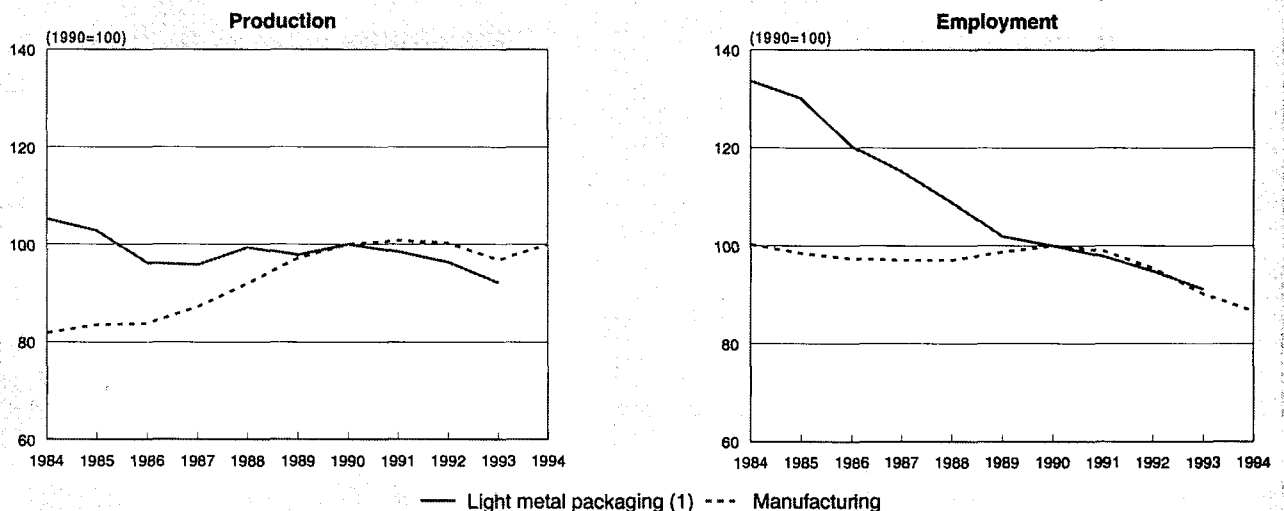
A combination of sectoral restructuring and productivity-boosting measures have, since 1981, resulted in a steady fall in employment, which dropped below 50 000 for a second consecutive year. Over the same period, productivity increased from 70 000 ECU per employee in 1980 (at constant 1985 values) to about 140 000 ECU in 1993. The sector counts some 300 companies.

### Foreign trade

The metal packaging sector is not traditionally characterised by major long-distance international trade for technical and economical reasons. Although the EU is a net exporter in this sector, imports continue to grow faster than exports. In 1993, extra-EU imports grew by 7.1 %. The EFTA countries continue to represent the largest share of EU imports, accounting for 66.5 % in 1993. This clearly reflects an increased interest by these countries to boost sales into the EU.

At present, although imports only represent 3 % of market demand, they have grown significantly over the last few years. Intra-EU trade is also increasing substantially, and amounted to more than 1 billion ECU in 1993.

Figure 1: Light metal packaging  
Production and employment compared to EU total manufacturing industry



(1) SEFEL production data in current prices deflated by using NACE 3160.  
Source: DEBA

**Table 1: Light metal packaging**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	5 818.0	5 884.0	5 656.0	5 691.0	6 106.0	6 247.0	6 580.0	6 809.0	6 781.0	6 465.0
Production	6 048.0	6 144.0	5 875.0	5 900.0	6 321.0	6 561.0	6 912.0	7 100.0	7 119.0	6 814.0
Extra-EU exports	341.7	368.8	328.0	320.4	391.4	489.8	522.2	518.9	519.0	542.4
Trade balance	230.1	259.5	219.5	208.5	214.6	314.2	331.7	291.5	338.2	348.8
Employment (thousands)	69.8	67.9	62.8	60.1	56.8	53.2	52.2	51.1	49.5	47.6

(1) Excluding Portugal.  
Source: SEFEL, Eurostat

**Table 2: Light metal packaging**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-1.58	-1.56	-1.57	-4.65
Production	1.64	0.95	1.33	-4.28
Extra-EU exports	3.04	-0.28	1.55	1.49
Extra-EU imports	6.28	-0.39	3.26	0.96

Source: SEFEL, Eurostat

**Table 3: Light metal packaging**  
**Production by country (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (2)	6 048	6 144	5 875	5 900	6 321	6 561	6 912	7 100	7 119	6 814
Belgique/België, Luxembourg	322	343	344	349	312	320	334	348	354	332
Danmark	224	236	235	232	185	197	200	218	210	219
BR Deutschland (3)	1 105	1 102	1 178	1 164	1 196	1 260	1 426	1 462	1 388	1 408
Hellas	N/A	180	166	165	184	179	167	174	214	458
España	399	398	430	459	473	566	597	649	629	561
France	979	1 036	987	957	977	1 018	1 049	1 080	1 073	1 147
Italia	694	648	598	655	866	986	1 043	991	1 131	904
Nederland	492	494	405	408	408	396	424	450	448	200
Portugal	98	113	103	103	104	N/A	N/A	N/A	N/A	N/A
United Kingdom, Ireland	1 559	1 594	1 429	1 408	1 616	1 639	1 672	1 728	1 672	1 585

(1) Production is estimated using total sales (national sales & exports).

(2) 1984 Greece estimated; from 1989, excluding Portugal; from 1990, including former East Germany.

(3) From 1990, including former East Germany.

Source: SEFEL, Eurostat

**Table 4: Light metal packaging**  
**External trade in current prices**

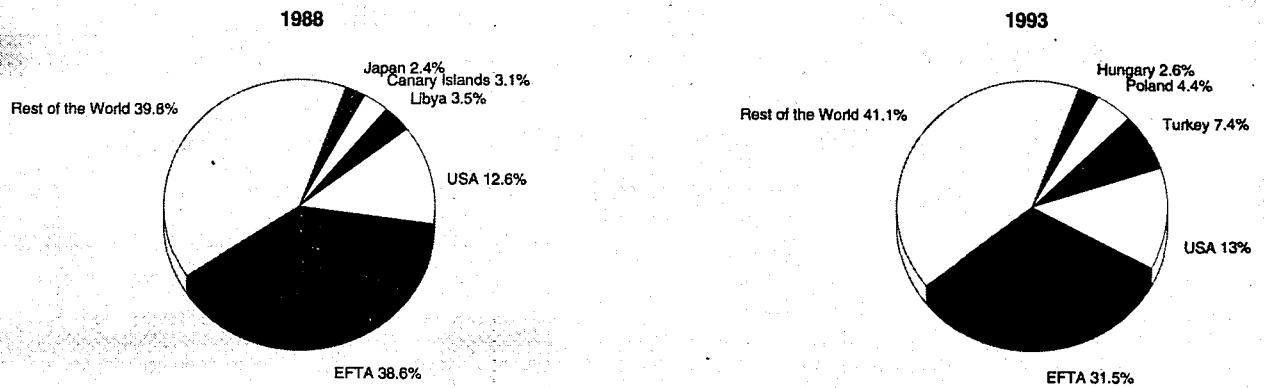
(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	341.7	368.8	328.0	320.4	391.4	489.8	522.2	518.9	519.0	542.4
Extra-EU imports	111.6	109.3	108.5	111.9	176.7	175.6	190.4	227.4	180.8	193.6
Trade balance	230.1	259.5	219.5	208.5	214.6	314.2	331.7	291.5	338.2	348.8
Ratio exports / imports	3.1	3.4	3.0	2.9	2.2	2.8	2.7	2.3	2.9	2.8
Terms of trade index (1)	91.8	92.2	96.5	98.6	98.4	97.6	100.0	99.2	100.6	97.6

(1) NACE 3160.

Source: Eurostat



**Figure 2: Light metal packaging  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

Although originally developed for food products, light metal packaging has developed an increasingly important role in everyday life thanks to its unique properties compared with other forms of packaging. Food conditioned in metal packaging can be stored for long periods without any loss in nutritional value or any risk of corrosion or contamination. The primary advantage of this longevity is that products can be more readily transported and stored.

Efforts are being stepped up to enhance the quality of printing and design (stackability, easy open ends) aimed at upgrading the image of metal packaging. This should positively influence demand. Up to now, metal packaging has quite successfully withstood the pressures arising from packaging waste issues.

In recent years, economic growth within the sector has been relatively modest, ranging from 2 to 3 % per year on average. However, 1993 was a bad year for the sector, with apparent consumption and productivity both dropping by more than 4 %. While consumption for most products fell, this was not the case for drinks and aerosol cans.

Currency devaluation in the third quarter of 1993, in some countries, tended to distort figures expressed in ECU, for the UK, Spain and Italy. Most of these countries managed to record a higher output expressed in their own local currency. Production by country, in 1993, evolved as follows: UK -5.2 %, Germany +1.4 %, France +6.7 % and Italy -20.1 %. Sales in Greece showed a substantial jump, due to improved data collection, which now covers a major part of the industry. Some European countries saw their export sales fall substantially (UK -23 %), while others increased (France +12 %, Italy +16 %).

Besides overall poor demand, the industry was also faced with serious overcapacity in some product lines. The combination of these elements naturally had a negative impact upon prices, and consequently, returns to companies. It seems likely that most of the structural growth in the metal packaging sector is attributable to developments in the canned foods industry and the emergence of new market segments in canned beverages and aerosols.

As far as industrial packaging is concerned, however, the industry's position is distinctly less positive. This is due to a difficult economic situation in certain consumer sectors (among them the construction industry) and to growing com-

petition from the plastic packaging sector, in terms of specific applications, notably motor oils and cleaning agents.

Overall, developments in the light metal packaging sector are strongly influenced by a number of external factors, including:

- changes in consumer preferences and patterns (including a trend towards individual portion packaging in the food industry and more sophisticated methods of preservation), which have prompted an increase in demand for packaging of sophisticated canned food, pre-cooked dishes and aerosols;
- stiffer competition from new types of packaging (such as compound plastics on impregnated board, ultra-lightweight glass and flexible packaging) and new preservation technology (e.g. deep-freezing or freeze-drying);
- psychological aversion to certain types of packaging and product presentation, particularly where long-life foodstuffs or beverages are concerned; and
- environmental legislation and the unpredictable reaction of the conditioning industry to packaging materials, which they will favour in the future.

### Production process

At present, light metal packaging production can be broken down as follows: 60 % food packaging (of which 83 % is accounted for by foodstuffs and 17 % by beverages), 30 % multi-purpose packaging and 10 % metal closures and accessories.

Tinplate, blackplate and aluminium are the three principal raw materials used in the manufacture of light metal packaging. Tinplate is cold-rolled steel sheets less than 0.5 mm thick and coated on both sides with a thin (3g/m<sup>2</sup>) film of tin. It is used principally in light metal packaging. Some 95 % of annual tinplate production (which is to say, approximately 11 million tonnes world-wide) is used by this sector. Among the various properties which make it especially useful for the light metal packaging industry are: high mechanical strength, susceptibility to decoration (it accepts print readily), and the fact that a vast range of products can be packaged using this material; notably food, chemical and pharmaceutical products.

Blackplate, usually referred to as tin-free steel, is a steel substrate coated with a chrome oxide compound. Although the technical properties of blackplate are inferior to those of tinplate, it has been widely used in recent years to manufacture products to less exacting specifications. Typical examples include: can bases and lids, bottle caps, and so on. The principal

factor in its favour is that it is approximately 10 % cheaper than tinplate.

Aluminium is the third most popular base material for light metal packaging. Currently, around 10 % of world aluminium production is earmarked for the packaging sector. Major uses include: dishes, small food cans for fish and meat, flexible tubing, can lids and beverage cans. However, use of aluminium for light metal packaging varies significantly by region. Aluminium accounts for 95 % of can packaging for drinks in the USA market (with tinplate accounting for a modest 5 %), about 40 % in the United Kingdom, but only 15 % in Germany.

Consumption of tinplate accounts for 51 % in the conditioning of food and drinks, while blackplate and aluminium account for 40 % and 9 %, respectively. Overall, some 18 % of packaging needs are accounted for by aluminium. In 1993, consumption of tinplate and blackplate totalled 3.4 million tonnes and 500 000 tonnes for aluminium.

Changes in the relative cost of tinplate and aluminium largely dictate the use of these two materials in the metal packaging sector. Although the price ratio between tinplate and aluminium may have evolved, in favour of the former during the past decade, some unsettling movements in tinplate prices over the past year, if they persist, could well change this balance. At the same time, aluminium has not escaped the overall increase of raw material prices either, which have set in since the third quarter of 1993. Over the long term, however, one can observe a slight move towards increased use of aluminium for some types of cans. This is highlighted by a 40 % jump in aluminium consumption in 1993.

Packaging manufacturers, particularly in the food sector, rarely limit themselves to a single technology or a single type of packaging material. For example, the leading world-wide groups each use a broad range of materials. Hence, they are an important factor in the development of materials they will use in the future.

## INDUSTRY STRUCTURE

### Companies

All EU Member States are involved in the light metal packaging sector in varying degrees. The four largest producers are the United Kingdom, Germany, France and Italy, together accounting for 74 % of total EU output, which currently equals two-thirds of US output.

The light metal packaging sector is relatively concentrated within the EU. Its structure is based on large groups that manufacture predominantly standardised products and small to medium-sized firms that specialise in customised products. Standardised products (those mass-produced on highly-automated production lines) are manufactured by a small number of large companies in each country. This is particularly true with respect to standard-size food and beverage cans, caps, and so on.

Several factors impact on concentration within the sector, not least of which is the capital investment implicit in large-scale production. For example, a modern beverage can production line requires an initial outlay of up to 40 million ECU. There is also the problem of access to advanced technologies. The trend towards mergers at the level of major industry clients, such as food processing groups and brewers, has also affected the structure of the light metal packaging sector. Finally, economies of scale, implicit in mass-production, are a factor in increased concentration.

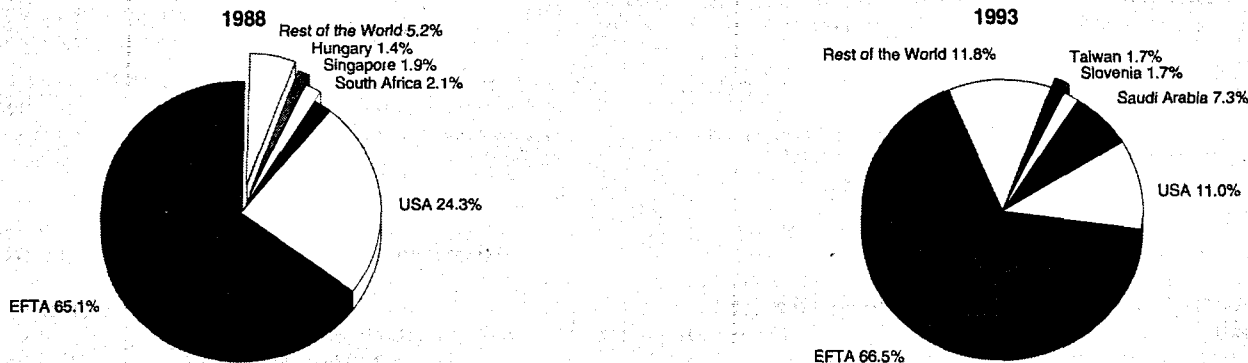
Merger and acquisition activity, joint ventures and cooperation agreements between firms are becoming increasingly common. As a result, beverage can production is now largely concentrated in the hands of five European manufacturers. These manufacturers, which are also the five major industrial groups dominating the light metal packaging sector in the EU are: Pechiney (F); Carnaud-Metalbox (F-UK); VIAG, Continental Can Europe (D); Crown Cork Cy (USA); and PLM (S). However, the fact that CMB, the market leader, only has 6 % of the market (according to Marketline, a market research bureau) clearly indicates how much the European market is still fragmented.

Customised products are manufactured in smaller quantities and for more limited markets. Customisation frequently relates to the shape of the packaging (conical or irregular shapes), non-standard sizes (outsize or mini-capacity packages), or product-specific decorative effects. Typically, such customised packaging is produced by small or medium-sized firms employing 20 to 200 people. General-line cans, where product variety and limited volume require optimal production flexibility, are manufactured principally by companies in this category.

### Impact of the Single Market

The Internal Market programme, and especially the environmental policies of the EU, have had an impact on the industry: the free movement of goods and the enlargement of the market have facilitated trade and stimulated competition within the

Figure 3: Light metal packaging  
Origin of EU imports



Source: Eurostat

**Table 5: Light metal packaging  
Industry structure, 1993**

	Number of manufacturers	Employment	Tin plate Consumption	Aluminium
EU (1)	292	47 635	3 387	497
Belgique/België, Luxembourg	9	1 857	167	9
Danmark	13	1 540	95	5
BR Deutschland	53	10 650	674	213
Hellas	9	3 005	199	2
España	70	5 580	357	19
France	36	8 226	577	28
Italia	50	4 860	561	44
Nederland	15	2 000	93	21
United Kingdom, Ireland	37	9 917	664	156

(1) Excluding Portugal.  
Source: SEFEL

sector, whereas the environmental and recycling policies have impacted competition between different packaging materials. The EU Directive on packaging is thus highly relevant to the sector. In the different Member States, however, national regulations remain which complicate trade and in some cases constitute new internal barriers. The removal of these barriers should have the highest priority.

### REGIONAL DISTRIBUTION

The geographical spread of companies in the sector is largely determined by the nature of the products they manufacture.

Metal packaging offers the benefits of a comparatively low unit value (the sale price of a standard food or beverage can is currently around 0.1 ECU) combined with large volume. As packaging requires significant space in transporting for small unit values, large-scale exporting or long-distance delivery is not very profitable. In practical terms, the maximum sales radius, within which a firm can deliver its products on a competitive basis (taking account of transportation costs), is approximately 300 kilometres. It is for this reason that firms are so widely dispersed throughout every region of the EU. It is also for this reason that food can manufacturers are typically located in predominantly farming regions and general line can manufacturers in industrial areas. However, large multinational groups of manufacturers achieve wider market networks by buying up local producers and rationalising their respective product ranges.

### ENVIRONMENT

In volume terms, packaging accounts for nearly one-third of the 100 million tonnes of waste generated by EU households. However, metal packaging waste represents only a small part. By weight, all metal containers account for less than 2 % of household waste, with drink cans accounting for less than 0.5 %. Nevertheless, environmental problems, together with increasing pressure from certain substitute materials, are major challenges for the sector.

In recent years, the EU and most national governments have set up environmental policies which focus on packaging waste. These policies have two aims: to increase the proportion of recyclable packaging by discouraging the sale of large quantities of non-returnable packaging; and, to promote new forms of environment-friendly recycling. These priorities have been supported by a series of rules and regulations, including a Directive on the packaging of food liquids dated June 27, 1985.

A proposed new Directive, covering the packaging industry as a whole, was approved by the European Commission on 15 July 1992, and was formally voted on by the European Parliament on 16 November 1994. This new Directive aims at promoting substantial reductions in the total volume of packaging on the market and stepping up requirements relating to the re-use and recycling of all types of packaging. As several countries are stepping up efforts to develop their own solutions for limiting the packaging waste stream, the European Commission and its Member States recognise an increased need to stop the proliferation of national initiatives, which risk having a negative impact upon the environment and trade. Member States and the industry, therefore, welcomed the passing of this Directive. In the long term, 90 % of all packaging used in the EU marketplace will be required to be re-usable and/or recyclable.

The recovery rate of metal packaging waste in EU Member States is already relatively high, around 20-30 % on average, but it should increase substantially as the new Directive takes effect.

In this respect, the metal packaging industry is well placed to comply with future EU legislative requirements because it represents a packaging process which is ecologically sound and capable of reducing waste to a minimum. Advantages of the Directive for the light metal packaging industry include:

- the raw materials used are in plentiful supply and will remain so for the foreseeable future;
- in the case of tinplate in particular, process, recycling and transport-related energy consumption is modest by comparison with other materials; and
- elimination of downstream consumer waste is relatively simple to achieve, given that the packaging material can be selectively recovered and recycled without difficulty.

Steel substrate-based packaging has a salient advantage in that it can be separated and recovered by magnetic means. This also means steel packaging materials can be recovered even from non-separated domestic waste or after incineration.

As a non-magnetic material, aluminium does not offer this advantage. On the other hand, its high residual value constitutes a major incentive to selective recovery and recycling, an operation that requires only one-twentieth of the energy required for primary smelting. After recovery, both aluminium and steel are readily reprocessed by raw materials producers to derive new products, which exhibit no quality loss.

As mentioned earlier, several EU Member States, such as Denmark, Belgium and Germany intend to or have already introduced relatively stringent regulations. For example, in

Denmark, refillable bottles are mandatory for domestic production of carbonated soft drinks, implying an absolute ban on beverage cans. In Germany, the Töpfer Packaging Ordinance makes distributors responsible for re-use and recycling of packaging outside the public waste disposal system. These obligations are waived, however, for manufacturers and distributors taking part in a "Dual System" organisation, which collects, sorts and passes on used sales packaging free of charge for recycling. All collection and sorting costs are financed through the use of an onpack "Green Spot" symbol. Metal packaging manufacturers also participate in this scheme. The Ordinance also fixed some collection targets (e.g. 40 % of tinplate and 30 % of aluminium from January 1993, and 80 % of all materials from July 1995) and recycling rate targets (e.g. 65 % for tinplate in 1993 and 90 % in 1995).

In 1993, a voluntary agreement was signed in France requiring manufacturers and importers to take responsibility for the recovery of packaging waste from households. As a result, service organisations such as Eco Emballage, ADELPHÉ (Wines and spirits packaging) and CYCLAMED (pharmaceutical packaging) have been set up to carry out the disposal obligations on behalf of the manufacturers and importers. In July 1994, a new decree on industrial and commercial packaging was adopted. Metal packaging will have to comply with this regulation from July 1995 onwards. Likewise, the Dutch industry and public authorities concluded a voluntary agreement known as the "Covenant."

In Belgium, the national government introduced the Eco-tax law imposing environmental taxation on beverage containers. The three regional authorities intend to conclude an inter-regional cooperation agreement, in anticipation of which, the service organisation Fost Plus was founded.

There are also grounds for optimism when one considers the situation in certain non-EU countries. In the USA, for example, more than 60 % of beverage cans are now recovered and recycled. In order to improve the present recycling rates in the EU, 22 international mass-market manufacturing and user firms, including several producers of light metal packaging, have decided to pool their efforts within the framework of an umbrella group known as the European Recovery and Recycling Association (ERRA) to develop and promote ecologically-sound and commercially cost-effective solutions to the problem of waste processing.

## OUTLOOK

A diverging pattern of demand in various user sectors combined with increased competitive pressures exerted by plastic packaging across a broad spectrum of applications will act as a brake on output over the coming years in the light metal packaging sector. Output in 1994 is likely to improve as the economic climate improves and a pick-up in consumer spending is realised. For 1995 and 1996, output could increase again by 2-3 % each year, provided, the overall economic situation continues to recover in Europe. Yet, as new plants are being set up in some central European countries, it is not excluded that output growth in the EU could be hampered to some degree.

Certain market subsectors will outperform others. The food can industry seems poised on the threshold of a growth period and there is no indication that conventional food cans will be substituted by another type of packaging in the medium term. The pet food sector is currently expanding at 6 % to 10 % per year and exhibits solid prospects for the years ahead. The total market for all beverage cans is projected to increase by close to 20 % between 1991 and 1995, with metal cans predicted to increase substantially their current 15 % share of this market. Nevertheless, certain EU manufacturers have over-reacted to this potential demand and committed substantial investment into the industry, which could lead to an excess of production capacity in certain regions of the EU. Packaging for miscellaneous applications (such as paints and detergents) should, at best, maintain its current position.

In addition to these specific market developments, there will be significant progress, in the next few years, in terms of product quality and production line yields. These forecasts are based on a variety of factors, including: the development of new materials; the progressive ability to reduce the thickness and quantity of metal substrate, as the quality of protective coatings improves; the use of laser welds; the rationalisation of production through the application of stricter standards; the introduction of more sophisticated printing techniques, which enable packaging to play a more effective role in product promotion; and, steady increases in productivity.

Overall, the tendency towards increased concentration, both within the EU and world-wide, seems set to continue in the years ahead.

Written by: SEFEL

This industry is represented at the EU level by: European Secretariat of Manufacturers of Light Metal Packaging (SEFEL). Address: Rue des Drapiers 21, B-1050 Brussels; tel: (32 2) 510 2311; fax (32 2) 510 2301.



# Steel drums

## NACE 316.41

The steel drum has been around for a long time and in that time both the container and those who use it have had to adjust to meet prevailing circumstances. The concept of the steel drum might be a hundred years old, but the technology to achieve its current high performance has to be "state-of-the-art".

During its evolution and particularly during recent years, the steel drum has had to adapt to changes in legislation, covering both its performance and its suitability for re-use and recycling.

### INDUSTRY PROFILE

#### Description of the sector

The term "heavy metal packaging" as listed under NACE 316.41 is unclear and may cause confusion if the words are inverted during translation into different languages such as English or German.

This designation was probably adopted by the authors of NACE by analogy with "light metal packaging", but as an easy solution it would have been more correct to describe the products in this sector as industrial metal packaging.

In fact they are simply steel drums which are officially defined at European and world level by the competent authorities of the European Union (Combined Nomenclature), the UN, the European Committee for Standardisation and ISO as follows: "drums, casks, barrels and cans having a capacity not exceeding 300 litres, manufactured from cold sheet steel having a thickness equal to or greater than 0.5 mm".

The industry within this sector produces steel drums having a capacity of 18-250 litres, and the determining factor which separates it from the light metal packaging sector is the 0.5 mm thickness of the steel sheet used for their manufacture.

The commonest packaging units in this sector are steel drums of a capacity of 210 or 216.5 litres (55 USG) which are covered by the European Standards laid down by the European Committee for Standardisation. They are supplied with either full aperture (with lid) or partial aperture (with bung) for the packaging of dangerous or non-dangerous solids or liquids.

#### Recent trends

Turnover in the European steel drum sector is thought to be about 750 million ECU, and the annual consumption of cold-rolled laminated steel is approximately 850 000 tonnes. Most of this raw material is used for the production of 40-42 million steel drums with a capacity of 18-250 litres.

After a drop in demand in 1992 and 1993, partly as the result of the general recession and partly because of competition from other types of packaging, the most recent data indicate an upward trend which began in the first half of 1994.

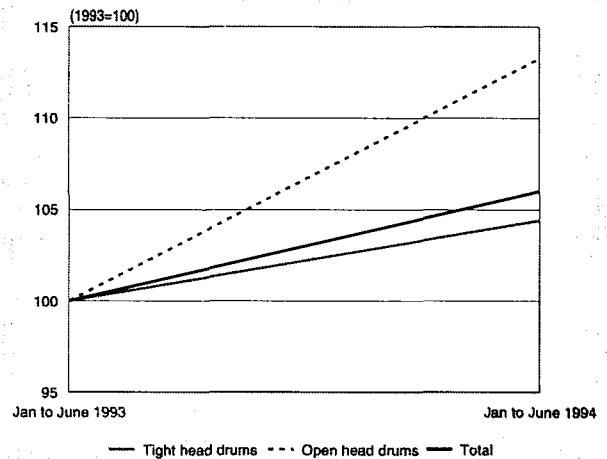
This encouraging development has been confirmed by the incomplete data already available for the second half of 1994: in comparison with 1993, production in 1994 appears to have gone up by 5 % to 6 %, with a larger increase for full aperture steel drums.

### MARKET FORCES

#### Demand

Steel drums are used principally for the transport of chemical and petrochemical products (mineral oils, lubricants, paints

Figure 1: Steel drums  
Development of production



Source: SEFA

and varnishes etc.) and agri-foodstuffs. Recently, following the evolution of demand, the industry has also started the production of higher value added products (such as stainless drums for beer).

Because of their volume, large empty steel drums are hardly ever supplied for filling at distances in excess of 300 or 400 kilometres. It follows that they are manufactured at a large number of production plants located throughout Europe.

After filling, steel drums are used to carry products throughout Europe and the rest of the world. They meet the requirements of transport regulations and are approved in accordance with a large number of certification systems, which means they can be used on all continents.

It has been estimated that, every year, some 40 million tonnes of products are transported in this way by air, land and sea.

#### Impact of the Single Market

The sector has been particularly affected by environmental legislation. The proposed measures inevitably lead to industry-wide technical improvements which, in conjunction with rationalisation efforts imposed by business trends, resulted in productivity gains and leaner corporate structures.

Due to freight rates, empty steel drums usually do not travel distances over 300-400 kilometres. They are manufactured in strategically located production units throughout Europe. The creation of the Single European market did not, therefore, have major consequences on this regional oriented industry, the more so since the most common packaging units in this sector are standardised to a large extent in Europe and at world level. In addition, packaging produced by the sector is submitted to stringent performance tests imposed by the United Nations, so that the role of the EU is of minor importance in this field.

On the other hand, however, exchange rate fluctuations and the distortion of competition originating in countries with lower labour costs are of concern to the sector, which favours stable currencies for its international contracts and harmonised social legislation to eliminate unfair competition.

### ENVIRONMENT

Steel is a 100 % recoverable material which complies with the requirements relating to economy and usage of natural resources. The strength of steel and the existence of an in-



dustrial reconditioning infrastructure also mean that steel drums can be reused.

Millions of steel drums are reconditioned, restored or recycled in Europe every year and the necessary arrangements have either already been made or are in the process of investigation to improve systems for collection, reconditioning and recycling.

The European sector has established contacts with the steel drum industry in the USA and Japan with a view to manufacturing to universal standards, which will permit the reconditioning and reuse of steel drums throughout the world.

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## OUTLOOK

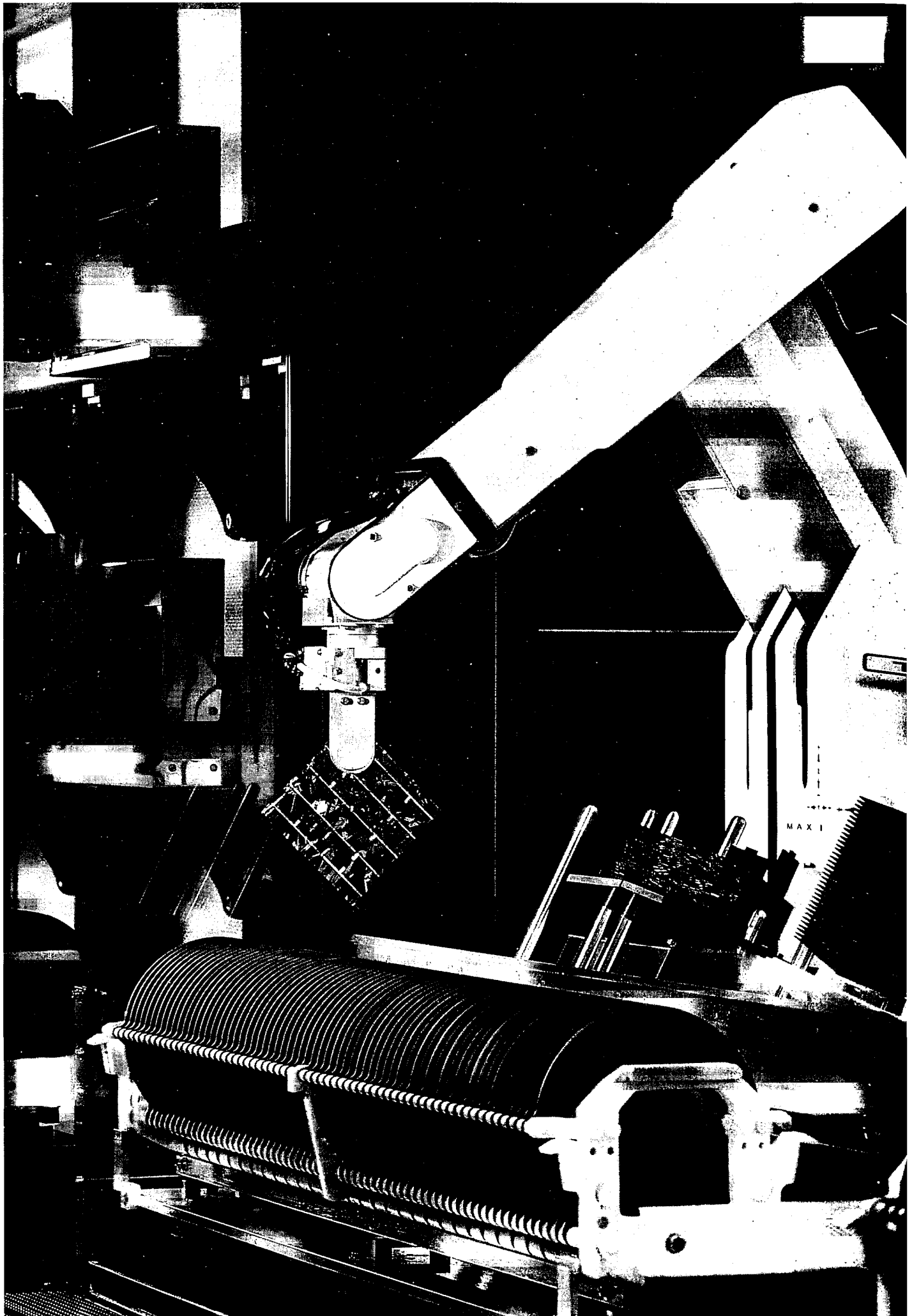
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Even though it is a traditional type of packaging, the steel drum is continually being developed to meet technical and ecological demands. Efforts made to this end require a high level of investment and greater cooperation among all those involved in the life cycle of packaging in this sector.

Written by: SEFA

The industry is represented at the EU level by: European Association of New Steel Drum Manufacturers (SEFA). Address: Boulevard du Souverain 53/17, B-1160 Brussels; tel: (32 2) 673 2447; fax: (32 2) 673 0083.





## Overview NACE 32

The mechanical engineering sector supplies almost exclusively capital goods and their components. Consequently, its performance is strongly dependent on cyclical fluctuations in the propensity to invest. Currently, the sector is receiving momentum from the diffusion of computer-aided machinery, the growing demand for environmental technology and an increasing service content in the products offered. As a supplier of advanced production technology, mechanical engineering holds a key position within the manufacturing sector of the European Union. The performance of its products determine the potential of productivity growth and quality enhancement in all manufacturing sectors. Mechanical engineering is therefore at the base of industrial competitiveness in the European Union. The mechanical engineering industry in the European Union has so far been able to maintain its leading international position. However, in the field of standardised machines and components it is facing severe price competition from East European and Asian producers.

### INDUSTRY PROFILE

#### Description of the sector

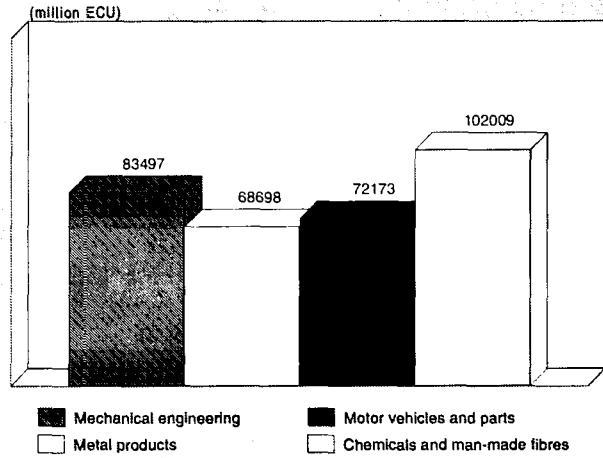
The mechanical engineering industry fulfils an essential role in the economy as supplier of capital goods. It supplies production equipment to all sectors of the economy. Its product range extends from miniaturised precision components to complete production plants. These products all embody highvalue technology, although, with a few exceptions, they are not considered to belong to the so-called leading-edge technologies. The sector is nevertheless very innovative in the integration of micro-electronics, optics and sensor technology in mechanical applications.

The standalone machine has lost its position at the centre of the product range to integrated machinery systems incorporating state-of-the-art information technology. To operate these systems customers increasingly need services such as advice, training, maintenance and special software. Most machinery manufacturers therefore also supply product-related services, which already make up more than one tenth of total turnover in the sector.

Many client firms demand customised solutions. To serve these demands manufacturers are forced to abandon the mass-production of standardised items and to adopt a high degree of specialisation. This promotes the international division of labour and offers good opportunities to small and medium-sized enterprises.

Mechanical engineering is one of the leading manufacturing sectors in the EU, contributing 8 % of total industrial output. The industry is concentrated in Germany, which accounts for 49 % of the net product of the mechanical engineering sector in the EU in 1993. The other important producers are the United Kingdom (with a share of 15 % of EU production), Italy (13 %) and France (10 %). Behind them comes a group of countries with shares of between 2 and 3 %, including Spain, the Netherlands, Denmark and Belgium. The entry of Finland, Austria and Sweden has added almost 10 % to machinery production in the EU.

Figure 1: Mechanical engineering Value added in comparison with related industries, 1993



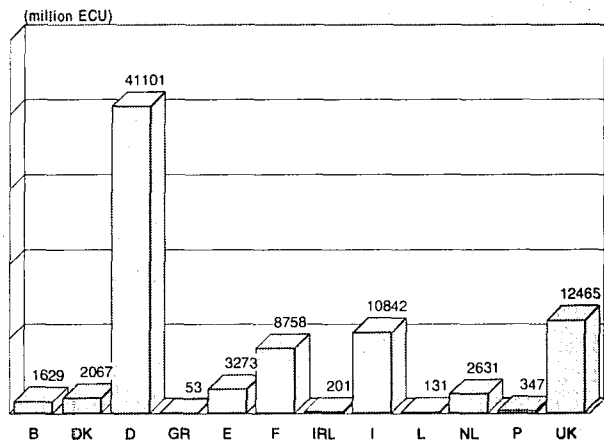
Source: DEBA

#### Recent trends

The mechanical engineering industry experiences much wider cyclical fluctuations than most other industries. This is a consequence of its strong dependence on investment activity, which is highly sensitive to overall economic conditions. This applies in particular to industrial investment in equipment, which is the outlet, directly or indirectly, of most mechanical engineering products. This relation underlies the evolution of the mechanical engineering sector in recent years.

The large investment wave between 1988 and 1990 caused machinery manufacture in the EU to surge. In contrast, the subsequent three years 1991-1993 were marked by a sharp reduction of investment activity, and the demand for machinery fell drastically. Production was cut back and the growth achieved during the preceding boom was largely lost. The

Figure 2: Mechanical engineering Value added by Member State, 1993



Source: DEBA



**Table 1: Mechanical engineering  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	110 782	151 501	175 176	190 546	191 665	185 587	166 397	170 924	184 240	200 700	216 260
Production	144 400	183 580	210 809	227 371	227 087	222 130	210 722	218 411	233 800	253 200	271 500
Extra-EU exports	49 040	56 600	64 607	68 358	68 388	68 946	75 143	82 160	87 800	95 100	102 200
Trade balance	33 619	32 079	35 634	36 825	35 422	36 543	44 325	47 487	49 560	52 500	55 240
Employment (thousands)	2 314	2 284	2 359	2 426	2 380	2 268	2 106	1 980	1 970	1 990	1 990

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Mechanical engineering  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.27	-3.68	0.66	-6.65
Production	3.56	-3.12	0.54	-6.15
Extra-EU exports	0.14	-0.01	0.07	-1.47
Extra-EU imports	0.00	0.39	0.18	1.27

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Mechanical engineering  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	49 040	55 874	55 204	53 081	56 600	64 607	68 358	68 388	68 946	75 143	82 160
Extra-EU imports	15 422	18 977	19 426	20 721	24 521	28 974	31 533	32 966	32 403	30 818	34 673
Trade balance	33 619	36 896	35 779	32 360	32 079	35 634	36 825	35 422	36 543	44 325	47 487
Ratio exports / imports	3.18	2.94	2.84	2.56	2.31	2.23	2.17	2.07	2.13	2.44	2.37
Terms of trade index	150.2	139.3	133.9	120.4	108.0	104.6	100.0	96.3	98.7	116.2	N/A

Source: DEBA

**Table 4: Mechanical engineering  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	85.2	90.0	88.8	88.1	93.8	99.6	100.0	97.9	97.2	98.3
Unit labour costs index (3)	83.4	84.3	90.8	95.8	94.7	94.7	100.0	109.9	116.6	118.4
Total unit costs index (4)	78.5	81.5	86.6	88.4	91.0	95.3	100.0	104.8	108.7	110.5
Gross operating rate (%) (5)	8.72	9.40	8.20	8.65	9.48	9.74	8.92	7.83	7.12	6.72

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

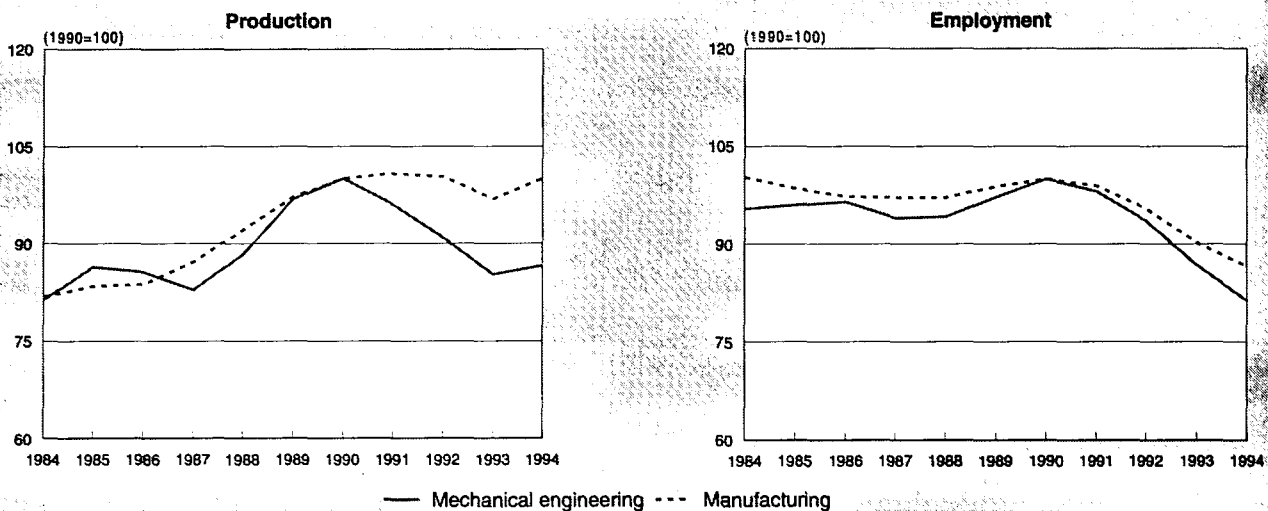
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Mechanical engineering  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

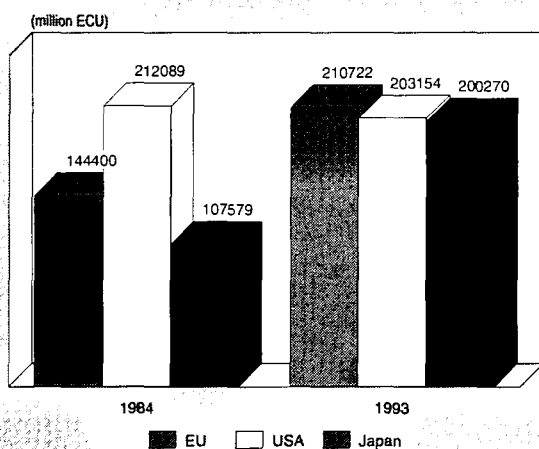
segments supplying standard components were particularly hurt, because downward adjustments of the stocks of components reinforced the impact of the decline of equipment demand. The machine tool industry also experienced an excessively sharp drop in demand, not only because it supplies equipment to the capital goods industry, which itself suffered from the decline of equipment demand by the industry at large, but also because it was affected by the worldwide decline in armaments production. The sharp drop of production and thus revenues forced manufacturers to reduce the workforce drastically. Between 1990 and 1993 about 320 000 mechanical engineering jobs in the EU disappeared. This figure does not include job losses in East Germany, where structural changes were accompanied by the loss of another 350 000 jobs in the same period.

Investment activity outside Europe recovered in 1993, giving machinery manufacturers in the EU the opportunity to increase sales to nonEU countries. However, extra-EU exports only partly compensated for lost sales within the EU. The protracted

economic downturn in Western Europe finally ended in early 1994, with the result that the volume of orders received by machinery manufacturers started to increase. In the first phase, the recovery of demand was mainly fuelled by rebuilding of stocks, and benefited component suppliers. Soon afterwards investment in equipment also picked up. In the course of 1994 the recovery of the mechanical engineering sector accelerated and exceeded predictions from earlier in the year. Job losses, however, did not show any slow-down until the end of the year. In 1994 another 130 000 jobs disappeared.

The strong growth of orders in early 1994 was followed by production only after an unusually long delay. This observation applies in particular to Germany. Two reasons can be cited. Firstly, a very high proportion of the orders related to large-scale plants, which require long lead times. Secondly, as demand recovered in the course of 1994 the drastic workforce reduction in the preceding recession created bottlenecks, particularly with suppliers, which prevented prompt completion of orders. These problems are temporary, related to the transition from recession to recovery. Production and employment are therefore expected to follow soon the growth in orders.

**Figure 4: Mechanical engineering  
International comparison of production in current prices**



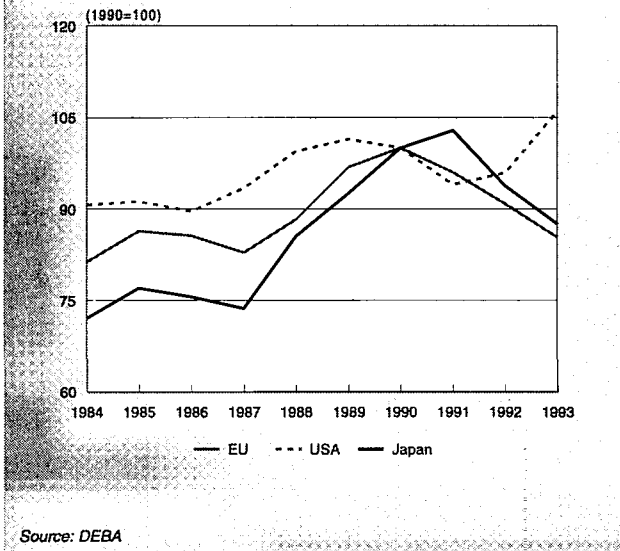
Source: DEBA

**International comparison**

The EU, the USA and Japan are the world's three largest machinery markets. In 1993 the market volume was about equal in the three regions. In 1994 machinery demand in the USA, where economic recovery had already started in 1992 and investment activity was strong, pulled ahead of that in the EU and Japan, where the recession had barely ended. These divergent demand evolutions caused a further deterioration of the persistent US trade deficit in machinery, whilst the EU and, in particular, Japan, were able to increase their export surplus.

Machinery production mimics the evolution of demand. The US machinery industry emerged earlier from the recession than its counterparts in the EU and Japan. The recession in the USA was also smaller. Whereas US production fell by 7 % in 1990 and 1991, production in the EU dropped by 15 % between 1991 and 1993, and in Japan by 17 % between 1992 and 1994. Not until Japan had as last pulled out of recession in early 1995 did the production of machinery increase in all three Triad regions, and this for the first time since 1989.

**Figure 5: Mechanical engineering  
International comparison of production in constant prices**



### Foreign trade

Divergent economic conditions between Western Europe and the rest of the world have determined the trade performance of the EU in machinery. Whilst exports to nonEU countries showed a strong growth in the period 1992-1994, extra-EU imports shrank in 1992 and 1993. They recovered in 1994, but their growth remained far behind that of extra-EU exports. As a result the EU trade surplus in machinery increased, after having stagnated since the mid-eighties. Exports represented almost 36 % of EU machinery production in 1993, and in 1994 the export intensity has probably increased still further. This ratio is much higher than the corresponding figures for Japan and the USA, which in 1993 were respectively 25 % and 16 %.

The loss of sales in the EU by nonEU countries does not indicate a deterioration of their competitive position, but is the result of the low investment activity within the EU. NonEU countries have maintained their share of machinery sales in the EU. In 1993 extra-EU imports reached more than 18 % of sales, compared to under 14 % in 1984. EFTA countries hold the strongest position, with a market share of 7 % in

1993, ahead of the USA with about 6 % and Japan with 3 %. Machinery trade between Member States has also intensified in the last decade. Between 1984 and 1992 the share of intra-EU imports in machinery sales in the EU went up from 27 % to 33 %. There are indications that this trend has continued in 1993 and 1994, although accurate data are not yet available.

Divergent economic trends in the various regions of the world have also affected EU machinery exports to nonEU destinations. The Europe-wide recession hit the EFTA countries simultaneously with the EU, and produced a similar slump of investment activity. As a result the EFTA was overtaken by the USA as the biggest export market for the EU mechanical engineering sector. Japan, where imports account for only some 5 % of the supply of machinery, has never been an important export market. Its importance has declined even further in recent years due to the recession. However, other countries in the Far East have gained importance. These include China, South Korea, Hong Kong, Taiwan and Singapore, which together already accounted for 9 % of extra-EU exports in 1993. Markets in the Far East continue to be dominated by Japanese machinery manufacturers, but the enormous appreciation of the yen has seriously hurt their ability to compete. EU machinery exporters have benefited and in recent years have consistently improved their position in Far East machinery markets, which are the world's fastest growing. Finally, EU exports to Latin America have also increased, without, however, attaining the level of the early eighties.

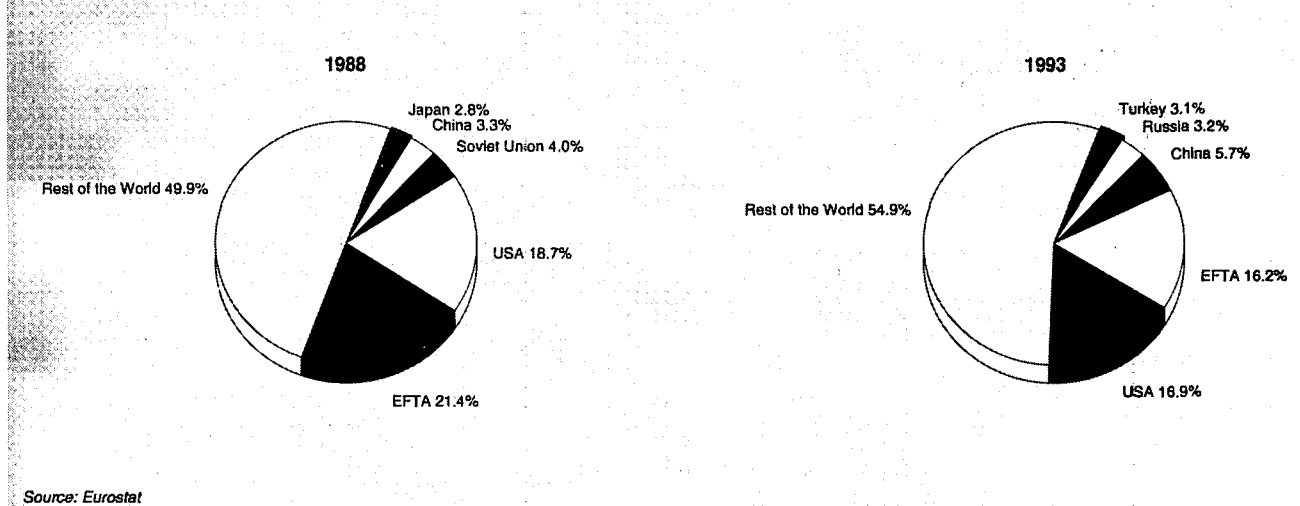
### MARKET FORCES

#### Demand

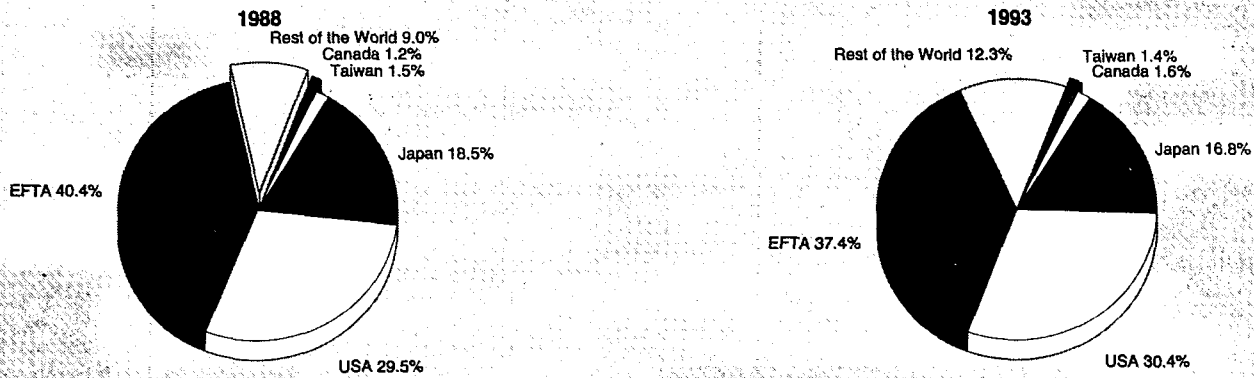
Well over half the output manufactured by the mechanical engineering industry consists of finished capital goods. The remainder predominantly consists of unfinished goods to be built into capital goods. This includes not only components such as drive units, but also turbines for ships, or even entire industrial furnaces to be installed in a cement works. Only a few of these unfinished goods are built into consumer durables, e.g. roller bearings in domestic washing machines. Finished consumer goods are an exception in product range of the mechanical engineering industry, e.g. domestic sewing machines.

Attempts to provide a more detailed description of the segments of the mechanical engineering sector than the one presented above encounters problems of insufficient statistical data. A breakdown of domestic sales by customer sector of

**Figure 6: Mechanical engineering  
Destination of EU exports**



**Figure 7: Mechanical engineering  
Origin of EU imports**



Source: Eurostat

the German mechanical engineering industry can be made using the inputoutput tables constructed by the Statistisches Bundesamt (Federal Office of Statistics) and the investment calculations of the IfoInstitut. 70 % of the production of the mechanical engineering sector is delivered to the manufacturing industry, 4 % to energy and water utilities, 4 % to agriculture and forestry, and 4 % to the construction industry. The service sector has substantially increased its consumption of mechanical engineering products in recent years and now takes up 14 % of production. Within the manufacturing industry, mechanical engineering is its own biggest customer because of the large share of unfinished goods in the product range, followed by vehicle manufacturing and electrical engineering. Within the service sector, commerce is the biggest customer, as logistics requires much equipment.

The high degree of dependence on investment activity implies that the demand for mechanical engineering products is characterised by strong cyclical fluctuations. Investment decisions are influenced by changes in past or anticipated capacity utilisation, evolution of earnings, cost of borrowing and overall business conditions. These factors exhibit similar evolutions

in broad areas of the economy, causing peaks and troughs in the economy as a whole and in overall investment activity. The mechanical engineering industry is therefore forced to follow the booms and recessions of the economy.

Between 1991 and 1993 investment activity and the demand for machinery were very low in the EU. Expansion investment almost disappeared, and even replacement investment was postponed. The latter created a substantial pentup demand for machinery, which fuelled the recovery of early 1994. In addition, demand receives momentum from the diffusion of computer-aided systems. As the recovery progresses, capacity expansion investments will also pick up. Demand prospects are equally favourable in the new Member States, Finland, Austria and Sweden, and also in the rest of Western Europe.

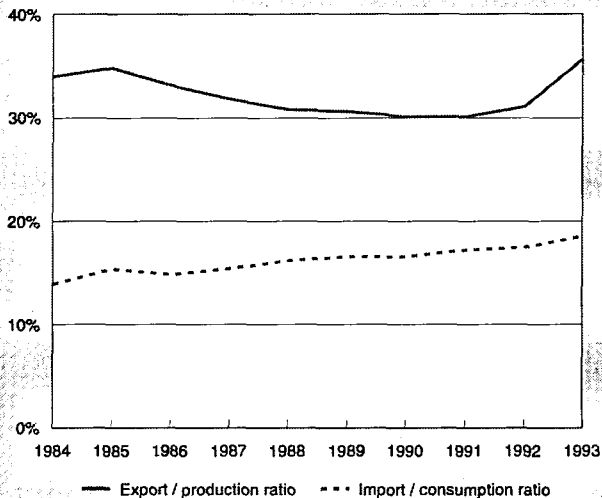
Sales opportunities in Eastern Europe have also improved. Successful restructuring efforts have created companies capable of financing the modernisation of their production apparatus. Such a modernisation is necessary if the company desires to export to Western markets, since only modern equipment can achieve products of the required quality levels. In addition the demand is fuelled by the increasing amount of direct investment by Western companies in Eastern Europe.

Outside Europe the demand for machinery recorded steady growth in 1993 and 1994, which is continuing in 1995. The highest rates of growth were achieved in North America and the emerging countries of the Far East. As Japan too has now emerged from the recession, demand will this year increase in all large machinery markets of the world.

### Supply and competition

The slump in the production of the mechanical engineering industry in the EU between 1991 and 1993 was unusually deep. The industry responded by deep cuts in capacity and workforce. The contraction was strongest among component suppliers, where downward stock adjustments reinforced the impact of the declining demand, and in the machine tool industry, where low investment activity in the automotive industry and by machinery manufacturers coincided with an almost complete absence of orders from the armaments industry. In these segments the unexpectedly brisk recovery of demand has already caused bottlenecks, which normally only occur in peak years. In addition, many machinery manufacturers complained in early 1995 of difficulties in the supply of special steels, castings and electronic components. These bottlenecks are the after-effects of a particularly deep recession, after which many companies are unable to raise production levels quickly. These initial problems will probably

**Figure 8: Mechanical engineering  
Trade intensities**



Source: DEBA

**Table 5: Mechanical engineering  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	98 795	82.4	14.6	12.1
20-99 employees	16 683	13.9	23.1	23.9
100 or more employees	4 437	3.7	62.3	64.0

(1) Estimates.  
Source: Eurostat "Enterprises in Europe"

be overcome in the course of 1995. The sector plans to increase the workforce by at least 2 % and investment by more than 10 %.

The sharp fluctuations in the production of the mechanical engineering industry are also visible in the evolution of labour productivity and unit labour cost. A declining rate of capacity utilisation, as experienced from 1991 to 1993, reduces labour productivity and increases the weight of labour costs. Presently, in a period of growth, the opposite situation occurs. The combined effects of the increasing capacity utilisation and the cost-cutting measures implemented in the recession have contributed to substantial productivity gains in 1994. In 1994 the mechanical engineering sector in the EU achieved a marked reduction in unit labour costs, and despite the expansion of output manpower costs increased only moderately. This trend will continue in 1995 and will provide the basis for lasting improvements in profits, despite increasing materials prices.

The mechanical engineering industry in the EU continues to hold a strong competitive position at the global level. Its comparatively modest growth performance in the early 1990s does not reflect a deterioration of its competitiveness, but the unfavourable demand evolution in its main markets. The competitiveness of the EU mechanical engineering industry is built on advanced technology, high quality and the ability to offer specialised solutions to the specific production problems of customers. EU producers face a continuous pressure on prices, until recently from Japanese competitors, but increasingly from producers in the emerging countries of the Far East and Eastern Europe. However, EU producers benefit from the fact that the ability of equipment to solve a production problem is a more important decision criterion than price. This is borne out by the fact that the demand for machine equipment is far less price-sensitive than for most other industrial products.

The competitiveness of the EU mechanical engineering sector depends crucially on its success in maintaining a superior level of technological expertise. Patent statistics provided by the Ifo-Institut suggest that EU machinery producers are indeed successful in this area. Of the patents for mechanical engineering products applied for in at least two countries between 1989 and 1991, EU manufacturers accounted for 43 %, the USA for 23 % and Japan for 21 %. By restricting attention to patents applied for in at least two countries, only the inventions which the applicant considers so important that he does not limit their registration to his own country are taken into account. No other major EU industry group performs so well on this measure as mechanical engineering.

The mechanical engineering industry manufactures products that combine high-quality engineering with applications from new technologies such as microelectronics, information processing, optics, sensor, laser and advanced materials. The incorporation of new technologies fuels an ongoing process of innovation, which offers machinery manufacturers frequent opportunities to gain an advantage over their competitors. In addition, established techniques are continuously improved

and made more efficient. A very important recent trend in this respect is the shift from standalone machines towards integrated machinery systems. The incorporation of high-technology applications and the spread of system solutions has increased purchaser needs for consulting advice, training, software and maintenance. Most machinery manufacturers provide these services themselves, because they regard this as an area in which they can enhance their standing and gain a competitive edge. The provision of these services requires specially-qualified personnel. The availability of a highly skilled and qualified workforce is one of the main strengths of EU companies, which distinguishes them from competitors in most nonEU countries.

The internationalisation of manufacturing constitutes a new challenge to the mechanical engineering industry in the EU. Relocation opportunities have become more numerous, principally for manufacturing processes that can be carried out at a location separate from research and development activities. In the mechanical engineering sector this is the case for standard products which are manufactured in large volumes. In contrast, in customer-oriented mechanical engineering, where practical experience in production situations is fed back to research and development, the separation and relocation of manufacturing is much more difficult. EU producers enjoy a considerable locational advantage because of the availability of a highly qualified workforce. However, the decline of transport costs increasingly allows standard components and supplies to be obtained and shipped in from lowest cost locations. Outsourcing is an important strategy to reduce the extremely high value added component in mechanical engineering as compared with other industries.

The opportunities for machinery producers in the EU to relocate their manufacturing operations have substantially expanded with the opening up of Eastern Europe, which has made lowest cost manufacturing locations available at a very short distance. Moreover, some East European countries, especially the Czech Republic, have a long tradition in mechanical engineering. In practice, however, the cost advantage of these countries has turned out to be much smaller than suggested by the huge discrepancy in labour cost. A much lower level of productivity combined with a high cost of communication and quality control severely constrain cost savings. The development of manufacturing in Eastern Europe and emerging economies elsewhere in the world will on the whole have a positive effect on the performance of the mechanical engineering industry in the EU. Although the producers in these countries are a source of additional pressure on prices, they also create a growing demand for modern production equipment which they are unable to manufacture themselves in the required diversity and quality. This demand represents a substantial market potential for machinery exports from the EU.

### Production process

Most machinery is produced in very small volumes, often a volume of only one. The very small batch sizes are necessary to meet the multiplicity of specific customer requirements.



**Table 6: Mechanical engineering  
The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Mannesmann	D	14 458	44	127.7
Linde	D	3 708	286	29.6
Thyssen Industrie	D	3 563	-11	40.9
SKF	S	3 214	141	41.4
Sandvik	S	2 396	311	26.9
Atlas Copco	S	2 081	211	17.8
Metra	FIN	1 839	157	15.4
T.I. Group	UK	1 698	237	24.0
Kloekner-Humboldt-Deutz	D	1 679	-101	11.3
Kone	FIN	1 621	132	20.7

Source: DABLE

Mechanical engineering products are usually highly complex, manufactured with precision and very expensive. To be able to supply these products manufacturers employ a high proportion of engineers and a skilled labour force. The mechanical engineering sector is a very labour intensive industry. Employee costs represent about 30 % of the production value.

Unfinished goods and components represent 60 % of production value and are largely obtained from within the sector itself. The electrical engineering sector is the second largest source of supplies. Its importance is growing because of the increasing application of microelectronics. The most important raw material for the construction of machinery is steel. However, a large fraction of steel is purchased in partly processed form, for example as castings, forgings or structural steel work.

The sector makes efficient use of computerisation in all phases of the production process, ranging from design and work preparation to manufacturing and management of stocks. Flexible manufacturing systems prevail. They have allowed to reduce the overall lead time for an order, to provide more flexible responses to individual customer requirements, and to implement ongoing quality control. Finally, information and communication technologies are also used for marketing and invoicing.

## INDUSTRY STRUCTURE

### Companies

In 1990 almost 120 000 mechanical engineering companies were active within the EU. Of this number almost 99 000 firms had fewer than 20 employees. They were primarily involved in repairs or the production of parts. Only 21 000 therefore had more than 20 employees, which is considered as the lower limit for the industrial production of complex products. However, even in this category large firms were a small minority. Only 4 400 companies employed more than 100 employees, and only 800 more than 500 employees. The total number of firms has probably declined in the recession years between 1991 and 1993, when the number of bankruptcies increased and new company registrations went down. Nevertheless, the size structure has probably remained virtually unchanged.

The distribution of firm sizes shows that the mechanical engineering industry in the EU is characterised by small and medium-sized companies. The structure of the sector results from the characteristics of the manufacturing process. Machinery equipment is, as a rule, not suitable for volume manufacturing. Consequently, there is no incentive to establish large units to achieve economies of scale. On the contrary, the high degree of specialisation required by the market often is pro-

vided better by small companies. The few large mechanical engineering companies are generally active either in standard equipment production, where economies of scale can be achieved, or in the construction of complete plants, which requires substantial human and financial resources.

Experience has shown that small and medium-sized engineering companies can respond more flexibly than large firms to the large cyclical fluctuations of demand that characterise this sector. They have lower capabilities, however, in finance, research and marketing, the latter particularly in distant markets. These disadvantages can generally be overcome through cooperation. A clear trend towards closer cooperation has emerged in the past few years, although many medium-sized companies are still reluctant to engage in such ventures.

Many of the largest companies are included in the mechanical engineering sector because of the nature of their main activity. In addition, they are engaged in other areas of industry, ranging from steelmaking to electrical engineering. The share of these companies in the total turnover of the industry is hence not entirely representative. Nevertheless, all surveys of industry concentration have shown mechanical engineering to be one of the least concentrated sectors.

### Strategies

During the recession, many machinery producers implemented cost reduction programmes. The programmes affected every part of the production organisation: slimming down of administration, development of less expensive products, rationalisation of the flow of materials, and promotion of team work. The restructuring efforts have not yet been completed, but they have already accomplished a sizeable reduction in costs.

Merger and acquisition activity increased during the recession. Some deals were part of rationalisation programmes, and combined firms whose performance had become dismal due to the recession. It remains to be seen whether the new entities will prove viable. In other cases, successful companies took the opportunity to take over struggling competitors. Overall, however, merger activity is still negligible in the mechanical engineering industry, and hence can not be interpreted as a move towards greater concentration.

During the recession the European market had lost all appeal to mechanical engineering companies due to the protracted situation of low investment activity. Instead, EU producers explored the rapidly growing machinery markets in the Far East, where their presence had formerly been negligible. The recovery in Western Europe has shifted attention back to the home market. The EU market is also gaining attractiveness owing to the expansion of the EU and the further harmonisation of technical guidelines for machinery.

## Impact of the Single Market

The mechanical engineering sector has welcomed the New Approach to technical harmonisation and standards which was a key element of the Internal Market programme. Under the New Approach, directives only lay down the essential safety or other requirements with which products put on the market must conform. The development of harmonised standards which, if adhered to, ensure compliance with the essential requirements established by the directives, is entrusted to standardisation bodies. If products are manufactured in accordance with harmonised standards, or if manufacturers can prove in any other way that the products conform to the requirements established by the relevant directives, these products enjoy free movement throughout the EU. The New Approach therefore constitutes a powerful tool to remove technical barriers and implement the Single Market. The necessary legislation to implement a unified internal market in machines is already in place. Since 1 January 1995, the Machinery Directive, the most relevant New Approach Directive for the sector, is fully in force. Nevertheless, important barriers to the movement of machines within the EU remain. These are mainly the result of problems and delays in the transposition and implementation of the New Approach Directives. The most important problem is that the national transpositions of the Machinery Directive often contain requirements differing from those in the Directive itself, and also differing across Member States. In case no harmonised standards have yet been developed, manufacturers must prove conformity with the requirements of the national transpositions. If these requirements differ, the free movement of a product throughout the EU is constrained. The mechanical engineering sector therefore considers as priorities for future action the checking by the Commission of future transpositions, and the continued development of harmonised standards.

## REGIONAL DISTRIBUTION

In all Member States the mechanical engineering industry is concentrated in particular regions. These generally coincide with historical centres of industrial activity, because machinery producers were traditionally located near their main customers. Cooperation and close contacts with industrial customers were necessary to develop machinery that met customer requirements. In Germany centres of machinery production are situated in Baden-Wuerttemberg, Bavaria, Hessen, Low Saxony and Nordrhein-Westfalen, in Italy in Lombardy and Emilia-Romagna, in the United Kingdom in the South East and the Midlands, in France in the Ile de France and the Paris Basin, and in Spain in Catalonia and the Basque Country. Modern transport and communication facilities and the international dimension of most important machinery manufacturers have eliminated the reasons for regional concentrations, but they remain as the legacy of historical development.

## ENVIRONMENT

The production of machinery usually does not cause serious environmental pollution. The noise generated by metalworking was a problem in the past, but it has been greatly reduced by modern machine tools. Cooling lubricants can be disposed of without creating pollution. Surface treatment processes such as galvanising did create pollution. Now, however, these processes are generally carried out by specialists outside the mechanical engineering sector, who operate under strict regulations to safeguard the environment. Many machinery producers have installed an environmental management system and will have their operations verified by an "EU Eco-audit. On the whole the costs of environmental protection are low in the mechanical engineering sector.

On the other hand, the mechanical engineering sector is one of the main suppliers of environmental technology. It provides

**Table 7: Mechanical engineering  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.76	0.62
Danmark	1.26	1.25
BR Deutschland	1.46	1.43
Hellas	0.12	0.09
España	0.44	0.54
France	0.67	0.68
Irland	0.25	0.21
Italia	1.11	1.11
Luxembourg	0.80	0.72
Nederland	0.56	0.71
Portugal	0.23	0.33
United Kingdom	1.00	0.92

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

the techniques for the safeguarding of soil, air and water. Furthermore, it incorporates environmental requirements in the design of its products to prevent pollution associated with their operation. Growing environmental awareness and the implementation of EU regulations will increase the demand for environmental technology, creating new development challenges for the mechanical engineering industry.

## REGULATIONS

The EU Machine Directive requires that machines placed on the EU market comply with essential health and safety requirements. This Directive applies to almost all machines and engines for commercial, industrial and private use. The manufacturer certifies his compliance with the directive by affixing the CE mark to his product. The European Commission has also appointed the European standards organisations to devise standards that, when followed, ensure compliance with the Machine Directive.

To export to nonEU countries producers must be able to deal with a large variety of special technical requirements. As the mechanical engineering sector is already geared towards meeting specific customer needs, such requirements do not normally pose significant problems. Machinery producers experience more difficulties with export controls that prevent the supply to certain countries of advanced technology or equipment that could be used in the manufacture of arms. The EU harmonisation in 1994 has brought an improvement, because it was much more straightforward than the preceding national regulations.

Except for Portugal and Greece all Member States have a substantial surplus in mechanical engineering trade with nonEU countries. For many specialists even the internal market is too small to support an adequate production volume. These facts demonstrate that EU machinery producers benefit from free world trade, and therefore do not favour restrictions on imports from other countries.

## OUTLOOK

The production of the mechanical engineering industry in the EU is expected to record a substantial increase in 1995. Investment activity has picked up throughout Western Europe and the sector can expect a growing demand for machinery in all markets. The recession has forced manufacturers to lower costs and explore new concepts, resulting in a strong level of competitiveness. They are therefore in an excellent

position to benefit from the worldwide surge in demand for machinery equipment. The recovery of the mechanical engineering industry in the EU, which began in 1994, will accelerate in 1995. The strong economic conditions will allow manufacturers to address the aftereffects of the recession. The most serious problem is the low level of profitability, which constrains investment and innovation efforts. Furthermore, in the early phase of the recovery, many small and medium-sized mechanical engineering companies encountered difficulties in obtaining bank funds to finance the orders they had received. Finally, the drastic cuts in production has created capacity bottlenecks, although new investment and hiring should soon resolve these.

The cyclical recovery of the mechanical engineering industry will continue beyond 1995, but might lose momentum after 1996. Over the long term, ignoring seasonal fluctuations, the mechanical engineering industry in the EU will remain a growth sector. EU producers benefit from unique locational advantages, which will safeguard its international competitiveness. The most important is the availability of a highly qualified workforce, which is essential in the provision of customer-oriented, tailor-made engineering solutions. The increasing internationalisation of manufacturing and the emergence of new industrial nations offer EU machinery producers more opportunities than risks.

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# Agricultural machinery

## NACE 321

1993 will be remembered in the annals of European agriculture as a hinge-year: implementation of the reform of the Common Agricultural Policy (CAP) and conclusion of the Uruguay Round of the GATT negotiations in December.

Such drastic changes in the philosophy of the European Union could only have adverse effects on farm machinery markets: the average decrease reached 9.2 % a year in real terms between 1989 and 1993. In other words, this industry sector shrunk by 38 % in volume during the period under consideration.

As the disinvestment of the European agriculture could not continue much longer without damaging its competitiveness, 1994 put a stop to the deterioration, even showing a noticeable recovery in certain sectors of activity and/or in some countries of the EU.

1995 should evidence a continuation of this tendency, albeit at a slower rate. European agriculture might again enter a zone of major turbulence as 1996 draws near due to the fact that the pluriannual commitments agreed upon within the framework of the reform in May 1992 will have to be re-negotiated.

In addition, it may be then that the first constraints resulting from the implementation of the multilateral GATT agreement of December 1993 will become apparent.

In this context it is to be reckoned that the agricultural machinery production sector as well as its markets will take a fresh downward turn at the end of 1995.

### INDUSTRY PROFILE

#### Description of the sector

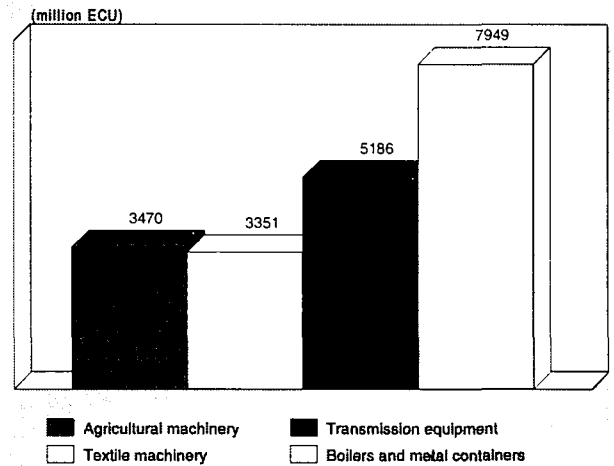
The diversity of animal and vegetable farm products as well as the different stages of processing ranging from simple cleaning to the preparation of marketable products in the vicinity of production sites have led the manufacturers of the farm machinery sector to cover a wide range of equipment totalling around 450 different types of machines manufactured in Europe alone. The main machines produced are: agricultural and forestry tractors; motor cultivators, motor hoes and motor mowers; machines and implements for soil preparation and soil working; machines and implements for sowing, planting and distributing fertilizers; machines and implements for crop and root harvesting; machines and implements for crop protection or irrigation; machines and implements for cleaning, grading or treating farm products; dairy and cattle-breeding equipment; forestry machinery; transport equipment; storage equipment; lawnmowers; other agricultural and horticultural machines and implements.

The extreme diversity of the equipment offered enables a large number of small and medium-sized companies, which are often specialised in the manufacture of a single type of machine or a range of agricultural machines used in a specific agricultural area of production, to exist side by side with a small number of large multinational or international companies which essentially manufacture tractors and self-propelled harvesting machines.

The sector of agricultural and horticultural machinery and tractors is one of the most important of the European mechanical engineering industry, representing 5 % of the total production.

Germany, with 35 % of the total added value, is the largest producer of agricultural machinery in the EU, followed by France (18 %), Italy (16 %) and the United Kingdom (9 %).

**Figure 1: Agricultural machinery**  
Value added in comparison with related industries, 1993



Source: DEBA

The other countries represent approximately 21 % of the total EU added value.

#### Recent trends

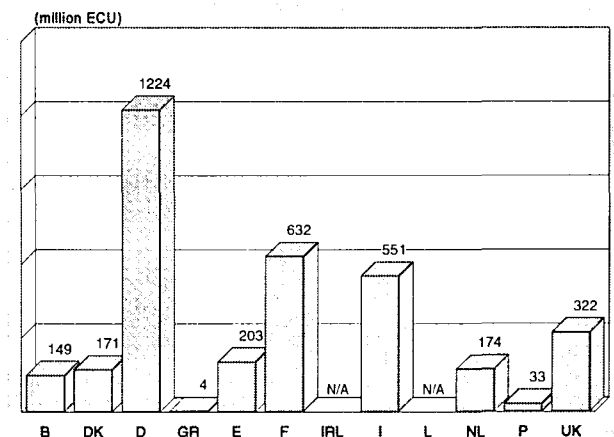
The situation of the sector, which had substantially deteriorated between 1989 and 1993, not only in terms of production (-32 % in volume) but also in terms of market size (-38 % in volume) recovered in 1994.

The European production of agricultural machinery appears to have risen by 9.5 % in volume against 1993, whilst at the same time the EU market showed a 10.3 % increase in real terms.

#### International comparison

In 1993, production of agricultural machinery reached practically identical levels in the USA and the EU (i.e. 11 billion ECU). Compared to 1984, there has been a decline in production both in the EU and the USA: from 1990 onwards,

**Figure 2: Agricultural machinery**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Agricultural machinery**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	10 990	12 281	12 288	12 255	10 652	10 912	9 474	10 257	10 680	11 180	11 680
Production	13 371	13 883	14 093	14 312	12 480	12 340	11 038	12 051	12 400	12 900	13 300
Extra-EU exports	3 062	2 613	2 990	3 146	2 998	2 649	2 820	3 206	3 300	3 400	3 500
Trade balance	2 382	1 602	1 805	2 057	1 828	1 429	1 564	1 793	1 720	1 720	1 620
Employment (thousands)	183.6	149.5	136.0	137.8	128.7	122.8	110.0	101.9	99.0	97.0	94.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA/

**Table 2: Agricultural machinery**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-1.81	-9.20	-5.17	-14.36
Production	-2.69	-8.52	-5.33	-11.39
Extra-EU exports	-3.31	-3.39	-3.34	3.54
Extra-EU imports	7.71	-2.03	3.27	-4.12

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Agricultural machinery**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 062	3 131	2 621	2 394	2 613	2 990	3 146	2 998	2 649	2 820	3 206
Extra-EU imports	680	661	690	758	1 011	1 185	1 088	1 170	1 221	1 256	1 413
Trade balance	2 382	2 470	1 931	1 635	1 602	1 805	2 057	1 828	1 429	1 564	1 793
Ratio exports / imports	4.50	4.74	3.80	3.16	2.58	2.52	2.89	2.56	2.17	2.25	2.27
Terms of trade index	100.4	95.4	98.6	101.6	100.7	96.5	100.0	95.3	94.8	90.8	N/A

Source: DEBA

**Table 4: Agricultural machinery**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	88.0	91.6	83.4	85.5	97.0	103.6	100.0	90.1	90.7	89.7
Unit labour costs index (3)	84.1	85.3	99.3	100.8	95.1	90.4	100.0	116.3	122.0	124.2
Total unit costs index (4)	77.5	81.2	87.8	89.2	90.6	95.7	100.0	105.0	109.0	111.1
Gross operating rate (%) (5)	8.02	7.30	4.95	5.05	7.18	6.88	5.48	3.58	3.44	3.15

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

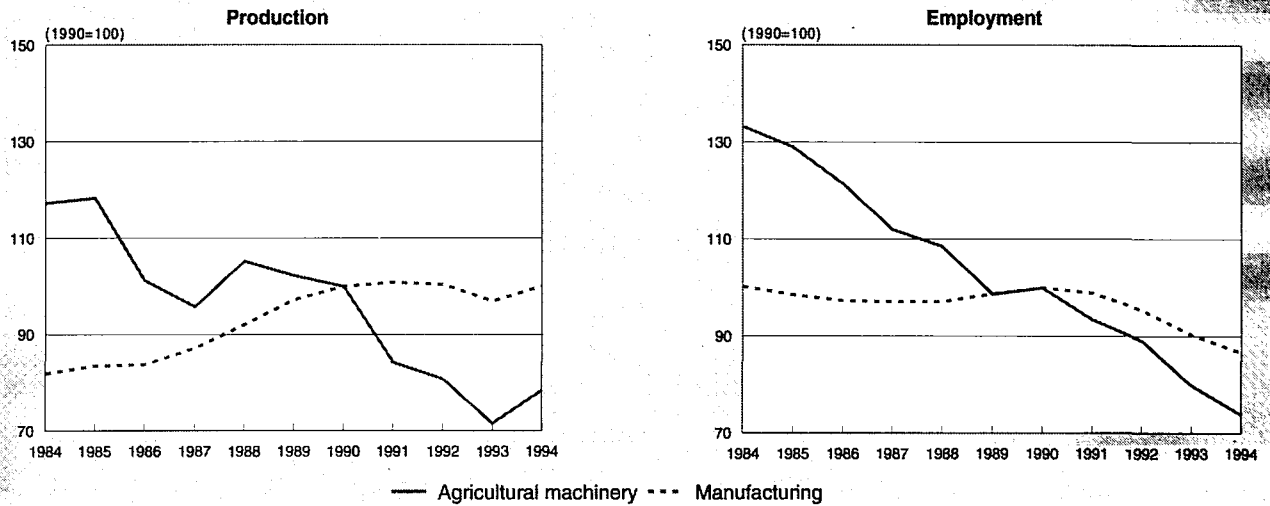
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Agricultural machinery  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

this decline has been more marked in the EU (see Figure 5), while the USA enjoyed a mild recovery since 1991.

In 1993, Japanese production of agricultural machinery was lower than in the other two members of the Triad, at about 9.7 billion ECU. Production in real terms in Japan has been slightly but steadily declining since 1990.

In order to take full advantage of the weakness of the American dollar, guaranteeing a satisfactory protection of the domestic market and providing exports incentives, the two major American producers have recently introduced redeployment schemes and resorted to temporary shutdowns with the result that production sites have been relocated in the United States.

The positive effect of these measures start to become apparent as, after the depression observed in the years 1991 and 1992, American production increased by 6 % in real terms in 1993 and should register still better results in 1994.

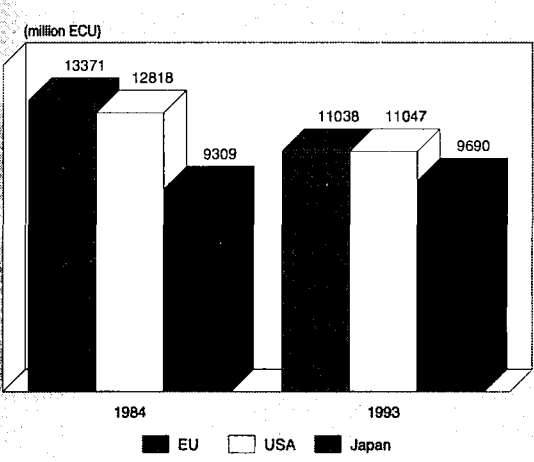
On the other hand, Japan is still confronted with problems connected with a heavily subsidised agriculture and the high level of the Yen. Even though the rapidly declining rate of the agricultural population vs. that of civilian workers tends to put Japan on a level with the European average, the fact remains that the average useful agricultural area of Japanese holdings (1.5 ha) presents a noticeable handicap in terms of mechanisation.

In real terms, Japanese production of agricultural machinery continues to decrease annually by 1.2 % over the period 1984-1993.

**Foreign trade**

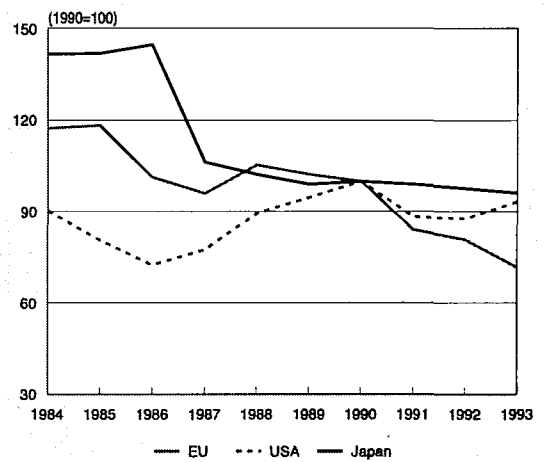
In 1993, the companies belonging to this industry's sector have exported 25.5 % of their production outside the EU. Total exports, including intra-EU trade, exceed 50 % of the total production. Extra-EU exports, which had dropped significantly in 1991 (-5 %) and 1992 (-11.5 %), recovered in

**Figure 4: Agricultural machinery  
International comparison of production in current prices**



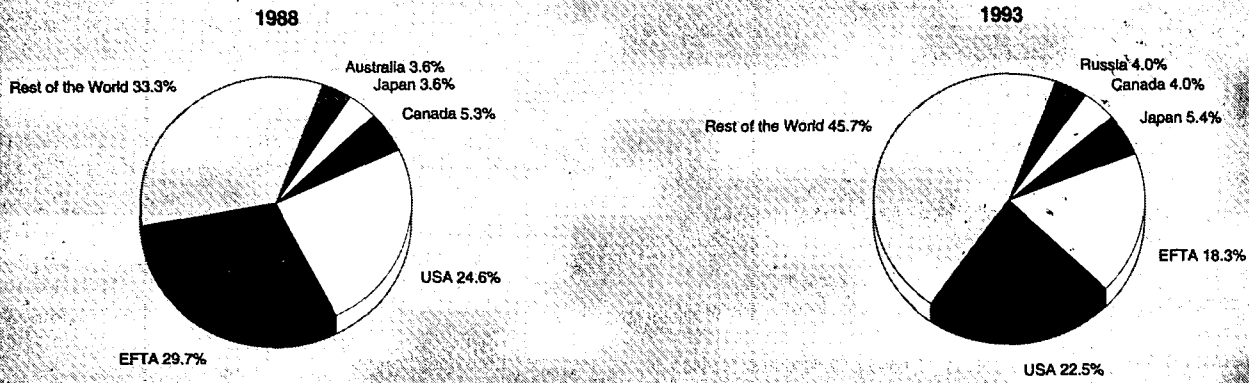
Source: DEBA

**Figure 5: Agricultural machinery  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Agricultural machinery  
Destination of EU exports**



Source: Eurostat

1993 (+6.5 %). This trend should continue until 1995, where-upon a reversal should be witnessed in the following years. The main markets are the United States (22.5 %) and EFTA countries (18.3 %). The market share of Japan in extra-EU exports reached 5.4 % in 1993. It is also to be noted that Russia is now absorbing 4 % of the total exports of the industry sector.

Extra-EU imports have been steadily increasing for several years. However, it would appear that there has been a slowing down over the recent period. The EU however remains a net exporter of agricultural machinery, as exports were 2.25 times higher than imports in 1993. Nevertheless, the fact remains that extra-EU imports, which represented only 6 % of the total Community apparent consumption in 1985, now make up for almost 14 % of the agricultural machinery market of the EU. The United States remain the main supplier, with 47 % of the total extra-EU imports in 1993, followed by EFTA countries (26 %) and Japan (12.6 %).

## MARKET FORCES

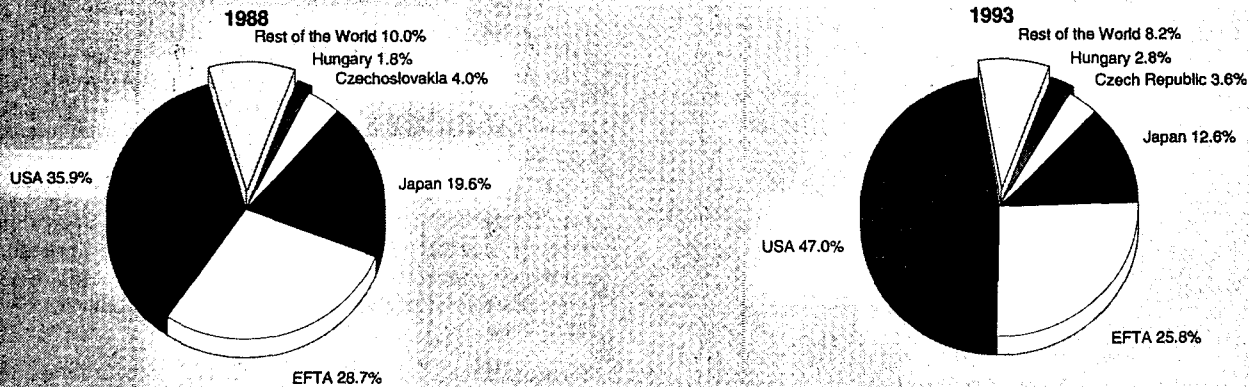
### Demand

Since 1989 and up to 1993 European demand for agricultural machinery has steadily and substantially dropped by 9.2 % annually in real terms.

This deep trough in sales of agricultural machinery within the EU is the direct result of the confusion experienced by European farmers at the announcement of the CAP reform. The signature of the GATT agreements at the end of 1993 has rekindled their disarray.

However, the trend which is taking form now - mastering production volumes thanks to the variation of set-asides and narrowing the gap between world and European prices - begins to appear as potentially beneficial to the farming community. This is the reason why a recovery in demand for agricultural machinery has been witnessed in 1994, which led to sales increases in the order of 10 % in real terms.

**Figure 7: Agricultural machinery  
Origin of EU imports**



Source: Eurostat

## Supply and competition

The EU which represents a market of 245 million consumers with a high standard of living - i.e. 6.5 % of the world population - and a little less of 5 % of the total arable land, is the most important market of agricultural products in the world.

Advances in genetics and the implementation of new techniques made it possible - with the help of the CAP - to increase the Community agricultural production.

The European agricultural machinery industry sector has been associated with these developments over the years until it ranked first in the world.

It is also worthwhile noting that branches of the main North-American companies, some of which have been re-deployed as early as under the Marshall Plan, count among the largest producers in the Community.

In direct proportion with the drop in demand, productivity is shrinking every year (-13.4 % between 1989 and 1993). As a result, the sector is faced with an excess output capacity which necessarily burdens its profits. Few factors speak in favour of a change in the trend in the coming years.

## Production process

For many years the European companies belonging to this industry's sector have been investing in robotics and in machining centres in order to optimise their production techniques and facilitate work. Most of them have already implemented the principles of the "just in time" and "stockless" production.

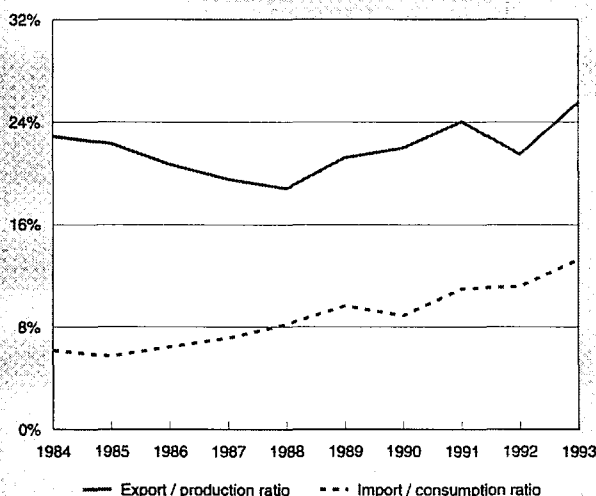
Computer-aided design (CAD) has been introduced in the largest firms, whereby the software is taking charge of the design of tools, forging bolsters and of programmes necessary to the manufacture of the different components of a machine.

In direct proportion with the above-mentioned, a rapid increase in internal investments in the order of 8 % per annum has been observed in the recent period.

Up to now however all these endeavours have only resulted in a 14 % decrease in per capita value added between 1989 and 1993 whereas unit labour costs increased by 37.5 % over the same period.

Nevertheless the conditions for obtaining productivity gains do exist, as soon as a recovery occurs, which was the case in 1994 which registered a 10.5 % increase in the added value over 1993.

**Figure 8: Agricultural machinery  
Trade intensities**



Source: DEBA

## INDUSTRY STRUCTURE

### Companies

As the companies belonging to the Industry's sector produce a wide range of machines it is difficult to give an overall picture of the European farm machinery industry, which is divided into two segments of similar size: tractors on one side and other agricultural and horticultural machines and implements on the other.

A large number of small and medium-sized specialist companies (around 4 000) are present beside a few large multinational or international companies.

Most of these large companies produce tractors and self-propelled harvesting machines. The main European manufacturers of this type of machines are FIAT-Geotech (Italy) which in 1991 has taken over Ford-New Holland, a company established in Belgium and in the United Kingdom. SAME (Italy), Renault Agriculture (France), KHD and Fendt (Germany) and the German firm Claas producing combine harvesters and balers.

The large American companies are also established in Europe: Case International Harvester, John Deere and Massey Ferguson. The activity of the large companies generate around 60 % of the turnover in the profession.

Year after year the world agricultural machinery market is contracting. In addition, hundreds of thousands of European farm holdings are bound to disappear in the coming years. In order to fight the unavoidable fall of the markets the companies - and more specifically the large ones - have been led to conclude cooperation or manufacturing agreements with some of their competitors on the world scene such as John Deere with Zetor-Brno or Massey Ferguson with AGCO, Landini, Steyr and Valmet.

In 1994 new cards have been dealt out in the agricultural machinery industry more rapidly:

Whilst the Tenneco Group launched a public offering of 35 % of the Case capital, Varsity announced the transfer of all their Massey Ferguson shares to AGCO, another American Group which already owned Hesston, Allis, Gleaner and White.

At the same time Massey Ferguson concluded a mutual supply agreement with Iseki, the Japanese specialist of small compact tractors, which also provided for the creation of a joint subsidiary to distribute Massey Ferguson and Iseki products in Australia and Japan. Iseki for its part became a partner in Landini, which specialises in the production of narrow tractors, together with Massey Ferguson.

Finally, in the same period, Massey Ferguson concluded an industrial and technical partnership agreement with Renault Agriculture which led to the creation of GIMA (International Group of Agricultural Engineering) - a subsidiary held on a fifty-fifty basis by Massey Ferguson and Renault Agriculture - in order to design and produce gears.

Renault Agriculture also concluded a mutual agreement with John Deere, according to which John Deere would supply Renault Agriculture with diesel engines whilst John Deere would take care of the marketing of Renault Agriculture tractors equipped with John Deere engines.

The year 1995 seems to start under similar auspices: the German Group Klöckner-Humboldt-Deutz (KHD) has just signed a letter of intent with the object of selling the agricultural machinery side of its business to the Italian firm SAME. SAME already owned the Italian mark Lamborghini and the Swiss Hürlimann.

### Strategies

A strategic study on the development of the European agricultural machinery industry prepared for the industry and the European Commission was delivered in November 1994. It



**Table 5: Agricultural machinery  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.11	0.92
Danmark	1.61	2.10
BR Deutschland	1.23	1.03
Hellas	0.25	0.16
España	0.63	0.88
France	0.84	0.99
Ireland	N/A	N/A
Italia	1.42	1.30
Luxembourg	0.00	0.00
Nederland	0.49	0.97
Portugal	0.26	0.60
United Kingdom	0.77	0.78

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

concludes that agricultural machinery companies within the EU need to make the most of the new possibilities offered by the harmonised internal market, step up research and training efforts and industrial alliances. They should capitalise on the market opportunities emerging in the countries of Central and Eastern Europe, in the short term by building up direct exports, in the medium term by complementing this approach with industrial cooperation. In view of the risk of chronic decline and stagnation in the domestic market for traditional agricultural machinery, it will become increasingly important to focus the innovation effort on the expected growth areas of agricultural non-food production and landscape management activities.

### Impact of the Single Market

The impact of the Single Market on the agricultural machinery industry is linked to the Common Agricultural Policy (CAP) and its effects on agricultural activity and the number of farmers. Due to the change in policy from price fixing to the reduction of capacity (with compensation payments), demand and thus sales of agricultural machinery have been positively influenced. A remaining barrier is the failure of a mentality among farmers and farmer's associations to think European instead of thinking nationalistic. Another problem is that at this moment new barriers (labelling) are created or continue to exist on national levels, which cannot be prevented by the EU.

In terms of the trade impact, the industry is internationally oriented, being the number one in the world. As this position is not really threatened, the industry has approved the double zero taxation of the GATT agreements. However, EU SMEs are often not able to benefit from the European Programmes for SME's, as the procedures are perceived to be too complex and there is often a language problem. The removal of the remaining barriers to intra-EU trade should have a high priority.

### REGIONAL DISTRIBUTION

In 1994 the largest producer of agricultural machinery in the EU was Germany with 34 % of the total European production, followed by Italy (20 %), France (19 %) and the United Kingdom (11 %).

Germany is also the most important extra-EU exporting country with 36 % of the total exports, followed by the United Kingdom (23 %), Italy (18 %) and France (9 %).

In terms of intra-EU trade Germany's share represents 28.5 %, followed by Italy (24 %), France (14 %) and the United Kingdom (12 %).

### REGULATIONS

The importance of standardisation in the agricultural machinery industry is always increasing. The implications at commercial level and therefore in the conception and design phases are becoming very real. This is to say that the time when standardisation was considered a side-issue belongs to the past.

This new orientation results from several factors:

- Liaisons (mechanical, hydraulic, electric, electronic couplings) between the tractor which remains the mostly used energy source and the machine are becoming more sophisticated. Their standardised characteristics must be observed if one wants to make the best of the tractor-machine combination.
- Farmers always require more data on the performances of their machines. These performances must be determined in clearly defined terms, i.e. in standards. It is considered that agriculture is polluting the environment owing to the animals' production of organic dejections and the use of chemicals in treatments and fertilising. Construction standards which will enable farmers to measure precisely what they distribute are under current study and will be implemented in practice.
- Due to the "New Approach" principle which has been introduced in Europe to implement EU Directives, standards are becoming particularly important. The importance of this issue has resulted in the abandonment of a strictly national standardisation in favour of a European or international standardisation.

The activity in this field can only increase in the coming years.

All categories of agricultural machines fall under Directive 89/392/EEC (amended by Directive 91/368/EEC among others) which has come into force on 1st January 1995 and specifies safety and health aspects to be complied with.

Agricultural tractors either fall under Directive 74/150/EEC (applicable to four-wheel tractors with a limited maximum speed) or are dealt with by the different national provisions as the Directive is optional.

### OUTLOOK

The EU agricultural machinery sector supplies approximately 87 % of its own market. The impact of the confidence crisis experienced by the European agriculture in relation to its future has already been analysed at length. The recovery observed in 1994-95 can be considered as a purely technical phenomenon.

1996 will be the year of the intergovernmental conference, where the fifteen governments of the European Union may

**Table 6: Agricultural machinery  
Expected real annual growth rates**

(%)	1994-95	1995-97
Apparent consumption	6.3	-1.8
Production	5.9	-1.8
Extra-EU exports	2.5	-2.0

Source: CEMA



discuss about the future of an enlarged Europe extended to Central and East European Countries and review the adjustments to be made to the amended CAP.

The first constraints resulting from the implementation of the GATT agreement may also appear at that time. So many changes occurring over such a short period of time are not likely to restore durably the confidence of the farmers who need stable rules. This is why forecasts for the years 1996 and 1997 are downward-oriented, as much in terms of production (- 2.5 % per annum in real terms) as in terms of apparent consumption (- 2.7 % per annum in real terms). At the same time extra-EU exports should drop by 3 % per annum in volume.

**Written by: CEMA**

**The industry is represented at the EU level by: European Committee of Agricultural Machinery Manufacturers (CEMA). Address: Rue Jacques Bingen 19, F-75017 Paris; tel: (33 1) 42 12 85 90; fax: (33 1) 40 54 95 60.**

# Machine tools

## NACE 322

The EU industry has got a strong technological position in markets for special machinery and systems, but R&D in areas of new technologies is not sufficient. In volume markets Japanese competitors are in the lead.

The current broad economic recovery provides the environment for the implementation of future oriented measures. Among them must be the expansion of basic and applied research, the improvement of price competitiveness and the restructuring of some companies to evolve to full European and even global players.

### INDUSTRY PROFILE

#### Description of the sector

The machine-tool industry provides machines for the processing of metal. The product programme can be divided into two broad groups, cutting and forming machine tools. The first group lost shares on total industry's output. In the mid-1980s, it accounted for about 75 % of production volume, whereas in 1993 it only accounted for 63 %.

The major product groups among cutting machinery are lathes, milling machines, grinding machines, gear cutting machinery and machining centres. The second group, forming machines, comprises among its main products presses, bending and shearing machines.

Beside mechanical manufacturing processes there are non-mechanical processes, such as laser cutting, electrical discharge manufacturing (EDM) and electrical chemical manufacturing (ECM). Since the mid-1980s the demand for this kind of machinery has grown much stronger than for the whole industry on average.

The supply of the industry does not only comprise standalone machines. The industry also provides complete manufacturing systems. Besides transfer lines, especially for the automotive industry, flexible manufacturing systems and cells (FMS/FMC) are supplied.

Due to the growing importance of systems, machine-tool companies have expanded their product programme by supplying equipment and software not only for the production but also for related areas, as for production planning systems (PPS) and computer aided design (CAD). Thus, the industry is more and more involved in engineering services.

As a whole, the machine-tool industry provides goods and services for production purposes and is, therefore, of major importance for the efficiency of a broad range of manufacturing industries.

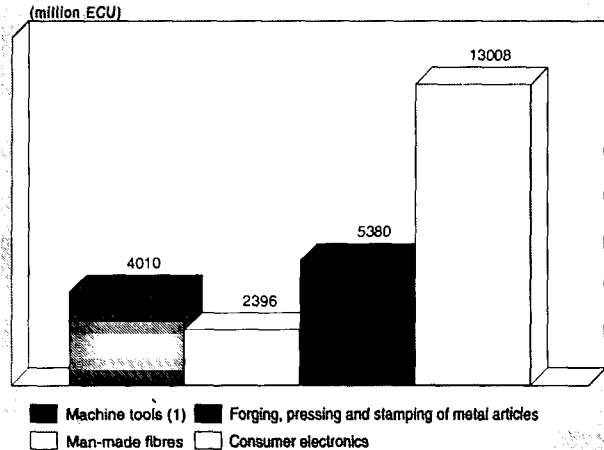
#### Recent trends

The machine-tool industry is greatly affected by business cycles, and demand is more volatile than for most other goods (see Figure 3).

An overall economic slowdown began in 1990. The manufacturing industries throughout the EU were hit hard. Shrinking profits and over-capacities induced a slump in manufacturing industries' investment activities. The EU machine-tool manufacturers suffered the most severe recession after World War II. In 1990, production had peaked and then declined for four subsequent years. In 1994 the real output only reached 50 % of the former record volume.

In 1994 the European economy - preceded by the United Kingdom - recovered progressively, and the investment climate

**Figure 1: Machine tools**  
Value added in comparison with related industries, 1993



(1) Estimate; including former East Germany.  
Source: CECIMO, DEBA, Vieweg

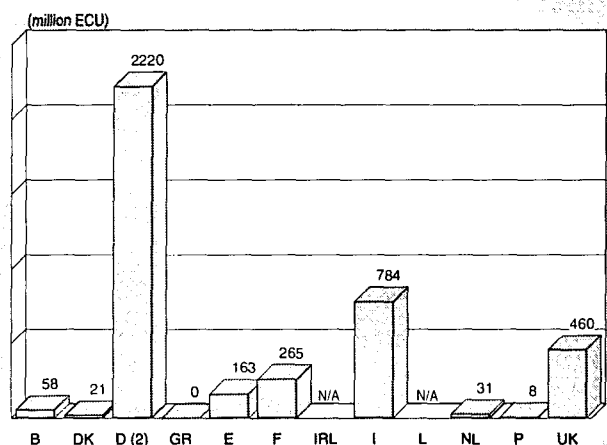
improved. The framework conditions for the machine-tool industry changed for the better. For most of the important EU Member States new order bookings expanded by more than 10 % in comparison with the preceding year. But there is always a lag between orders and deliveries because of the nature of production of specialised machine tools which explains why the output remains largely behind the orders.

The production of the British machine-tool industry, as well as the Spanish one, grew by a double digit rate in 1994. The overall EU output was nearly stable in 1994 compared to 1993 thanks to an upward reverse of the trend in mid-1994.

Due to the broad recovery of the world economy most forecasts indicate that there will be no major set back. Medium-term prospects for the manufacturing industries are bright, and investment activities will grow.

However, the continued price pressure and the low margins do not allow the manufacturers to take full profit of the growth.

**Figure 2: Machine tools**  
Value added by Member State, 1993 (1)



(1) Estimates.  
(2) Including former East Germany.  
Source: CECIMO, DEBA, Vieweg



**Table 1: Machine tools**  
**Main Indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993 (3)	1994 (3)	1995 (4)	1996 (4)	1997 (4)
Apparent consumption	4 983	8 719	10 307	11 988	11 535	9 219	6 542	6 493	7 739	8 875	9 684
Production	6 772	10 379	11 910	13 074	12 773	10 676	8 338	8 505	9 866	10 852	11 503
Extra-EU exports	2 855	3 571	4 028	3 824	3 795	3 505	3 389	3 626	3 876	4 031	4 112
Trade balance	1 789	1 660	1 603	1 086	1 238	1 457	1 796	2 012	2 126	1 977	1 819
Employment (thousands)(2)	160	169	175	178	168	151	129	118	122	125	130

(1) Excluding Greece and Ireland.

(2) Excluding Denmark and the new German Länder.

(3) ifo Institut, Vieweg estimates.

(4) ifo Institut, Vieweg forecasts.

Source: CECIMO, ifo Institut, Vieweg

**Table 2: Machine tools**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	10.5	-13.3	-0.8	-29.8
Production	6.9	-11.1	-1.5	-22.8
Extra-EU exports	2.3	-7.0	-1.9	-4.4
Extra-EU imports	12.6	-12.5	0.6	-23.1

Source: CECIMO, ifo Institut, Vieweg

**Table 3: Machine tools**  
**External trade in current prices**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993 (2)
Extra-EU exports (1)	3 243	3 636	3 309	3 571	4 028	3 824	3 795	3 505	3 389
Extra-EU imports (1)	1 414	1 811	1 670	1 911	2 425	2 738	2 557	2 048	1 593
Trade balance	1 829	1 825	1 639	1 660	1 603	1 086	1 238	1 457	1 796
Ratio exports / imports	2.29	2.01	1.98	1.87	1.66	1.40	1.48	1.71	2.13

(1) Excluding Greece and Ireland.

(2) Estimated

Source: CECIMO, ifo Institut, Vieweg

**Table 4: Machine tools**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	75.9	80.4	86.7	87.3	90.9	97.1	100.0	99.9	90.8	82.1
Unit labour costs index (3)	86.7	85.4	89.6	94.4	95.3	94.7	100.0	114.1	126.7	129.5
Total unit costs index	77.6	81.0	85.4	88.2	90.3	94.7	100.0	105.4	110.8	112.8
Gross operating rate (%)	7.3	9.5	9.5	9.8	10.7	9.9	9.6	7.3	3.9	3.6

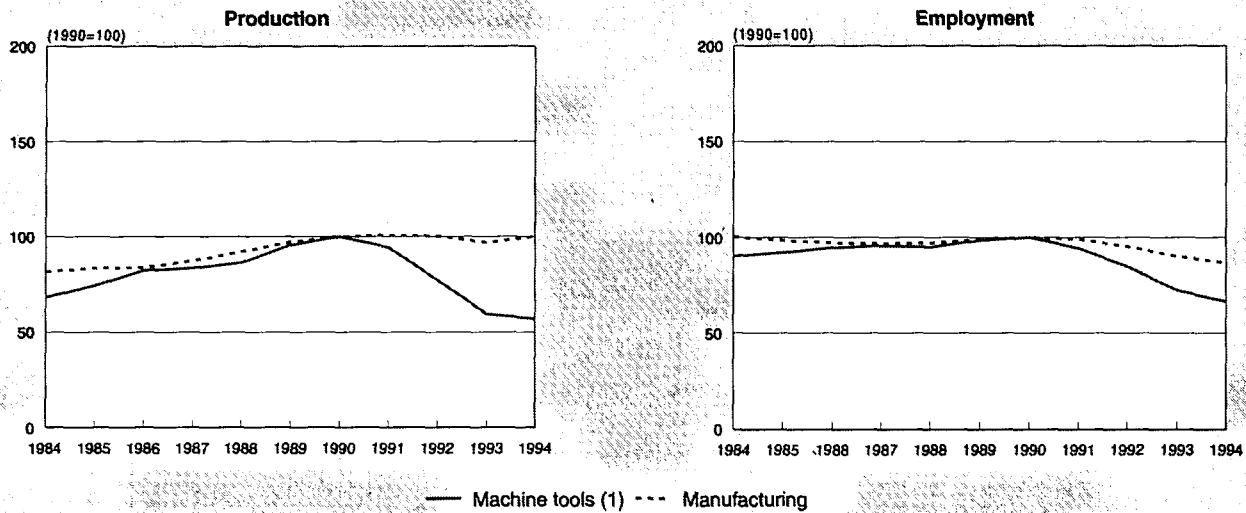
(1) Excluding Greece and Ireland.

(2) Calculated on production in 1985 constant prices.

(3) Based on (value added - labour costs) / turnover.

Source: CECIMO, ifo Institut, Vieweg

**Figure 3: Machine tools**  
**Production and employment compared to EU total manufacturing industry**



(1) Including former East Germany from 1990 onwards.  
 1994 are DEBA and Vieweg estimates.  
 Source: CECIMO, Eurostat, Vieweg

Taking into account the forecasts for the development in the capital goods markets and business cycle indicators, the EU machine-tool production will probably grow by about 15 % in 1995 and by 10 % in 1996.

The dismissal of employees came to an end in late-1994. A further reduction of capacities is not required, and the companies have achieved "leaner" organisations with an improved efficiency. Currently the demand push induces companies to hire new staff, above all blue collar workers, and demand for white collar workers is set to take off later on.

Nevertheless the losses during the recession will not be balanced in the upturn phase. In spite of the recovery, in 1997 the number of employees will be around 25 % below the past peak.

**International comparison**

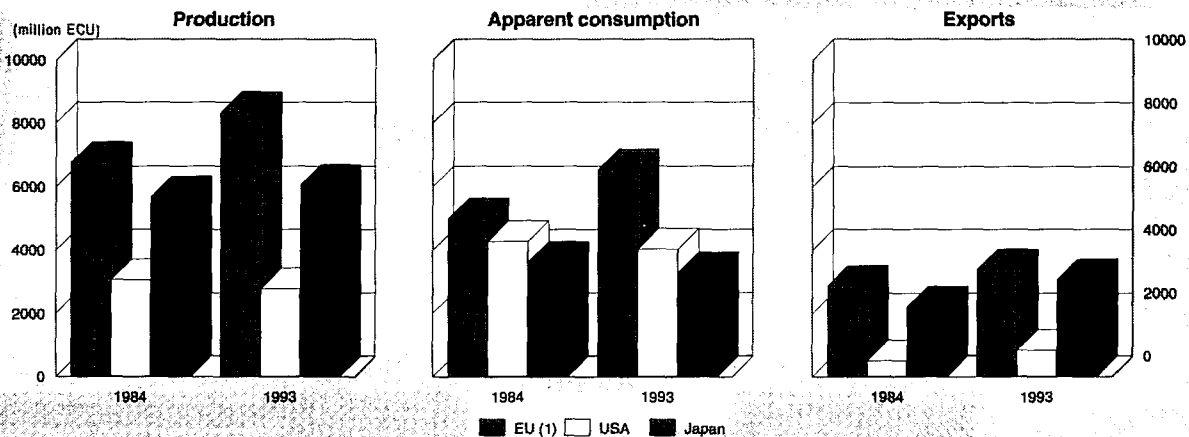
The importance of the EU machine-tool industry is shown by its weight on worldwide production. Its contribution accounted for 35 % of the output in 1980 as well as in 1993.

Currently, about 60 % of the deliveries are dedicated for the domestic market and about 40 % are exported to third countries. In 1984 the export ratio reached 42 %, but meanwhile some Asian competitors (mainly Taiwan and Korea) have grown significantly. The EU imports reached a share of the apparent consumption of around 25 % in 1993. In comparison with 1984 it has increased slightly.

The EU share of exports of production shows a strong dependency on foreign markets and can be regarded as a result of the international competitiveness of the EU machine-tool industry. With respect to the size of the internal market the high share is noteworthy.

Japan, the other important nation in the machine-tool market expanded its share of worldwide production from 14 % in 1980 up to 25 % in 1993. The foreign trade is marked by an enormous surplus induced by a low import ratio, with less than 10 % of the domestic demand provided by foreign suppliers. On the other hand the share of exports of production is even higher than for the EU. In 1984 it accounted for only 39 % and in 1993 it reached 51 %.

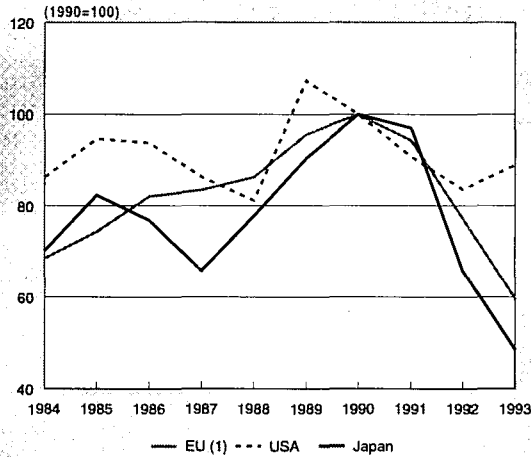
**Figure 4: Machine tools**  
**International comparison of main indicators in current prices**



(1) Including former East Germany in 1993.  
 Source: CECIMO, American Machinist, Vieweg



**Figure 5: Machine tools**  
International comparison of production in constant prices



(1) Including former East Germany from 1990 onwards.  
Source: CECIMO, American Machinist, Vieweg

The third important supplying nation in machine tools is the USA, although the contribution to the worldwide output declined from 18 % in 1980 to just 11 % in 1993. In principle the US companies' dependency on foreign markets is low. The share of exports of production accounted for only 17 % in 1984. But the share grew and reached 30 % in 1993. This development is partly due to investment in anticipation of the entry into force of the NAFTA and related exports, especially to Mexico, but also due to Japanese transplants in the US market which started exporting to third countries.

The time series of the Triad members' production show dependency on the high cyclical business. Between 1990 and 1993 the Japan and the EU machine-tool industries suffered a major setback due to the recession with a reduction of production by 51 % and 41 %, respectively, in real terms (the strong appreciation of the yen is a major factor behind this trend). The US machine-tool industry enjoyed a better development, because the economic situation in the domestic and neighbouring market was brighter.

### Foreign trade

The EU industry is not only the largest supplier of machine tools, but also an important player in the international trade. With their extra EU exports the European players command a share of around 30 % of the worldwide trade. The analyses of time series suggest that this indicator of competitiveness has been stable.

The dynamic countries in the Far East have been heavily investing in manufacturing industries, and the demand for machine tools is growing strongly. During the early 1990s EU deliveries to Far Eastern markets as a share of total EU exports increased from 15 % in 1990 up to 25 % in 1993.

This expansion was above all caused by the People's Republic of China that has become the most important single client country beside the USA. China is the only Asian country which EU companies have a better access to than their Japanese competitors. The EU share of Chinese imports stays at a level of around 35 % 1990 and 1993. It must be mentioned that Japanese companies are expanding their efforts in this market and competition will be tougher.

There is a challenge for EU companies to improve the access to other Asian markets too, to benefit from the growth potential. This is also true for the large Japanese machine-tool market to which only 2.7 % of EU exports were delivered in 1993.

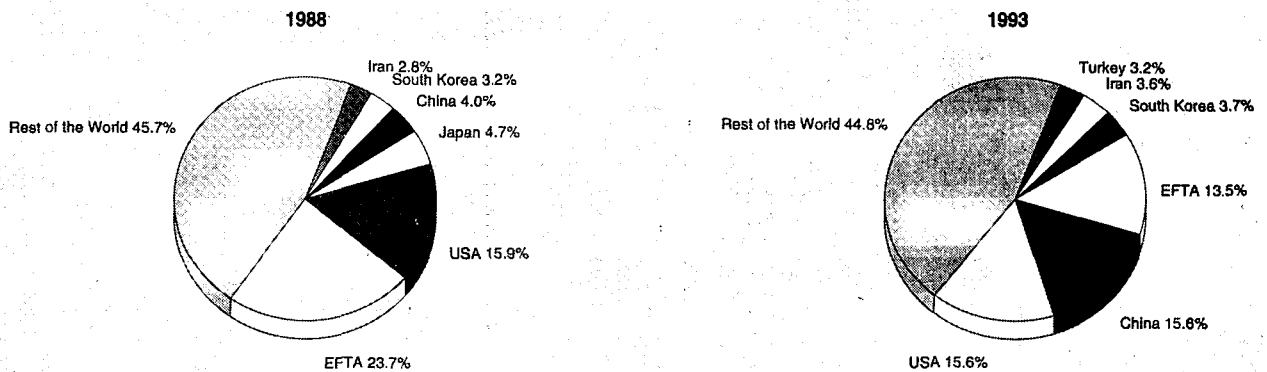
In spite of the cyclical upswing in the USA the EU machine-tool exports to the United States only grew slightly between 1990 and 1993. The EU share of US machine-tool imports declined from one third in 1990 to one fourth in 1993. It was only in 1994 that EU companies enjoyed growing exports into this market, a trend which is likely to continue.

The dissolution of the COMECON and the breakdown of the centrally-planned economies induced a slump in the demand for machine tools. The exports to the CIS countries shrunk by more than one third between 1990 and 1993. Although exports to CIS countries grew in 1994, further prospects are rather poor.

The Central Eastern European countries overcame major difficulties of the transition period. Due to an improved economic framework and foreign inward investment in manufacturing industries the demand for machine tools is growing. But up to now the share for this region of EU exports is low, even lower than that of the CIS.

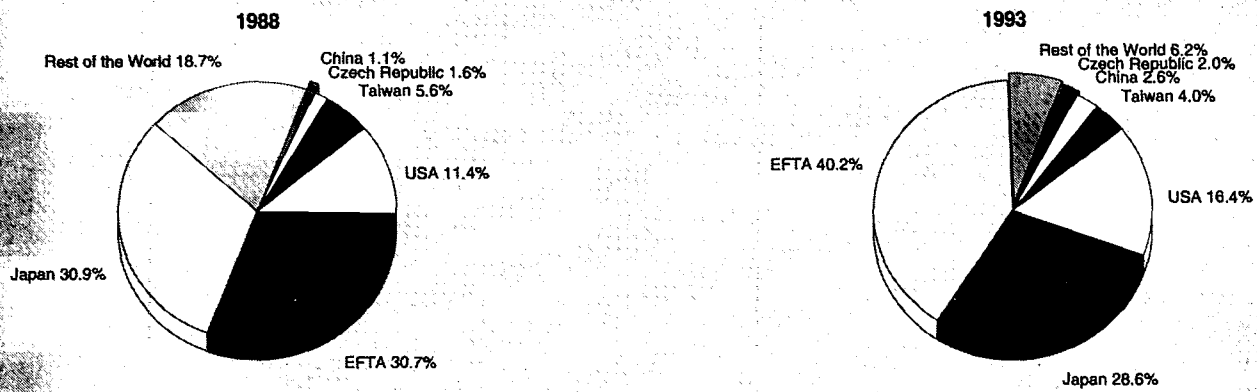
Total EU machine tool exports grew at an average yearly rate of 2.0 % between 1984 and 1993; simultaneously the imports grew at an average rate of 4.1 % per year. This de-

**Figure 6 : Machine tools**  
Destination of EU exports (1)



(1) Including former East Germany.  
Source: CECIMO, Vieweg

**Figure 7: Machine tools  
Origin of EU Imports (1)**



(1) Including former East Germany.  
Source: CECIMO, Vieweg

development indicates that the EU position in international trade has been worsening, although indicators for the performance in the international trade, such as the trade balance and X/M (exports/imports ratio) have not changed very much.

The foreign supply of machine tools in the EU is dominated by EFTA companies; most important are Swiss firms. Although their deliveries shrank by 42 % since 1990 they could maintain their share on EU imports which declined to the same extent during the recession.

Since 1987 the share of Japanese deliveries to the European market for machine tools is roughly stable, but this country remains, with about 30 % of EU machine-tool imports, by far the most important single supplying nation. Other Asian countries that were successful in European markets during the late-1980s are up to now only of minor importance. Some of their deliveries originate from Japanese transplants that could expand due to exchange rate alterations.

The US companies' exports to the EU shrank by less than 20 % during the recession, but in comparison with other for-

eign suppliers they were successful. Their share of EU imports grew up to 16.4 % in 1993. The driving forces behind this development are an improved price competitiveness by the devaluation of the USD, but also technological progress and presumably deliveries of Japanese transplants.

## MARKET FORCES

### Demand

The machine tool industry supplies capital goods above all for the manufacturing industries, most important is the mechanical engineering industry with a share of one third of total EU-demand. Second in this ranking is the automotive industry and third the electrical products industry with a share of one quarter and one tenth respectively. The aeroplane and space industry is of less importance by volume. But its demand for highly sophisticated technology is stimulating innovations.

The manufacturing industries were hit hard during the latest recession and investment budgets were cut. This development not only affected investment in advanced machinery and new capacities. In the latter half of the 1980s manufacturing companies had basically renewed their capital stock and, therefore, even the necessity for replacement investment was low.

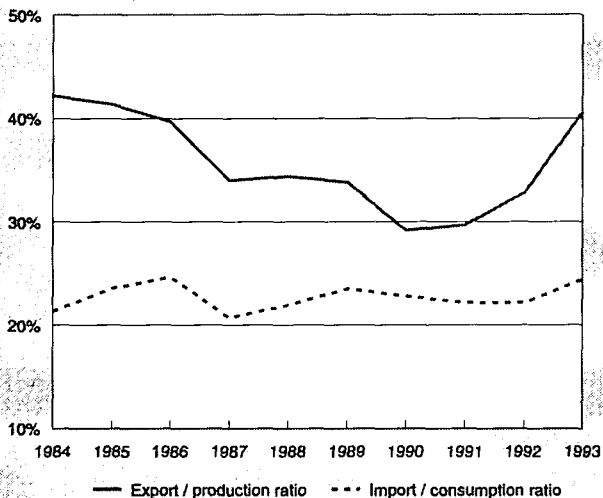
Due to this development the EU share of the worldwide demand for machine tools slumped from 37 % in 1992 to 29 % in 1993. This development was not only due to the shrinkage of the EU market, but also induced by enormous growth rates for other important markets, such as the USA, Canada and China by 40 %, 23 % and 44 %, respectively. Furthermore, during the recession period a sustained demand for second-hand or refurbished machines reduced the demand for new machines.

### Supply and competition

The description of the machine-tool market requires a distinction between two segments. One comprises standardised machinery, which have high shares in turning, milling, drilling and machining centres. The other segment comprises specialised and customised machinery. Specialised machinery comprises machining operations that require a specific know how, such as gear finishing, the machining of gears or extremely big parts and special presses. Customised machinery comprises machines and systems that must be adapted to a client's requirements.

Most markets for standardised machinery have evolved to volume markets, in which global players are of major im-

**Figure 8: Machine tools  
Trade intensities (1)**



(1) Including former East Germany from 1990 onwards.  
Source: CECIMO, Vieweg

**Table 5: Machine tools**  
**Average size of enterprise by Member State, 1993**

(%)	Number of companies	Number of employees	Employees per company
EU (1)	1 212	128 807	106
Belgique/België	15	1 900	127
Danmark	16	N/A	N/A
BR Deutschland (1)	340	73 000	215
España	115	5 322	46
France	133	6 885	52
Italia	420	28 120	67
Nederland	23	980	43
Portugal	25	1 000	40
United Kingdom	125	11 600	93

(1) Excluding new German Länder  
 Source: CECIMO, Ifo Institut, Vieweg

portance. In many of these markets Japanese companies have taken the lead, and European companies face strategic disadvantages. Their production capacities are too low, to enjoy economies-of-scale similar to their Japanese competitors, especially in the standardised metal cutting area.

During the latest recession the market for standardised machinery suffered a greater set back than the market for specialised and customised machines. The slump in demand provoked heavy losses, capacities were reduced and production sites were closed.

This poor development not only affected European suppliers. Japanese production fell even more. But the effects on the structure of the supply side in standardised machinery were more severe in Europe. Some strategic investment of the late-1980s, to catch up the Japanese lead, were withdrawn. The predominant Japanese suppliers were able to maintain their position and new competitors from Taiwan, Korea etc. emerged. Thus European machine-tool suppliers in volume markets face an even bigger challenge than before the recession.

In markets for special machinery, customised machinery and manufacturing systems, European companies have got a good position in international markets. Engineering know-how is of major importance for the production of high performance machinery. On the contrary, Japanese companies have a deficit in adequate qualified engineers. The same is true for some emerging competitors from newly industrialising countries (NICs).

The technological lead of European companies in this market segment reduces price pressure in comparison with volume markets. Nevertheless the EU firms must take into account that new competitors could try to penetrate the market if they perceive opportunities for sufficient profits. Therefore, cost cutting must be a strategic task even for technological leaders.

There is some doubt that the specialisation of the Japanese machine-tool industry on standardised products, and European suppliers on special machinery and systems, will result in an equilibrium in the world market. Indeed under pressure from some emerging countries and the higher salary costs in Japan, Japanese machine-tool manufacturers could be forced to penetrate the special machinery segment or to relocate an even more significant part of the production. In addition European specialised manufacturers benefit from the volumes which component suppliers are able to generate for volume machine business. A further reduction of such component production in Europe would increase the costs of these components for everyone.

Most important changes in price competitiveness during the past five years were induced by exchange rate alterations.

Production sites in Japan lost their competitiveness through several appreciations of the Yen against all other European currencies. For Japanese companies this development is a threat as far as their domestic plants are concerned. But many Japanese machine-tool manufacturers have become global players during the past 10 to 15 years and have launched production sites in their most important foreign markets. The dependency on the domestic currency has shrunk.

In contrast, US companies enjoy a strong depreciation of the USD against most other currencies. Additionally there are some signs that the US machine-tool industry enjoys a technological recovery that is partly stimulated by former secret R&D for defence projects. Some of the results have become available for market-oriented innovations.

During the 1980s the competition in the machine tool market could be characterised by the Japanese challenge. During the late 1990s there will be competition among all Triad members to be on the leading edge in advanced production technologies.

The challenge for the European industry in this environment is to compete with Japanese and US firms in some new technologies that are of importance for machine tools. This concerns the areas of new materials, highly integrated electronic components, high speed processing and micro machining.

### Production process

Usually machine tool manufacturers procure drives, controls and other electrical as well as electronic components from companies specialising in this area. These preliminary products are of key importance for the design of high performance machines.

European machine-tool manufacturers prefer to combine different components or modules to build new types of machines, but this requires enormous R&D efforts for the mutual adaptation. Up to now these tasks were time consuming because of lacking compatibility.

Current developments show that suppliers of electrical and electronic components try to overcome these problems by creating products designed as modules that are easy to combine with other units. By the introduction of a so-called open architecture for CNC systems the adaptation of different programme packages becomes easier. These developments provide the European machine-tool industry with a cost reduction potential in an area in which they experienced a major disadvantage in international competition.

In spite of this technological progress within Europe it must kept in mind that Japanese suppliers remain in the lead in R&D on advanced highly integrated controls. This is mainly due to the world's leader in numerical controls (NC) Fanuc (JPN). Japanese manufacturers are convinced that Fanuc con-



tributed a lot to the leading position of Japan in standard machine tools.

During the late-1980s advanced production technologies were widely introduced in the industry. Multi-purpose machines, flexible manufacturing systems (FMS) and -cells (FMC) were installed. Sometimes it was difficult to hire adequate educated operators to run these complex systems.

The advantages of investment in such automated production technology come into effect only if the utilisation of capacities is high. Otherwise pay back periods are too long. The cyclical demand for machine tools capital intensive production - with phases of under-utilisation - requires at least a flexible adaptation of running hours to become profitable. Relative rigidities in working practices in certain Member States

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## INDUSTRY STRUCTURE

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### Companies

The EU machine-tool industry consisted of 1 212 companies in 1993. The industry consists of predominately medium-sized firms with an average turnover of 6 to 7 million ECU and 100 to 110 employees. The industry's structure differs widely between the Member States: the average German firm employs 215, whereas the average Italian firm, which works with more subcontracting operations, only employs 67. Firms in the Netherlands and Portugal are even smaller.

The European industry is not dominated by large companies. The top five enterprises accounted for about 20 % of the EU machine tool production in 1993. The concentration of the Japanese and above all the US machine tool industry is much higher with the biggest five firms commanding 40 % and 55 % of the nations machine tool output, respectively.

### Strategies

The years of recession and current recovery have been marked by a major reshuffle of the industry, to create long term competitive companies, after some important suppliers have been dismantled. Mergers and acquisitions took place in the industry to create competitive units.

There is one major difficulty hampering the restructuring of the industry: to raise sufficient money for the implementation of strategies by adequate investment in production sites or in foreign subsidiaries or in distribution channels. Currently banks and other financial institutions are hesitating to grant the necessary credits.

Due to this problem the evolution towards a pan European industry has slowed down, because cross border investment is left undone. Additionally, companies that decided to remain in the volume market have to invest in adequate production sites and distribution channels to meet the challenge of the global players in the market.

European suppliers in particular in volume market are strongly dependant on the economic policy framework. Important fields are non-wage labour costs in some countries, high interest rates, qualification and flexibility of the labour force, R&D and trade policy. There are some initiatives of the EU that could contribute to overcome the difficulties of the industry, contained in the third and fourth Framework Programmes. In October 1994, the Commission adopted a communication on the competitiveness of the machinery construction industry. This proposes a coherent package of horizontal industrial policy measures to be taken by industry, Member States and the EU in the fields of investment promotion, the business environment, industrial cooperation, technical harmonisation, research and innovation, vocational training, regional policy, foreign trade and environmental protection, with a special attention to SMEs which form the bulk of this industry.

Many machine-tool companies have problems in getting access to EU schemes. This is true for the small companies and for the firms that are not classified as medium sized by the European Commission, because they have got more than 250 employees. These medium-sized companies with less than 500 employees have problems to meet all requirements in application forms for R&D schemes etc. that were designed for large companies.

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## REGIONAL DISTRIBUTION

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In 1993 three quarters of the EU machine tool industry's value added was produced in Germany and Italy. Next in this ranking are the United Kingdom and France with 12 % and 7 %, respectively. Spanish firms have caught up and currently command 4 % of the EU value added. Traditionally their competitive edge is the price, but they have caught up in the technological performance.

Analysing the countries' specialisation on machine-tools indicates Italy to be in the lead. The Italian's machine-tool industry's share of total output of the Italian manufacturing industries comes to 0.54 % in 1993. This share is higher than in 1984, indicating that the industry performed well during this period. For most other EU member countries this specialisation indicator shrank over time. This is also true for Germany, the country that was more specialised in machine tools than any other Member State. But it must be mentioned that due to German unification the comparison might be disturbed.

German production of machine tools is concentrated in Baden-Württemberg and in Nordrheinwestfalen. The unified Germany has got another important region, Saxony, situated in the South of the new Länder. In Italy most of the industry is located in the North, in Piemonte, Lombardia, Emilia-Romagna and Veneto. French suppliers are concentrated around the Ile-de-France and Rhône-Alpes. In the United Kingdom the machine-tool industry is located in the traditional industrialised region of the Midlands, in Yorkshire/Humberside and in the South-East. Spanish companies are centring in Euskadi, Catalunya and Madrid. In Portugal the industry is concentrated around Oporto. Denmark, Belgium and the Netherlands do not have particular areas of concentration.

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## ENVIRONMENT

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The machine tool industry's production consists predominantly of mechanical processes such as turning, milling, boring, drilling, grinding, forming, bending and assembling. Most of the preliminary products are of metal, and the input of energy is of minor interest. Therefore, the major threat for the environment lies in the use of cooling and lubricating liquids. The application of improved dressing equipment expands the life span of liquids and reduces the amount of liquids to be disposed.

Currently new kinds of cooling liquids are being developed, posing a reduced threat to the environment and the health of the employees.

Another opportunity for the protection of the environment is provided by the development of dry manufacturing processes. This kind of machining is an innovation that is used within the machine-tool industry but also supplied to customers. It must be admitted that dry manufacturing is restricted to specific materials and processes.

Hardening and galvanising are used to increase the durability and rigidity of materials and special surfaces such as slides. As hardening by heat treatment is not sufficient, chemical processes are necessary. Most of the machine-tool companies do not have their own capacities for these processes and employ specialised subcontractors.

**Table 6: Machine tools  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.43	0.50
Danmark	0.60	0.25
BR Deutschland	1.83	1.63
Hellas	0.00	0.00
España	0.60	0.59
France	0.46	0.34
Italia	1.23	1.69
Nederland	0.14	0.16
Portugal	0.29	0.19
United Kingdom	0.74	0.63

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: CECIMO, Eurostat, Ifo Institut, Vieweg

Because of technological progress advanced machine tools are equipped with controls, motors etc.; new materials are used, such as composites and compounds. These machines are not as easy to scrap as their predecessors. The recycling of components will only be possible if machines are adequately designed. Companies are beginning to comply with such requirements.

## REGULATIONS

The Machine Directive allows machine tools which comply with essential safety requirements, and whose compliance has been attested in accordance with set procedures, to circulate freely within the European Economic Area. Intra-EU trade has become easier, but exports to third countries furthermore require the compliance with specific safety regulations.

Some groups of machine tools are so-called dual-use (i.e. they could be used for military purposes) machines and require a special permission for exports in third countries. Up to now each EU Member State had its own regulation. In late 1994 the EU Council of Ministers adopted a regulation and a decision setting out a harmonised approval procedure on exports of dual-use machines. This will provide more transparency for EU machine-tool companies and simultaneously fully liberalise intra-EU trade.

Regulations, such as the electromagnetic compatibility directive and agreements on interfaces between data processing facilities set standards that ease the combination of products of different EU countries. These regulations are prerequisites for the Single Market and very important for the setting up of automated manufacturing processes.

## OUTLOOK

The Western European economies are enjoying a broad cyclical upswing, and the accession of Austria, Sweden and Finland improves the framework conditions. Thus confidence of companies in the future development stimulates the investment climate and medium-term prospects for capital goods' demand are bright.

Some threats endanger this overall dynamic development. Most likely are disturbances in the financial markets and the exchange rate mechanism. It is not presumed that such an incidence would trigger a recession, but that only a short break in the upward trend would take place.

In this environment the demand for machine tools will strongly expand, especially during the early years of the upswing. The first challenge for the companies is to meet booming demand; the second challenge is to develop long-term strategies that enable them to stay in an extremely volatile market environment. Especially in volume markets, companies have to reconsider their strategies.

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# Textile machinery

## NACE 323

In recent years, the EU textile machinery sector has experienced extremely low intra-EU demand, forcing European manufacturers to concentrate on foreign export markets. Through considerable increases in extra-EU exports, manufacturers have been able to compensate for weak domestic markets. Competition on the world market, however, is strong and intensifying as Japan and other countries want to take advantage of the growing and promising textile markets in the Far East.

### INDUSTRY PROFILE

#### Description of the sector

NACE 323 covers the manufacture of textile machinery, accessories of textile machinery (NACE 323.1) and sewing machines (NACE 323.2). This monograph mainly focuses on NACE 323.1 which can be further subdivided into: spinning machinery; weaving machinery; knitting and hosiery machinery; dyeing and finishing machines; and parts, accessories and other machines, such as man-made filament and fibre processing machinery, and preparatory machines. These machines spin (natural and synthetic) fibres into yarn; weave or knit the yarn into fabric; dye, print and finish the resulting fabric; and produce garments or other fabric products.

Production of textile machinery in the EU (in current prices) accounts for approximately 4 % of total production of the mechanical engineering industries in the EU. Compared to other related industries the textile machinery industry is relatively small.

Within the EU, Germany is the largest producer in the industry, accounting for 61 % of total value added, followed by Italy with 16 %. As a result, Germany accounts for more than 50 % of employment in the EU textile manufacturing industry and Italy accounts for about 18 %.

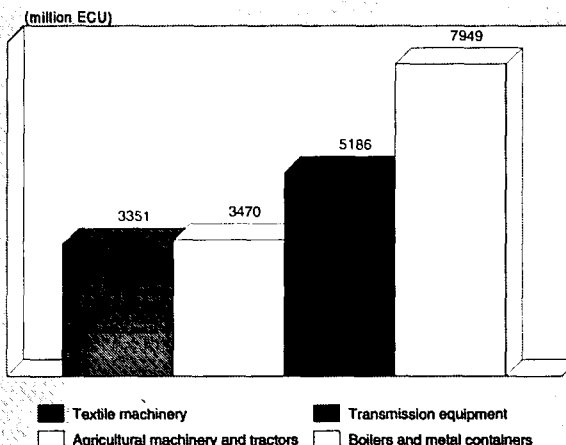
#### Recent trends

The general world recession of recent years did not spare the textile sector. According to the annual report of the International Textile Manufacturers Federation (ITMF), the world textile machinery market is still in a recession. The world market for staple spindles and looms for weaving dropped by approximately 20 % in the course of 1993. Textile machinery manufacturers have to meet changing needs of textile industries in both the developing and developed countries of the world and, perhaps more importantly, have to meet the growing needs of the vastly expanding textile regions of the Asia/Pacific, in which China is now the predominant producer of textiles.

After a 2 % decrease in EU production in 1993, there are signs of recovery, induced by an increase of extra-EU exports. Production in almost all EU countries declined in 1993, with the exception of Germany. German production rose by 4 % in 1993. For 1994, however, production increases are expected in Italy and the United Kingdom as well. Apparent consumption of EU textile machinery declined dramatically (26.8 %) in 1993 and no recovery is expected for 1994.

Employment in the EU textile machinery industry has been declining since 1990. In five years time, the number of employees fell from 107 300 in 1989 to 83 800 in 1993, a 22 % reduction. In Japan, employment has dropped as well. Only the USA has demonstrated a small rise in the total number of employees since 1992.

Figure 1: Textile machinery  
Value added in comparison with related industries, 1993

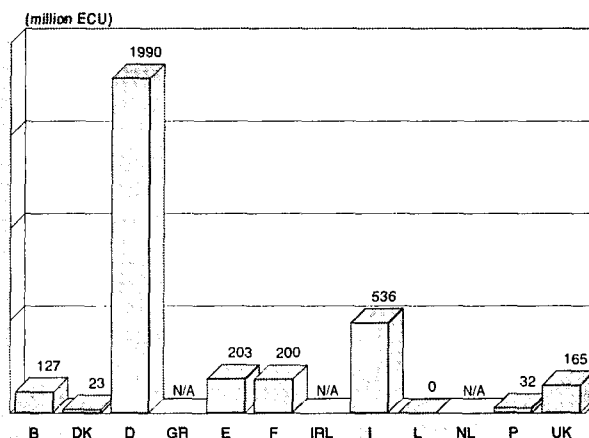


Source: DEBA

#### International comparison

The traditional predominant position of the EU as the world's largest producer of textile machinery has been affected by rapid production growth in Japan, which has become the largest single producing country. Besides Japan, Switzerland is also an important producing country of textile machinery and supplier on the world market. In 1984, EU production of textile machinery was 26.6 % higher than Japanese production; while in 1993 the difference was only 6.7 %. In 1994, however, production in Japan dropped, whilst production in Europe is expected to increase slightly. The main reason for the drop in Japanese production is a stagnation of exports, especially caused by the appreciation of the Japanese yen. US production is relatively small compared to production of Japan and the EU. Since 1991, however, US production has been increasing by 5 % per year.

Figure 2: Textile machinery  
Value added by Member State, 1993



Source: DEBA

**Table 1: Textile machinery**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	3 316	3 844	4 446	5 040	5 841	5 875	6 218	4 861	4 537	3 320	N/A
Production	5 290	6 249	7 096	7 782	8 659	9 341	9 700	8 210	8 602	8 433	8 550
Extra-EU exports	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629	5 230	6 228	N/A
Trade balance	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349	4 065	5 113	N/A
Employment (thousands)	97.9	100.7	102.1	105.1	105.9	107.3	107.2	99.3	91.3	83.8	78.5

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

Source: DEBA

**Table 2: Textile machinery**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	9.15	-11.05	-0.34	-17.91
Production	6.83	-4.71	1.54	-2.01
Extra-EU exports	3.74	-0.70	1.74	10.19
Extra-EU imports	4.13	-13.76	-4.24	-17.95

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Textile machinery**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629	5 230	6 228
Extra-EU imports	902	1 072	1 181	1 298	1 505	1 520	1 537	1 279	1 165	1 115
Trade balance	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349	4 065	5 113
Ratio exports / imports	3.19	3.24	3.24	3.11	2.87	3.28	3.27	3.62	4.49	5.58
Terms of trade index	92.7	93.4	94.7	97.2	95.4	97.3	100.0	101.1	101.7	94.2

Source: DEBA

**Table 4: Textile machinery**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	78.3	85.8	88.5	89.9	97.0	99.4	100.0	89.0	98.3	104.9
Unit labour costs index (3)	86.6	85.0	89.0	92.5	91.0	94.7	100.0	118.6	115.3	110.3
Total unit costs index (4)	75.4	77.4	84.0	88.5	90.1	95.1	100.0	106.0	107.9	104.6
Gross operating rate (%) (5)	9.07	10.79	10.69	10.27	10.80	9.10	7.70	3.77	5.88	7.01

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

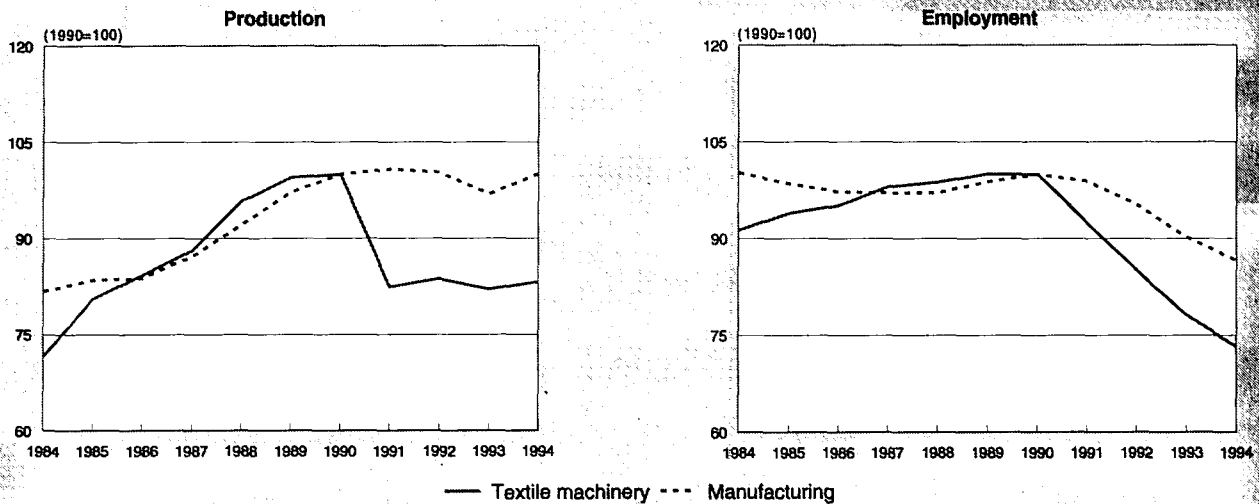
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Textile machinery  
Production and employment compared to EU total manufacturing Industry**



1994 are DEBA estimates.  
Source: DEBA

**Foreign trade**

The textile machinery sector can be characterised as highly export-oriented. In 1993, the EU export rate was nearly 74 %, compared with a rate of 61 % in 1992. Import penetration is much lower, but the import/consumption ratio increased in 1993 due to a lower decline of extra-EU imports than the drop of intra-EU demand. Total imports increased until 1990 and have declined since then. Total exports declined in 1990 and 1991 but recovered in 1992 due to an increase in extra-EU exports. These foreign trade flows have resulted in a growing trade surplus between 1984 and 1993 with the export/import ratio almost doubling.

In terms of size and output, the German textile machinery industry dominates the world export market with a share of more than one-third of total world exports. The most important export destinations for German textile machinery in 1993 were the USA (16 %), China (11 %), Turkey (8 %) and CIS (7 %).

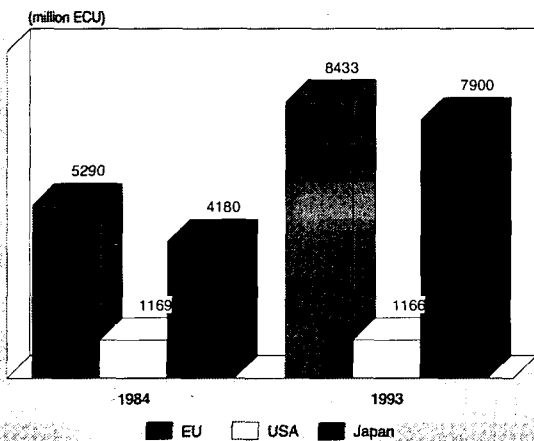
Current market trends show Asia and the USA as the most active areas, while India is becoming increasingly important.

Italy is responsible for 20 % of total EU textile machinery exports. Asian countries are the most important buyers of Italian exports taking about 42 %, followed by EU countries (18 %), other Western European countries (11 %), North America (13 %), South America (7 %), East European countries (5 %) and Africa (4 %). Italian exports increased in 1993 with export sales improving in several areas, particularly the Far East and Middle East.

French machinery firms produce about 8 % of total EU textile machinery exports and focus on Taiwan and Korea.

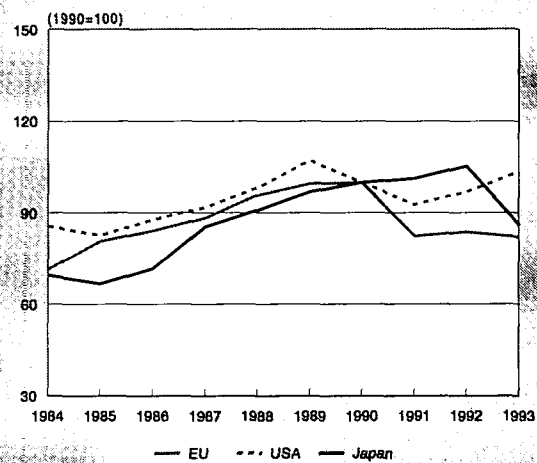
In 1992, British textile machinery exports amounted to 6-7 % of total EU exports. There are indications of rising British export sales during 1994, especially to the USA, which is in a re-equipment cycle that is expected to continue in the fore-

**Figure 4: Textile machinery  
International comparison of production in current prices**



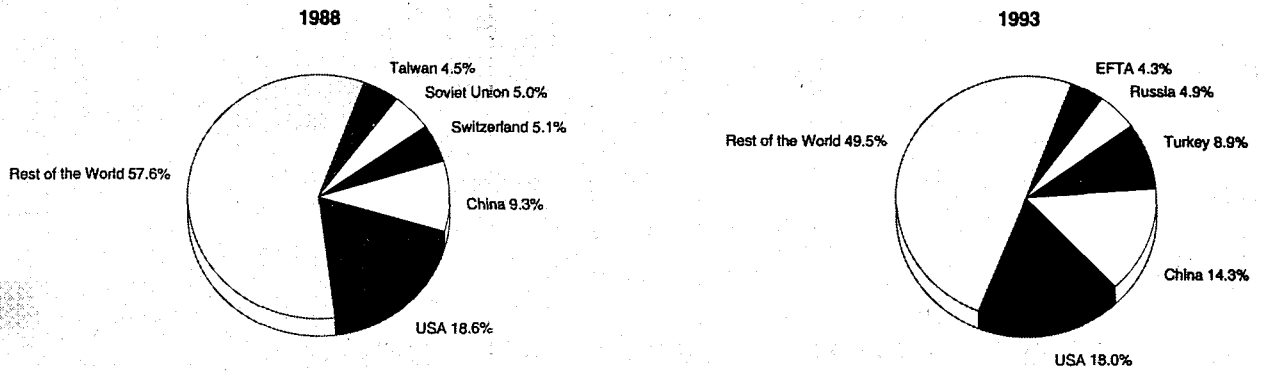
Source: DEBA

**Figure 5: Textile machinery  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Textile machinery  
Destination of EU exports**



Source: Eurostat

seable future, and to the newly developing and developed countries in the Asia/Pacific region.

Extra-EU imports mainly originate from the two most important countries in the world textile machinery market: Switzerland and Japan. Both countries together accounted for 58 % of total EU imports in 1993. The share of the USA was 12 % in 1993, up from 9 % in 1988.

## MARKET FORCES

### Demand

Demand for textile machinery depends on demand for clothing and textiles. The world market for textiles and clothing is expected to reach 56 million tonnes by the year 2000 compared with 38 million tonnes in 1992. By the year 2002 the populations of China, Latin America, AND developing Asia and Africa are expected to consume some 21 million tonnes of textiles compared with 15.7 million tonnes in 1992, a rise of 34 % over the ten-year period.

North America, Western Europe and Japan are becoming markets of the past as textile manufacturers seek to establish operations in developing areas of the world, especially in the Middle and Far East. These operations will require the most

modern and innovative equipment in order to produce the highest quality products with the greatest flexibility.

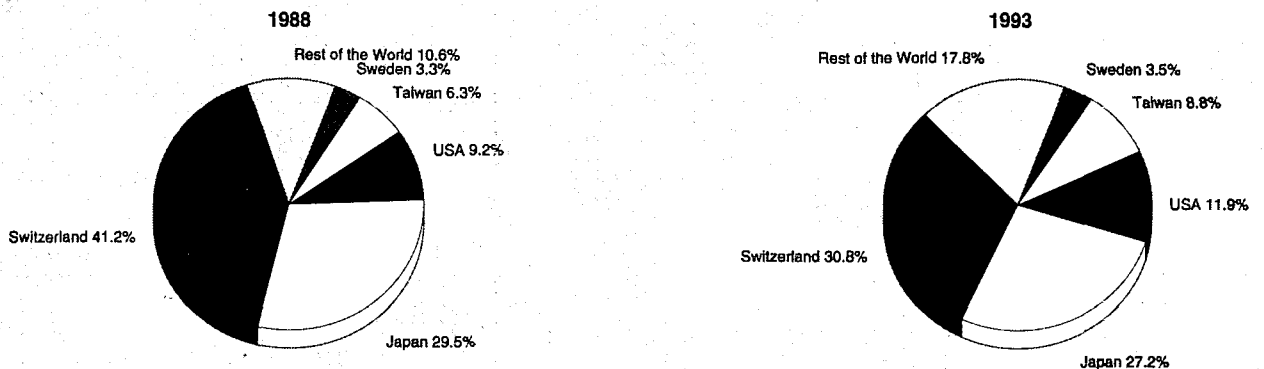
Some of the growth markets of the 1980s, such as Korea and Taiwan, are reaching a point of stagnation and investments will increasingly be placed elsewhere. South-East Asia, China, India and the Near and Middle East offer the best prospects for the next decade.

Further development in the former COMECON market is very difficult, but restructuring of the textile industries in Poland, Hungary, the Czech Republic and Slovakia is nearly finished and prospects are promising. A lack of hard currency is the main problem with regard to demand in Russia. For example, Stentex, a former GDR enterprise, based business on credits granted by the German government to the Russian state, which proved very unsatisfactory. As a result, a joint venture (Stentex-Kostroma GmbH) was established in April 1994 to activate the market.

### Supply and competition

International competition is growing rapidly. Japan has become the major competitor of the EU in the world market. The Japanese produce standard and highly advanced machinery and they have a strong position in the Asian markets. The

**Figure 7: Textile machinery  
Origin of EU imports**



Source: Eurostat

importance of Japanese products on the EU market is not increasing however.

Local companies in newly industrialising countries in the Far East and South-East Asia produce standard machinery at low prices and have become important competitors in the low-end markets.

Labour productivity in the EU textile machinery industry has been rising since a drop in 1991. Due to rationalisation of production and a reduction of the labour force, unit labour costs and total unit costs declined in 1993, causing a rise in the gross operating rate for the industry.

Global production of sewing machines is mainly concentrated in Germany and Japan. Other production facilities within Europe are located in Sweden, Switzerland, Italy and Spain. The rest of the global production takes place in the USA and Asia. Newly industrialised countries in Asia copy Japanese technology and sell their machinery at lower prices.

### Production process

During the 1980s new mechanical technologies provoked a renewal of capital stock, especially in the textile industries of the industrialised countries. Currently, machine manufacturers do not expect innovations that incorporate the potential to push labour productivity to new heights. Investment activities of developing countries in textile machinery are now focusing more on the latest technologies in order to attain cost reductions and higher quality levels through a more efficient and technologically advanced production process.

In contrast to mechanical technologies, the introduction of information and communication technologies (ICT) provide opportunities to increase efficiency. Most machinery provides opportunities for computer added manufacturing (CAM). In spinning and weaving, an integrated data exchange with a production planning system (PPS) is state of the art. The integration of several production steps with an automated flexible manufacturing system (FMS) has been reached, but fully automated production lines are still an exception. In-house integrated data processing connecting R&D, stocks and other logistic functions with the PPS are found in the textile manufacturing industry, but the level of penetration is low.

## INDUSTRY STRUCTURE

### Companies

The EU textile machinery industry consists of mainly small or medium-sized enterprises. There are about 160 German enterprises with roughly 39 % of them comprised of up to 99 employees. Only 24 % of German enterprises employ 500 people or more. The Italian textile machinery industry is more fragmented consisting of 400 enterprises with most companies being small or medium-sized. Among the 20 leading textile machinery manufacturers in Europe there are only two Italian companies.

One reason for the flexibility and innovative potential of the German textile machinery industry is the fact that many companies fall into the medium-sized category. High levels of expenditures on R&D also typify the German machinery sector. Important companies in the German textile machinery sector are: Schlafhorst, now part of the Saurer Group; Lindauer Dornier; Trützschler; and, Monforts and Fleissner GmbH & Co.

The 12 leading French textile machinery makers are: N. Schlumberger & Cie; Asselin; Houget Duesberg Bosson; Thi-beau; I.C.B.T.; Laroche; Staubli-Verdol; Comeureg; S.M.T.I.; Ameliorair; Caemard; and, Superba.

Belgium has a specialisation in the yarn and fabric making processes and the Netherlands has one in the finishing end of the business. Three Belgian companies are: Picanol (weaving machinery), Van de Wiele (carpet equipment) and Gilbos (winding systems). While Stork, Brugman and EFT are internationally operating Dutch companies.

### Strategies

The annual report of the ITMF states that as a result of the recession various textile machinery groups have been subject to reorganisation. The industry has been confronted with internationalisation and increasing competition. The resulting rationalisation of production has led to a number of acquisitions, mergers and other forms of cooperation within Europe and at the international level. The aim of specialised individual textile machinery manufacturers is to become a complete supplier to meet the growing demand of newly industrialised and industrialised countries for fully equipped, highly automated production plants.

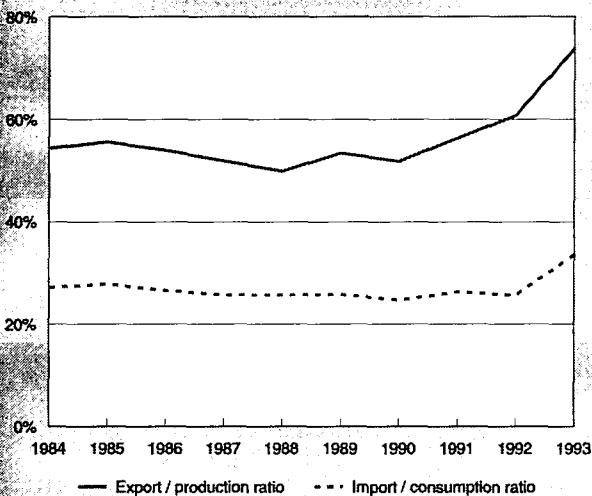
Further standardisation is another strategy. Machinery of accepted standard technology will mainly be sold in developing countries. Another strategy is producing special high-quality and flexible machinery. A relatively small size allows maximum specialisation and close customer relationships. Advanced machinery is especially destined for industrialised countries. Internationalisation also involves import substitution policies, e.g. companies in developing countries that manufacture under licenses of EU manufacturers.

Japanese textile producers are now attempting to reform themselves without being bound by traditional philosophies in areas such as the attitude of textile producing districts, change in generations, distribution structure, creation, manpower development and globalisation.

### Impact of the Single Market

The impact of the creation of the Single Market on the textile machinery industry has been very limited. One reason for this is the already highly international character of the industry. As the largest share of production is sold outside the EU, measures concerning the creation of the Single Market have not affected the major trade flows in the textile machinery industry. The removal of external barriers is considered to be much more relevant for this internationally oriented industry, as are all the measures aimed at diminishing the disadvantages of the small and medium-sized enterprises (SMEs) created by the Single Market.

**Figure 8: Textile machinery Trade intensities**



Source: DEBA

**Table 5: Textile machinery  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.34	1.44
Danmark	0.33	0.34
BR Deutschland	1.74	1.72
Hellas	N/A	N/A
España	0.60	0.67
France	0.45	0.44
Ireland	N/A	N/A
Italia	1.44	1.39
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	0.54	0.44
United Kingdom	0.43	0.30

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## ENVIRONMENT

In new technology development the industry pays a lot of attention to environmental issues such as a reduction of the production of noise (a maximum of 85 decibels being allowed for unprotected workers) and other emissions. Stricter laws on noise levels will raise the prices of machines. However, the trend in noise levels differs according to the kind of machinery. In general, the level will be affected by two factors: the replacement of the noise-making parts with more quiet parts, and by the actual running speed of the machines, which has been increasing.

## REGULATIONS

The Machine Directive (89/392/EEC) will attain its definite character in 1995. This Directive defines essential requirements concerning machine safety, health provisions for people and the environment. Provisions relate to the design, the materials used, the way in which machine operations should be illuminated, machine operation itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. Manufacturers that comply with the provisions of the Directive may affix the CE-mark on their products. In anticipation of the EU Directive for a safer working environment, European manufacturers have already put much effort in to R&D for the improvement of safety conditions of their machinery.

Products labelled with a CE-mark will have free access to the markets of all EEA States. The CE-mark can also become beneficial for EU manufacturers with respect to extra-EU export markets. While technology and know-how are becoming increasingly important to survive, strict EU regulations are inspiring manufacturers to innovate. Maybe not in developing countries, but certainly in Western economies, the CE mark will stand for safe and environmentally friendly machinery and equipment.

In 1992 the Directive for Electromagnetic compatibility (89/336) came into force. The transition period will last until January 1, 1996. The Directive applies to all electric and electronic equipment, systems and installations which can cause electromagnetic disturbances, or which can be influenced by such disturbances. The Directive tries to prevent the electromagnetic susceptibility of machinery and to stimulate the electromagnetic immunity of machinery. Manufacturing of machinery following this Directive implies the incorporation of the relevant measures in the development stage.

## OUTLOOK

Increases in production in Italy, the United Kingdom and some smaller EU countries were responsible for an anticipated overall increase in total EU production of textile machinery in 1994. Production increases are expected to continue in the medium term.

Demand in the EU for textile machinery will not rise in the near future. It will probably only rise in the long run as some replacement investment within the EU and a growing demand for technologically advanced machinery are expected. Technologically advanced machinery, including the application of modern technology, sophisticated automation, electronics and computer-to-computer communications, will generally find its destination in industrialised countries.

Developments outside the EU are particularly relevant for the highly export oriented EU textile machinery industry. Despite intensifying Japanese competition, in particular Asian markets, and a growing tendency towards local production of machinery in current export markets, extra-EU exports are expected to double over the 1987-97 period.

Written by: Netherlands Economic Institute  
The industry is represented at the EU level by: Comité Européen des Constructeurs de Matériel Textile (CEMATEX).



# Chemical machinery

## NACE 324.12

Total production in the EU chemical machinery industry is estimated at 6.5 to 7 billion ECU. The chemical machinery industry is largely dependant on the chemical processing industry. Remarkably, despite a decrease of investments in the chemical industry in 1993 and the prevailing recession, production increased in both Germany and the United Kingdom. This increase was particularly due to rising exports. With respect to demand for chemical machinery, quality control and environmental concerns are playing an increasingly important role. From 1994 onwards, the prevailing adverse economic conditions are expected to gradually improve.

### INDUSTRY PROFILE

#### Description of the sector

The products of the chemical machinery industry can be divided into the following categories:

- producer-gas or water-gas generators;
- centrifuges and dryers; and
- filtration and purifying machinery for liquids and gases.

Important products include: pressure vessels, heat exchangers, process towers and reactors, dryers (rotary, belt, adsorption), piping, filtering engineering, mixers, structural steel engineering, valves and fittings, heavy walled tubulars, air conditioning and jacketpiles.

As several products are not specific to the chemical industry, they have been classified differently within the EU. For instance, the production of water purification equipment is usually, but not always, classified under the heading of chemical plant equipment. Other equipment, which may or may not be considered chemical machinery in national statistics, includes furnaces, heat exchangers and pressure vessels. Comparing statistical evidence by Member State should thus be done with care.

#### Recent trends

Production in the six EU countries considered is estimated at around 6 billion ECU, while estimated total EU production was 6.5 to 7 billion ECU (the countries considered are assumed

to represent 85 % to 90 % of total production). With a trade surplus of 0.6 billion ECU in 1991, demand for chemical machinery was in the range of 5.9 to 6.4 billion ECU. On the basis of the above information, the export rate in 1991 can be estimated to be in the region of 20-22 % and import penetration in the region of 12-13 %.

Germany is still the largest producer of chemical machinery. In 1991 it accounted for a share in the region of 40 % of total production, while Italy and the United Kingdom followed with roughly 15 % each. France probably accounted for about 10 % of total production in 1991. Due to differences in the statistical classification systems, these figures give only an order of magnitude.

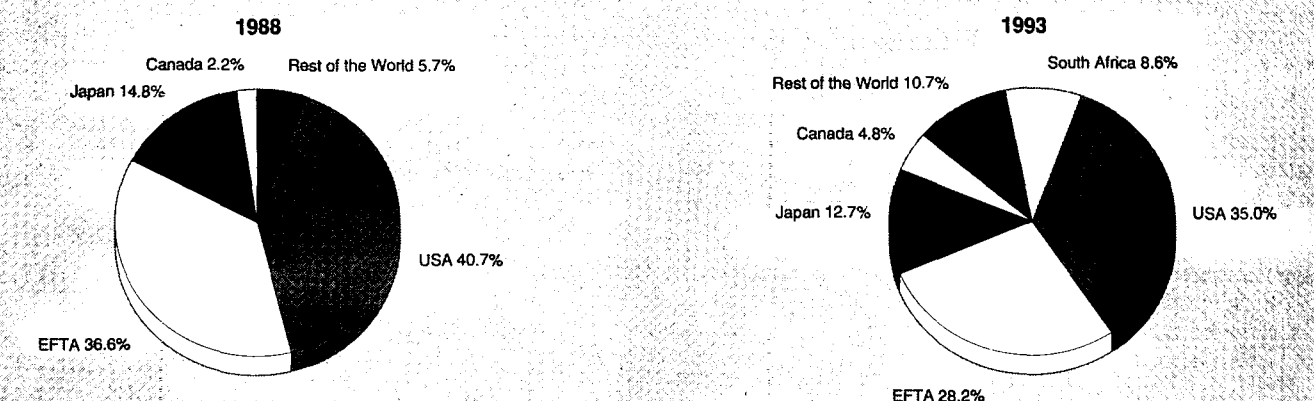
From 1988 to 1991 production in current prices grew at an average rate of 8.3 % per year. However, this rate varied significantly by Member State from 1.5 % in the Netherlands and 2.5 % in Belgium to 21.2 % in France. Two of the major producing countries, the United Kingdom and Italy, recorded average annual growth rates during the period of 6.3 % and 11.5 %, respectively. Available statistical evidence further reveals declining production in the Netherlands for 1992. Conversely, production in Germany and the United Kingdom continued to increase after 1991; although at lower rates than before. Ironically, investments in the chemical industry dropped in 1993 both in Germany (8 %) and in the United Kingdom (14 %) from their 1992 levels. The possible adverse impact of these declining investments on the chemical machinery industry has been compensated for by an increase of extra-EU exports of 16 %. Investments in the chemical industry also dropped in other Member States from 7 % in France to over 20 % in Belgium. Italy and the Netherlands from 1992 to 1993.

#### Foreign trade

Traditionally a sizeable net exporter of chemical machinery, EU saw its export-import ratio decline year by year from 3.4 in 1983 to a low of 1.8 in 1991-92, although the rate of decline slowed after 1986. Remarkably, the rates for 1988 and 1993 were virtually identical (2.22 versus 2.19), indicating that extra-EU imports and exports grew on average at about the same rate per year, namely by 9.7 % and 9.2 %, respectively. However, in 1993 extra-EU imports declined by 3 % and extra-EU exports increased by 16 %, resulting in an increase of the trade surplus of almost 40 %.

The USA, EFTA countries and Japan are the major non-EU suppliers of chemical machinery. In 1993 these countries accounted for 76 % of total extra EU-imports. However, in 1988

Figure 1: Chemical machinery  
Origin of EU imports



Source: Eurostat

**Table 1: Chemical machinery  
Production of chemical plant equipment**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België (1)	55	81	53	57	70	78	79	75	N/A	N/A
BR Deutschland (2)	1 541	1 829	2 097	2 199	2 225	2 135	2 384	2 763	3 023	3 141
France (3)	322	369	388	362	359	526	569	620	N/A	N/A
Italia	418	634	685	710	760	851	966	1 052	N/A	N/A
Nederland	244	255	296	339	511	562	621	521	473	N/A
United Kingdom (4)	676	669	745	712	859	913	1 000	1 030	1 057	1 110

(1) 1990 and 1991 estimated.

(2) 1988 estimated; from 1991 onwards including former East Germany.\*

(3) Estimates, figures do not include machinery for the oil and energy industries.

(4) Including industrial furnaces.

Source: National statistics, ANIMA

this share was 92 %, indicating a loss of market share to other countries. In this respect, mention should be made of South Africa, which increased its share from virtually nothing to 8.6 % in 1993. Eastern Europe also recorded a larger share, although they represented less than 3 % of extra-EU imports in 1993. Poland and the Czech Republic are likewise main suppliers.

The main non-EU export markets for EU chemical machinery manufacturers are the EFTA countries. In 1993 they accounted for one-fifth of extra-EU exports. However, this is a decrease from their one-quarter share in 1988. In contrast, the relative importance of the United States, Eastern Europe and the Far East markets has increased. In 1993 they each accounted for 13-14 % of extra-EU exports for chemical machinery. With respect to Eastern Europe, exports to Poland, Hungary and the Czech Republic increased during the period. Also, export growth to South Korea, Thailand, Taiwan and the Philippines is worth mentioning.

## MARKET FORCES

### Demand

The chemical plant equipment industry has a variety of client industries, all of which are processing industries. Among the customers are: the chemical industry, the petrochemical industry, the pharmaceutical industry, the biochemical industry, the food processing industry, water purification utilities, oil and gas exploration and production companies, refineries, power generation plants, environmental application companies, engineering contracting companies and government institutions. Most client industries follow cyclical business patterns.

Although other processing industries are also important clients, the chemical machinery sector relies most heavily on investments in the chemical industry. During the course of 1989 demand for chemicals started to decline. In 1991, the Gulf war, the recession in some major export markets, the depreciation of the US dollar and the Japanese Yen all added to the adverse development in the chemical industry. The recent recession also resulted in a decline of investments of 13 % in 1993 in the main client industry; however, preliminary figures suggest that this tendency has been partially reversed in 1994. Remarkably, available data suggests that the recent fall in investments did not result in a corresponding drop in EU production of chemical machinery. Production in major producing countries, such as Germany and Italy, even increased in 1993 stimulated by a substantial increase of exports. For the EU as a whole export growth was 16 % in 1993.

EU production of chemical machinery is several times higher than Japanese production (no figures are available for the USA due to differences in industry classification). Capital

investment in the chemical industry of Western Europe is by far the largest in the world, compared with the USA and Japan. Investments in Japan, however, grew faster than in Europe during the 1980s, while investments declined in the EU by 13 % in 1993.

Fierce competition in the downstream industries, and increasing regulatory requirements imposed on them (in particular with regard to safety and environmental issues) continue to be the main factors influencing demand for chemical machinery. Their need to improve energy efficiency, stemming both from the competitive situation and the regulatory context, also remains important. Hence, capital spending by the client industries is increasingly directed towards de-bottlenecking, energy-efficiency, environmental issues and safety.

### Supply and competition

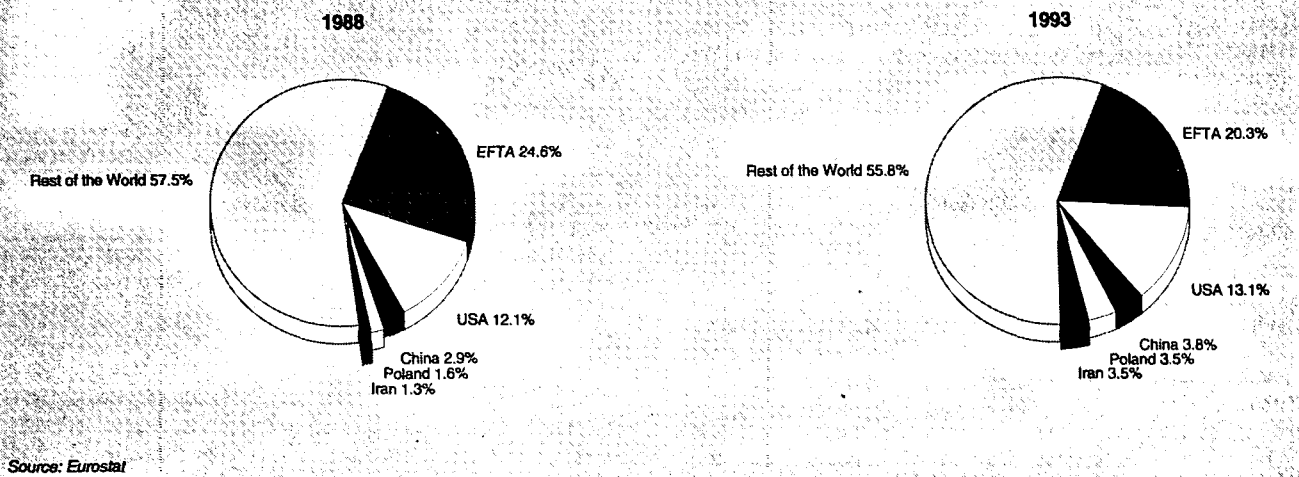
Chemical machinery manufacturers operate on the world market. This applies not only to large firms, but also to small companies. Reasons behind this are the highly internationalised downstream industries, as well as, the existence of large petrochemical multinationals. Since most of the machinery is designed for single-piece work, chemical machinery manufacturers from all over the world can bid for the specialised product needs of a multinational client. The competitiveness generated by this practice keeps prices low, and slow to respond to a booming market. On the other hand, in a recessive market prices tumble quickly.

The USD exchange rate is an important determinant of demand for EU chemical machinery. The prevailing cheap USD not only affects EU exports to the USA, in a more indirect way, it also affects competition with foreign companies in the EU market. Hence, the relatively high-valued EU currencies and the volatility of the USD adversely affects the competitive position of the EU chemical machinery industry. However, in 1993 Italy was an exception to this situation because the lira devaluated by 22 % as compared to the USD.

In order to meet the demand for increasingly sophisticated machinery and to meet clients' requirements with regard to flexibility, the environment and safety, the chemical machinery industry focuses on product innovation to upgrade the quality of their supplies. Areas of particular interest are:

- improvement of 'traditional' chemical process technology, such as, the cogeneration of heat and power, and more efficient and less polluting burner and combustion systems.
- microtechnology, to provide reliable sensors for process control and environmental monitoring.
- environmental technology and biotechnology, which often overlap. For example, biotechnology forms the basis for various promising approaches to soil decontamination. Fur-

**Figure 2: Chemical machinery  
Destination of EU exports**



Source: Eurostat

ther, bioreactors for groundwater treatment achieve purification levels of nearly 100 % for chlorobenzenes.

- 'green chemistry' or 'green technology', which seeks to incorporate environmental consciousness and the notion of sustainability into chemical research and development. This is an effort to shift the balance from an exclusive focus on yield to one that places economic value on minimising or eliminating wasteful by-products.

### Production process

Quality control is a major concern for the chemical industry, which has extended to machinery suppliers. Certification under the ISO 9000 series of quality-assurance standards is increasingly a prerequisite imposed by downstream industries on companies wishing to supply them with machinery. When implemented, these standards often complement industry-specific product standards in assuring customers that the processes and systems used by a supplier are indeed consistent with contractual requirements for quality. To the extent that such purchaser requirements are spread internationally, quality certification will be a tool of competitiveness for the European chemical machinery industry.

CAD/CAM systems are used to design and manufacture machines. Computerisation and application of advanced electronics have become a basic feature in the manufacture of new machinery, not only to improve the efficiency of the machine itself, but also for machine safety, pollution control, precision in operations and the like.

The increasing complexity of the machines, as well as, the higher quality standards with which they must comply, make it necessary to have more and better skilled labour. It is in this area that shortages are common. Spending on in-house training may need to increase.

## INDUSTRY STRUCTURE

### Companies

In the chemical machinery industry there are no large multinational enterprises, although most of the companies engage in exports. Two types of firms can be distinguished: product specialists and jobbers or activity specialists.

Product specialists are firms which design and develop equipment by themselves and can successfully export specific products due to low unit cost. These enterprises are normally medium-sized and export more than half of their production. In addition, they usually have a specific technical knowledge of the process in which the machinery will be involved after production.

Jobbers, or activity specialists are firms which manufacture items from the client's blueprint. This is the most common type of firm in the industry. However, they are less export oriented than the product specialists with exports normally accounting for less than 50 % of production. These firms' knowledge of the processes in which the machinery will be involved is less crucial than for the product specialists.

### Strategies

The strong dependency on its main client industry makes the chemical machinery industry vulnerable in a structural sense and to cyclical swings. One-sidedness can lead to a product-oriented attitude which can be detrimental in a market where competition is growing.

Knowledge of chemical processes can be profitable for an enterprise, because it allows them to discuss with the customer not only the apparatus, but also the whole process in which it is a part. This is important because optimisation of the

**Table 2: Chemical machinery  
External trade in current prices**

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	1 135.1	1 268.1	1 417.5	1 427.4	1 506.5	1 750.1
Extra-EU imports	510.5	619.3	689.0	789.6	824.6	799.9
Trade balance	624.6	648.8	728.5	637.8	681.9	950.2
Ratio exports / imports	2.2	2.0	2.1	1.8	1.8	2.2

Source: Eurostat



**Table 3: Chemical machinery  
Expected real annual growth rates**

(%)	1994-95	1994-98
Apparent consumption	1.5	2.5
Production	2.0	3.0
Extra-EU exports	2.5	3.0

Source: NEI

process cannot be achieved through optimisation of the individual units alone; an overall plan must be made.

Companies are seeking to reduce the negative effects of such over-dependency in two main ways. One way is by engaging in other markets. Given the process oriented products, logical markets are the food, pharmaceutical, power and environmental industries. Other companies are applying knowledge of the main client industry to develop new products for that industry. These companies tend to become niche players. While there are not many real niches in the world market, the companies that find one are much less affected by cyclical downswings.

### Impact of the Single Market

The impact of the creation of the Single Market on the sector has been neutral. The chemical industry is undergoing a restructuring worldwide, which is attributed to the globalization trend in the major downstream markets and not to the single market. The lack of one single European currency is considered an important internal barrier, and should be addressed in priority. Red-tape is another barrier for intra-EU, but also for extra EU operations and trade. Amongst the external barriers to trade which should be addressed are the import duties raised by other world countries, in particular some Far Eastern countries.

### ENVIRONMENT

Unlike the chemical industry, manufacture chemical machinery does not seriously threaten the environment. Moreover, by increasingly applying new production techniques, such as CAD/CAM, energy consumption and waste are reduced as much as possible. New production techniques also have a favourable impact on the ergonomic condition, for example through noise reduction. Finally, technological progress has also induced changes in the products themselves. Advanced chemical machinery is equipped with controlling equipment, and new materials, which can be recycled, are used as composites and components of the machinery.

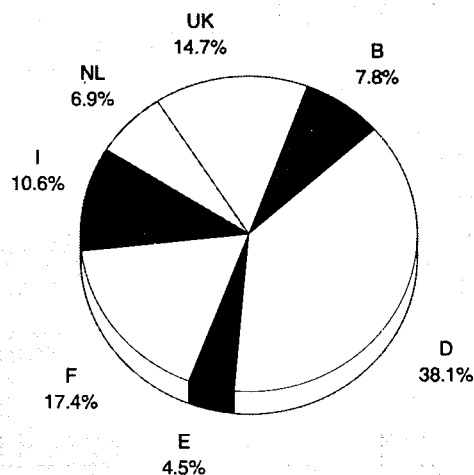
### REGULATIONS

Three EU Directives are of particular interest to the chemical machinery industry: the Machinery Directive, the Directive on pressure vessels and the Electromagnetic Compatibility Directive for electrical equipment. Manufacturers whose products comply with the relevant provisions of these Directives and who have demonstrated this conformity by following the applicable procedures set out in the Directives may affix the CE-mark. This allows free movement of the products throughout the European Economic Area.

The Machinery Directive sets out safety requirements for all machinery. Concerning its application to most chemical machinery, the transitional period for the Machinery Directive expired on 1 January 1995: it is therefore now mandatory.

The Directive on pressure vessels addresses simple compressed gases vessels; especially for oxygen and nitrogen. Pressure vessels have to fulfil certain requirements regarding safety.

**Figure 3: Chemical machinery  
Capital investment in the chemical industry by Member State, 1993**



Source: CEFIC

The Directive does not, however, apply to pressure vessels for nuclear installations, to pressure vessels for the propulsion of ships and aeroplanes or to fire extinguishers.

The Electromagnetic Compatibility Directive lays down mandatory essential requirements concerning emissions of electro-magnetic disturbances and immunity from such disturbances for electrical apparatus, equipment, systems and installations. The transitional period will end on 31 December 1996, until which time manufacturers may choose to comply instead with any relevant national legislation.

### OUTLOOK

The recession in the EU caused an adverse situation in the sector's main client industries, as both output and investments declined. A significant feature was the fall in investments in key countries such as Germany and the United Kingdom. Remarkably, due to increased exports to non-EU destinations, production of chemical machinery increased in these countries. However, during the latter part of 1993 and in 1994, the signs of recovery for the industry have been numerous, and are to be confirmed in 1995.

The current focus from client industries on quality, flexibility, environment, health and safety will encourage technological developments in areas such as the improvement of 'traditional' chemical process technology, environmental technology, biotechnology and 'green chemistry' or 'green technology'. These developments will create opportunities for the EU chemical equipment industry. This applies also to the creation of new export markets, for example in Eastern Europe, although the slow economic restructuring process and the shortage of foreign exchange will restrict short-term demand from these countries.

Short-term growth of the chemical plant industry is expected to be slow. In the medium-term, however, when more of the opportunities can be seized growth will accelerate, but it is still expected to be modest.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Committee of Chemical Plant Manufacturers (EUCHEMAP). Address: c/o FME, Bredewater 20, Postbus 190, NL-2700 AD Zoetermeer; tel: (31 79) 531 1256; fax: (31 79) 531 1365.

# Packaging machinery

## NACE 324.2

The EU is the world's largest manufacturer of packaging machinery. Germany and Italy are the major producing Member States. In 1993 EU demand declined by 10 %. As exports grew by 13 %, production declined by 1.5 %. New opportunities in areas such as Eastern Europe, Central and South America and the Far East have caused major shifts in export patterns.

EU competitiveness will increasingly depend on an enhanced quality of engineering that meets the demand for more versatile and 'environmentally friendly' products. This requires a large R&D effort and a highly qualified labour force.

The new EU Packaging Waste Directive will encourage the use of new packaging materials, which will be a challenge for the manufacturers of packaging machinery.

There are signs of economic recovery. The EU packaging machinery industry is expected to emerge gradually from the recession. Growth will pick up, but without attaining the high pre-1992 levels.

### INDUSTRY PROFILE

#### Description of the sector

The machinery classified under NACE 324.2 varies widely in use. The industry includes: form, fill and seal machines; combined filling and closing machines, group packaging and filling; accessories, parts and spares. These four groups account for around 60 % of total production of packaging machinery; 'other machinery' is accounting for another 40 %. These products are used in a few main downstream industries.

#### Recent trends

In 1993 EU production of packaging machinery totalled an estimated 5.8 billion ECU. Germany and Italy are the most important producing countries; their joint share was 75 % in 1993. Some two thirds of EU production is exported, of which over 65 % has a non-EU destination. With export shares of 74 % and 79 % respectively, Germany and Italy have an even stronger export orientation than the EU on average. These countries also have the lowest import penetration: about one third. This makes Germany and Italy both net exporters; all the remaining Member States recorded trade deficits in 1993.

Total employment in the EU packaging machinery industry is estimated at about 58 000 employees (United Kingdom excluded).

The packaging machinery industry has benefited from a favourable development in recent years. However, the situation deteriorated in 1992. The downswing of the trade cycle in the major industrial countries had an adverse impact on domestic and foreign demand. Furthermore, the reunification boom in Germany came to an end in 1992. These adverse developments caused a drop in growth rates e.g. in Germany the 1992 growth rate was 5 % as against 13 % to 15 % per year from 1989 to 1991. In 1993 the ongoing depression brought about a drop in EU demand for packaging machinery by over 10 %. However, production declined only by 1.5 %, because exports increased by 13 %. This sharp upturn is attributed to the Italian manufacturers, who took advantage of the devalued Lira by pushing their products into industrialised Europe, and to the seizing of opportunities in areas such as East Europe, Central and South America and the Far East.

#### International comparison

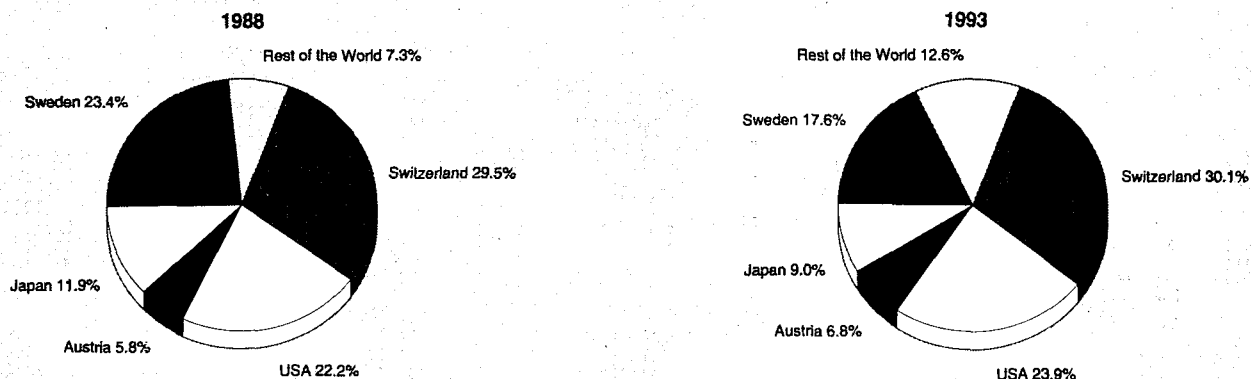
The Triad's total production was 11.8 billion ECU in 1993. The EU held about half of this figure; Japan accounted for 27 % and the USA for 23 %. While Japanese and American firms benefit from large domestic markets European firms have turned to exports markets. Germany and Italy account together for two thirds (intra-EU exports included) of the Triad's exports. Germany is the world's largest exporter. For Japan foreign trade is rather insignificant: only 7 % of production is exported, and only 4 % of Japanese demand is covered by supplies from abroad. For the USA these rates are 19 % and 23 %. The EU is a net exporter of packaging machinery and so is Japan, despite its low export orientation; the USA recorded a trade deficit in 1993.

#### Foreign trade

Throughout 1985-1993 the EU recorded a trade surplus. From 1985 to 1989 this surplus fluctuated from 1.2 billion ECU to 1.3 billion ECU. Then it increased at an average rate of 12.3 % per year, mainly because of growth in exports. Imports remained stable after 1990. Wrapping machines for candy, tobacco products, filling machines for the beverage industry and sundries were the main EU export products.

Three (blocks of) countries account for almost the entire extra-EU imports of packaging machinery: the EFTA countries, the United States and Japan with a collective share of 95 % in 1988 and 92 % in 1993. The EFTA countries were the

Figure 1: Packaging machinery  
Origin of EU imports



Source: Eurostat

**Table 1: Packaging machinery**  
**Main indicators by country, 1993**

(million ECU)	D	F	E	I	NL	UK	JPN	USA
Apparent consumption	1 050	521	280	496	197	885	3 153	2 834
Production	2 737	379	213	1 580	190	717	3 237	2 708
Total exports	2 039	223	89	1 255	234	184	219	521
Total imports	352	365	156	171	241	352	135	647
Trade balance	1 687	-142	-67	1 084	-7	-168	84	-126

Source: COPAMA, NEI

larger trade partner: in 1993 they accounted for 59 % of the extra-EU imports. However, given the relatively small size of extra-EU imports, they met only some 15 % of the EU needs. Although still small, both East European and Far East countries have increased their share in extra-EU imports: from virtually nothing to 2 %, and from 1 % to 2 % respectively.

The share of the developed countries in extra-EU exports has declined from 54 % in 1988 to 36 % in 1993, implying that these countries have become relatively less important for the extra-EU sales of packaging machinery. This is particularly true for the EFTA countries and the USA. The share of these destinations declined from 22 % to around 14 %. Conversely the exports destined for less developed countries, including East Europe and NICs recorded an increase in their joint share from 46 % to 64 %. Export growth to the Far East, including China, and East Europe was the main factor in this development. In 1988 these destinations accounted for respectively 10 % to 11 % of the extra-EU exports; in 1993 this was 17 % and 15 %. The lack of a Japanese export orientation, thus far, has created market opportunities for EU manufacturers in Far East countries. In this group the main countries of destination were China and South Korea. Exports to East Europe were mainly directed at Poland, Hungary and Rumania. The share of Mexico in extra-EU exports has increased remarkably, namely from 1 % in 1988 to 4.5 % in 1993.

The entry of Austria, Finland and Sweden in the EU will sensibly increase the weight of intra-EU trade in the sector.

## MARKET FORCES

### Demand

Demand for packaging machinery comes mainly from the food, beverage and tobacco industry. These industries account for an estimated 60-70 % of total demand. They are followed by the pharmaceutical, chemical and related industries. These downstream industries each have their own specific needs. The fact that these industries meet essential consumer needs causes demand for packaging machinery to be less cyclical than demand for other machinery and equipment.

Quality rather than price is increasingly determining demand for packaging machinery. Future trends in demand will continue to focus on automation, efficiency and flexibility. Ergonomics also has become important. More efficient, reliable, flexible and versatile machinery will enable the manufacturers to respond to the further diversification of consumer demand. This will cause product life cycles to shorten. More flexible and versatile machinery is needed to enable quick change-overs for packaging different products, package sizes and variable quantity production runs. In order to cope with the ongoing de-skilling process in the client industries the operation of the machinery should be made more simple. Furthermore environmental considerations will affect the packaging machin-

**Table 2: Packaging machinery**  
**International comparison of production in current prices**

(million ECU)	1987	1988	1989	1990	1991	1992	1993
BR Deutschland	1 620	1 750	2 020	2 330	2 650	2 790	2 737
Italia	1 184	1 250	1 330	1 425	N/A	1 592	1 580
Japan	1 330	1 730	1 980	2 135	N/A	2 895	3 237
USA	1 770	1 830	2 110	2 060	N/A	2 146	2 708

Source: VDMA, JETRO, PMMI, UCIMA, COPAMA, Ifo Institute

**Table 3: Packaging machinery**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	1 495	1 635	1 724	1 600	1 729	1 911	2 093	2 258	2 468	2 782
Extra-EU imports	396	389	377	417	462	540	620	639	595	602
Trade balance	1 099	1 246	1 347	1 183	1 267	1 370	1 473	1 620	1 873	2 180
Ratio exports / imports	3.8	4.2	4.6	3.8	3.7	3.5	3.4	3.5	4.1	4.6

Source: Eurostat

ery industry. They imply a gradual movement from plastic packaging to cartons. For instance blister packs are being replaced by hanging carton.

### Supply and competition

Many European, e.g. Italian manufacturers have invested heavily in research and development, and in production equipment in recent years. The resulting improvement of the quality of engineering has made their products more in compliance with current market requirements, which stress flexibility, production speeds and fast change-over times.

The minor Japanese share on the world market and its low export ratio can be explained by the fact that the packaging machinery industry is characterised by small businesses producing custom-tailored products that require extensive after-delivery service. For this reason the Japanese have been focusing on the nearby and large domestic market. Once the industrial trend is moving towards more standardised machinery and equipment, Japan will be able to develop similar advantages as they have in the automotive and other industries. However, as long as the market stresses engineering and tailor-made solutions, no large threat should be expected from the Japanese. For example, the export share of Japan in extra-EU imports declined between 1988 and 1993 from around 12 % to 9 %.

In contrast with other US machinery manufacturing industries, the packaging machinery industry seems to have been able to benefit from the lower dollar exchange rate. USA exports increased by 4 % in 1991, and by nearly 10 % in 1992. However, in 1993 they remained virtually stable. Compared to Italy and Germany, the USA export share is rather low (around a quarter). The USA packaging machinery is noted for its robust construction and sophisticated electronics.

The high degree of concentration in downstream industries such as in the food industry, might result in price cuts and lower margins in the long run. The packaging machinery industry, however, is itself also moving towards more concentration and a further internationalisation.

### Production process

Like in other mechanical engineering industries - especially where custom-tailored products are being produced - the labour force is an important asset. As a consequence, the quality of the labour force and thus the quality of the training programs is a major factor influencing the success of EU industry in the long run. Therefore, the quantity and quality of education and training should be maintained, if the technological ad-

vantage of the industry is not to fall behind. Furthermore, when demand for well-trained employees exceeds the supply of labour, productivity losses are likely to occur.

Keeping the quality of the labour force, however, should not lead to excessive wage increases. Sharp rises in input prices of materials and labour wages - as happened during the last couple of years - will have a negative impact on the industry's profitability and will cause reduction in investments weakening the competitiveness of EU firms.

The extent to which a manufacturer of packaging machinery is able to meet customer requirements is also determined by the quality and precision of its production equipment. The increasing demand for versatile machinery for instance requires advanced production equipment together with high labour skills and large investments in R&D.

## INDUSTRY STRUCTURE

### Companies

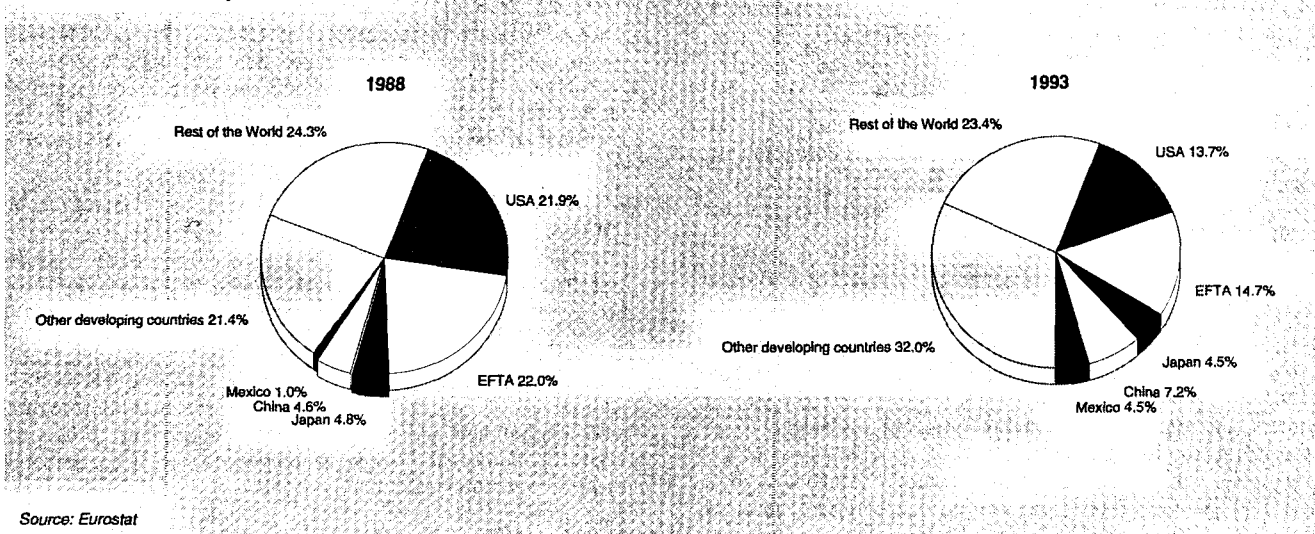
The total number of enterprises in the EU belonging to NACE 324.2 is estimated at some 1 050 in 1993. With an average of 60 to 65 employees and an average turnover of some 5.5 million ECU, these companies are mostly medium-sized, although figures vary by Member State. Average employment ranges from less than 20-25 employees in France and Spain to 90-100 in Germany and the Netherlands; average turnover varies from 2.0-3.0 million ECU in Spain and the United Kingdom to 8.0-10.0 million ECU in Germany, Italy and the Netherlands.

### Strategies

In general the enterprises focus on one market segment (e.g. mostly one machine function for a specific client industry). This also applies to larger firms, like for example Krones which focuses only on the beverage industry. Firms such as Bosch (D) and SIG (CH), which offer a whole range of products for several downstream industries, are still rare. A trend towards vertical integration might have been set by the two Swedish multinational companies Tetra Pak (milk and juice packaging group) and Alfa-Laval (manufacturer of food and other industrial equipment). Tetra Pak took over Alfa-Laval, thereby creating the possibility of 'one-stop shopping' as packaging and processing machinery can be bought from the same group.

Company strategies have been reviewed in response to the general market expansion caused by the Single Market, the

**Figure 2: Packaging machinery  
Destination of EU exports**



Source: Eurostat

**Table 4: Packaging machinery  
Expected real annual growth rates**

(%)	1993-94	1993-96
Apparent consumption	0.0	1.5
Production	1.0	2.0
Extra-EU exports	1.5	2.5

Source: NEI

German unification and the political changes in the former East bloc countries, and also to developments in specific markets. The general trend towards higher concentration through mergers or cooperation follows from these developments. Cooperation enables companies to offer tailor-made machinery and equipment to meet customer needs. A further explanation for the concentration of activities can be the threat of increasing market power of the large multinationals that dominate the downstream markets. This might lead to lower margins for the manufacturers of packaging machinery.

On the other hand, the expansion of the same multinationals in the former East bloc countries also offers market opportunities for EU manufacturers of packaging machinery. A further internationalisation will increase the strength of current market positions, and enhance opportunities to benefit from the European unification.

### Impact of the Single Market

The larger market and the harmonisation of regulations are considered to have been the main two (positive) effects of the single market on the packaging machinery sector. These have nevertheless not translated into a notable increase in production or trade, as harmonisation facilitates but does not really stimulate trade. An important remaining internal barrier concerns the differing regulations of the individual Member States with respect to safety and other related issues for the packaging machinery. The removal of these barriers should be the next priority.

### ENVIRONMENT

The growing consciousness among consumers regarding environmental issues together with the growing influence of downstream industries and retail channels on packaging decisions is affecting the packaging machinery industry.

Ever more restrictive legislation is determining the nature of packaging and packaging material, particularly in the West and North European countries. This has caused a growing demand for recyclable packaging material and 'environmentally friendly' packaging. For example, the Dutch government, the food industry and retailers in the Netherlands have concluded an agreement to switch to the recyclable glass bottles and discontinue the use of PVC packaging.

In the near future a growing demand is expected for form, fill and seal machinery, resulting from the rising demand for snacks and food in thermoform-packages. Other growing segments are combined filling and closing machinery and for group packaging.

### REGULATIONS

Packaging machinery manufacturers are preparing for the Machinery Directive, which is coming into force on January 1st, 1995. This Directive sets out safety requirements for all machinery, and hygiene requirements for machinery used to make or package food. Compliance with the provisions set in the Machinery Directive entitles manufacturers to affix on their machines the CE mark (Conformité Européenne). The com-

mercial value of the CE mark is that it will bring about free trade among the Member States. Currently Member States apply different technical and quality standards with respect to safety and hygiene, implying an obstacle to free intra-EU trade. Once carrying the CE mark a product is entitled to enter the EEA (European Economic Area) market, and individual States cannot refuse the product to their markets.

The CENTEC 146 EC safety standards also apply to the packaging machinery. In each member country, the packaging machinery manufacturers are cooperating with their national standards organisation to develop European standards.

The industry will also be affected by the Packaging and Packaging Waste Directive. This Directive must prevent the occurrence of differing national regulations, which would violate the Single Market principle. For example, the German Packaging Ordinance is said to constitute a barrier to free trade within the Community. Within the framework of the Packaging and Packaging Waste Directive, the EU Council of Ministers has agreed upon the upper and lower limits for recovery and recycling waste, and has developed a hierarchy of waste management options. This hierarchy places a high emphasis on waste reduction at the source and re-use of materials in the production of packaging. Despite the common position reached by the Council of Ministers the Directive is facing an uncertain future; Germany, the Netherlands and Denmark opposed, because of the watering down of the Directive; both the recovery and recycling targets were considered to be too low. Later Belgium and Luxembourg joined the opponents. Their refusal upset the delicate balance of votes within the Council, which requires that a qualified majority of the Member States support an initiative. In the meantime national legislation will prevail.

Changing requirements regarding packaging and packaging waste, such as the prohibition of excessive packaging and the substitution of certain raw materials by less polluting materials (e.g. a shift from plastic to board) might affect the machinery industry too. Enforcement of the development and production of new packaging materials could encourage the demand for new and innovative machinery.

Finally, the Electromagnetic Compatibility Directive for electrical equipment is relevant to the (packaging) machinery industry. This Directive comes into force on January 1, 1996.

### OUTLOOK

In 1989-1991 the EU packaging industry recorded double digit growth rates of 13 % to 15 % per year. However, since the autumn of 1992 manufacturers continued to feel the effects of the ongoing economic slump in major markets, which together with the ending of the reunification boom in Germany led to a much lower growth rate (5 %) than in the preceding years. In 1993 the ongoing recession caused a drop in the sales of packaging machinery of 1.5 %. This decline was much smaller than the drop in EU demand which was 10 %, as increase of 13 % in sales outside the EU compensated largely for this decline; the EU industry benefited from the recovery in the United States and from the growth of new markets in the Far East and Eastern Europe.

It is expected that from 1994 onward, the EU industry will gradually emerge from the recession, but growth rates as before 1992 are not envisaged. In 1994 production is expected to stabilise. After 1994, production growth will gradually pick up.

The EU industry already has strong footholds on the world market. However, in order to retain its competitiveness substantial effort and resources must be allocated to research and development and training of the labour force. This will allow the industry to respond effectively to the shift in demand to more versatile machinery.



New legislation such as the Packaging and Packaging Waste Directive, may give rise to a change in raw material requirements for packaging, and could create a stimulus for the manufacturers of packaging machinery. However, at the same time this legislation may increase cost in the client industries, thereby putting their profit margins under pressure, and lowering investment incentives.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Confederation of Packaging Machinery Association (COPAMA). Address: c/o VDMA, Lyoner Strasse 18, D-60528 Frankfurt/Main; tel: (49 69) 6603 1431; fax: (49 69) 6603 1211.



# Plastics and rubber machinery

NACE 324.3

*Rapid growth of the plastics and rubber machinery sector in the European Union has been interrupted in the last few years by the downturn in the global economy. The UK economy is already beginning to improve and it is expected that this will spread. Former environmental threats are now perceived to present new opportunities for technical innovation and new products. The Far East and Eastern Germany are emerging as the big markets for the future, but tough competition is to be expected from the Japanese. Nevertheless, the sector is in good shape to take full advantage of the return to growth.*

## INDUSTRY PROFILE

### Description of the sector

The plastics and rubber machinery manufacturing industry in Europe has a turnover of around 7 billion ECU, comprises about 600 companies and employs about 60 000 people. The industry manufactures a wide range of equipment for use by trade converters and in-house manufacturers of consumer and industrial products. The range of machinery includes: extruders, injection moulding and blow moulding machines, compression presses, foam converting and thermoforming machines. It also manufactures other equipment not separately classified, such as granulators, calenders, mills and a variety of spare parts and ancillaries.

Recently, specialised equipment has been developed for recycling materials and products into secondary applications in support of the general trend towards care for the environment. Most of this type of machinery can be adapted to suit particular requirements for processing plastics or rubbers. The machinery ranges in size from small bench-top machines for making small precision components to giant plants for making large storage tanks. Products made on such machinery range from: light weight burger cartons to large building insulation slabs in expanded polystyrene; medical catheter tubing to large diameter sewer pipes; and, miniature high precision computer components to full size truck cabs.

The wide range of plastics and rubber materials in use requires machinery specifications to be adaptable to suit their particular processing characteristics. Specialised machinery, such as tyre forming, vulcanisation and associated equipment and compounding mills are particular to rubber processing.

The world's leading producers of plastics and rubber processing machinery are based within the EU and include: Germany, Italy, France, UK, Austria, Netherlands, Spain and Luxembourg. Germany and Italy are the principal producers having shares of a half and one-third, respectively. The other countries together account for just one-fifth of the total.

An analysis of the production and consumption figures by machinery type shows the leading role that injection moulding and extrusion machines play in the processing sector.

### Recent trends

Apparent consumption, using total trade data in the four principal EU Member States, rose by an annual average of 20 % between 1984 and 1988, making this sector one of the fastest growing in the EU during the last decade. However, between 1988 and 1993 this average (excluding intra trade) was -4.0 % due to an average annual decrease in consumption of 27.7 % between 1991 and 1993.

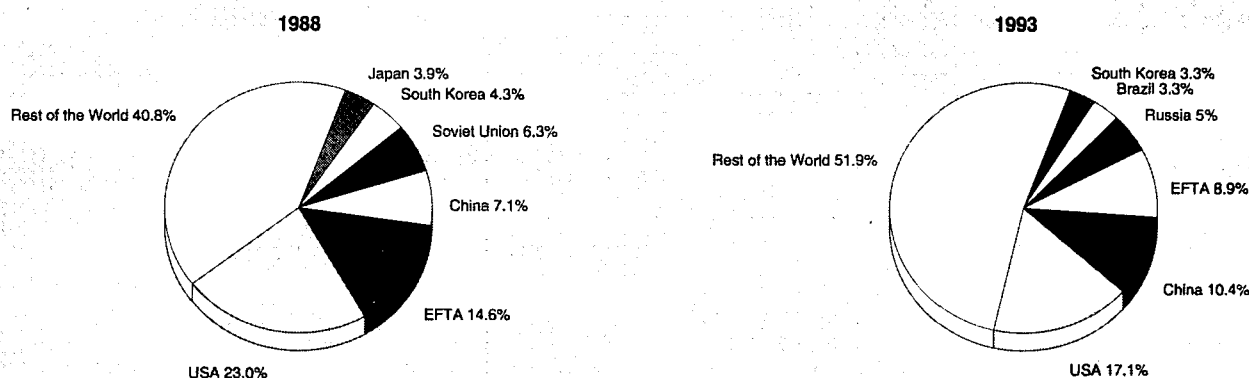
Production of machinery in these countries in 1993 totalled around 4.5 billion ECU, a decrease of about 5 % compared with the previous year. This decline is, however, less than that experienced in the previous year and is regarded as a temporary interruption in the continuing growth of the sector.

Total exports during this period showed growth of 8.5 % from 3.64 to over 3.95 billion ECU. This gives the industry confidence that its competitive strengths will enable it to take advantage of the upturn in investment by the plastics processing sector, which is already starting to happen as demand in world markets begins to grow.

### International comparison

European manufacturers are continuing to build upon their long established technological leadership in this sector and have established a commanding position with over three quarters of the world market. Competition from the USA, Canada and Japan continues to intensify, but prospects remain good for European manufacturers whose knowledge and experience give them an overall advantage. The growing ASEAN countries are being targeted as an area of great opportunity for the near future.

**Figure 1: Plastics and rubber machinery  
Destination of EU exports**



Source: Eurostat

**Table 1: Plastics and rubber machinery**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption (2)	1 399	1 632	1 890	2 631	2 850	3 557	4 287	4 456	2 994	2 328
Production	2 645	3 271	3 758	4 277	5 058	5 615	6 513	6 386	4 734	4 489
Extra-EU exports	1 154	1 431	1 515	1 410	1 664	1 911	2 029	1 797	1 877	2 268
Trade balance (2)	1 246	1 639	1 868	1 646	2 208	2 058	2 226	1 930	1 740	2 161

(1) Germany, France, Italy and the United Kingdom only.

(2) Calculated using data for total trade (intra and extra trade flows).

Source: Euromap/BPF, Eurostat

**Table 2: Plastics and rubber machinery**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption (2)	Production	Total exports (2)
Injection moulding machines	391.4	788.5	639.2
Extruders	380.1	805.6	527.5
Blow moulding machines	100.8	455.5	405.7
Thermoforming machines	73.1	140.0	91.9
Others	776.5	1 405.8	1 098.9
Parts	348.9	790.8	1 190.4
Total	2 070.8	4 386.2	3 953.6

(1) Germany, France and Italy only.

(2) Calculated using data for total trade (intra and extra trade flows).

Source: Euromap/BPF

**Table 3: Plastics and rubber machinery**  
**Average annual growth rates (1)**

(%)	1984-88	1988-93	1991-93
Apparent consumption	19.5	-4.0	-27.7
Production	17.6	-2.4	-16.2
Extra-EU exports	9.6	6.4	12.4
Trade balance	15.4	-0.4	5.8

(1) Germany, France, Italy and the United Kingdom only.

Source: Euromap/BPF, Eurostat

**Table 4: Plastics and rubber machinery**  
**External trade in current prices**

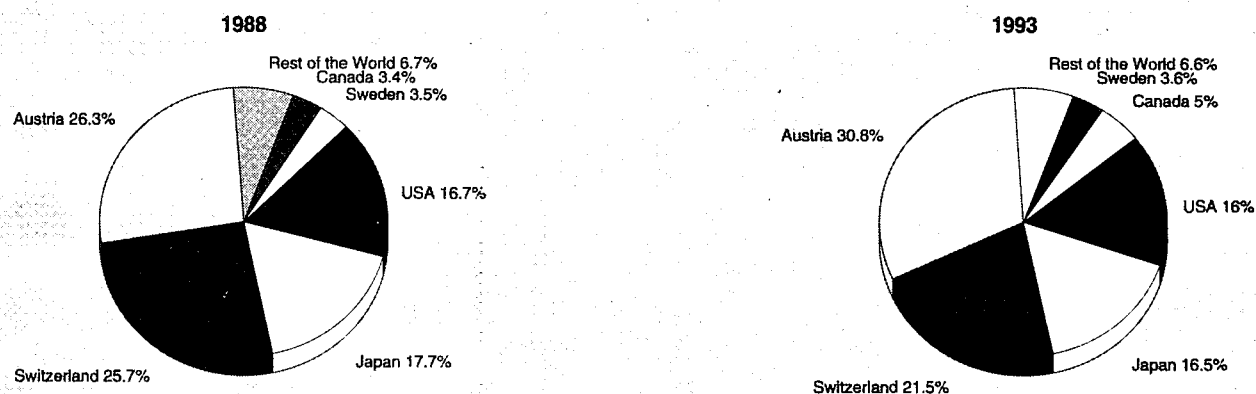
(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	1 196	1 493	1 597	1 516	1 763	2 020	2 157	1 913	2 026	2 454
Extra-EU imports	270	338	368	431	544	655	713	776	724	677
Trade balance	926	1 155	1 229	1 085	1 220	1 365	1 444	1 137	1 302	1 776
Ratio exports / imports	4.4	4.4	4.3	3.5	3.2	3.1	3.0	2.5	2.8	3.6
Terms of trade index (1)	93.1	92.2	95.5	99.3	100.0	97.1	100.0	98.2	101.1	94.3

(1) NACE 324.

Source: Eurostat



**Figure 2: Plastics and rubber machinery  
Origin of EU imports**



Source: Eurostat

**Table 5: Plastics and rubber machinery  
External trade by Member State, 1993**

(million ECU)	EU	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK
Extra-EU exports	2 453.8	47.3	23.9	1 370.6	5.0	25.1	234.7	2.0	557.8	80.6	1.4	105.4
Extra-EU imports	677.5	43.1	17.9	246.7	7.0	36.8	97.9	12.2	56.1	34.4	17.2	108.1
Trade balance	1 776.3	4.2	6.1	1 123.9	-2.0	-11.7	136.8	-10.2	501.6	46.2	-15.8	-2.7
Ratio exports / imports	3.6	1.1	1.3	5.6	0.7	0.7	2.4	0.2	9.9	2.3	0.1	1.0

Source: Eurostat

### Foreign trade

Germany still ranks first in world exports of plastics and rubber machinery in 1993, with 29 % of the total. Japan is now in second place with about 18 % and Italy third with 13 % of the total. Overall, European manufacturers secured 61 % of world exports in 1993. A 5 % recovery in the growth rate of European exports was seen over the last year reversing the trend of the previous three years. Most trade during this period was within the EU, with the UK and France being main destinations.

The single European market already exists in the plastics and rubber machinery sector. As for potential markets in Eastern Europe, they have yet to show signs of anticipated growth.

Growing internationalisation of the major consumer product manufacturers is leading to internationalisation of their key suppliers and of manufacturing standards.

### MARKET FORCES

#### Production process

Computerisation of control systems continues to be a prime feature of machinery specifications. It has become an essential requirement for the integration of processing machinery into modern production lines to meet ever increasing quality standards and productivity levels. European protocols have now been established for these computerised control systems and for links to ancillary equipment and central computers. Automation and robotics are also now well established features

**Table 6: Plastics and rubber machinery  
Production and consumption by Member State, 1993**

(million ECU)	Apparent consumption (1)	(%)	Production	(%)
BR Deutschland	953.4	41.0	2 589.3	57.7
France	303.3	13.0	346.9	7.7
Italia	814.1	35.0	1 450.0	32.3
United Kingdom	257.4	11.1	102.6	2.3
Total	2 328.2	100.0	4 488.8	100.0

(1) Calculated using data for total trade (intra and extra trade flows).

Source: BPF/Euromap

of modern plastics and rubber processing machinery and equipment.

Environmental pressures have led to big improvements in machinery designs aimed at reducing product weight, collecting and recycling process waste, and optimising energy consumption. For example, new machinery has been developed to efficiently reprocess and recycle used products collected from the domestic and industrial waste streams to reduce their impact on the environment and, ultimately, to recover the residual energy content of end-of-life components.

New plastics materials, products and applications continue to challenge machinery manufacturers ingenuity. However, European manufacturers are still at the leading edge of innovation in machinery design and development.

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## INDUSTRY STRUCTURE

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### Companies

The leading machinery manufacturing companies in the EU include: Krupp (D); Battenfeld (D); Klockner (D); Mannesmann (D) (including DEMAG and Krauss-Maffei); Sandretto (I); Reifenhauser (D); Engel (A); Stork (NL); Billion (F); Negri Bossi (I); Francis Shaw (UK); Netstal (CH); Bucher Guyer (CH); and Windmüller and Hölcher (D).

In the face of growing competition from Eastern Asia, the progressive trend of mergers and acquisitions continues as resources are rationalised and expertise is consolidated.

### Impact of the Single Market

The creation of the single market is considered positive from a general point of view. Due to the already existing international character of the industry, however, the impact of the Internal Market programme on the sector has been limited. A current obstacle for a further facilitation of trade concerns the regulations of the individual Member States with respect to safety and other related issues for the plastics and rubber machinery. Removal of this barrier should have a high priority. Another priority is related to external barriers which still exist with respect to exports to third countries. The EU should encourage mutual recognition of regulations on a global scale.

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## ENVIRONMENT

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Environmental considerations continue to grow as public opinion and legislation focus increasingly on energy conservation and pollution. Policies, codes of practice and legislation are impacting upon products and machinery specification and design.

The EU Machinery sector, through its trade associations, has been at the forefront of developments in design and technology to facilitate the exploitation of opportunities for improving products and processes. Modern machinery enables the minimisation of product weight and process waste, has low process emissions and maximises energy efficiency. Special machinery has been developed for the efficient collection, conveying, size reduction and reprocessing of domestic and industrial waste. The sector also collaborates closely with other pan European organisations in relevant promotional and educational activities.

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## REGULATIONS

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Implementation of the new Machinery Directive has had a major impact upon the sector during the year. Consequently, manufacturers and users have focused a great deal of time and effort into ensuring compliance, which is consistent with remaining competitive in the international marketplace.

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## OUTLOOK

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The UK economy started to improve in 1993 and is expected to continue over the next few years. Other principal European countries in the plastics and rubber machinery industry are also beginning to see signs of improvement. The sector has undergone some painful restructuring in order to survive in the interim and to sharpen up to compete in the future.

Winning potential new markets in the ASEAN region will provide a formidable challenge. Also, the market in Eastern Germany has yet to develop. This will present a considerable challenge in the face of growing competition.

Environmental threats will provide opportunities for EU machinery makers to exploit their leading technological expertise.

Growing markets for plastics and rubber products include: packaging; building and construction; transport; and, electrical/electronic goods. These markets are becoming increasingly international in their structure and more demanding in their product standards. The EU Machinery sector is fit and ready to take advantage of these opportunities as the international economic climate begins to improve.

Written by: British Plastics Federation

The industry is represented at the EU level by: European Committee of Machinery Manufacturers for the Plastics and Rubber Industries (EUROMAP). Address: c/o VDMA Postfach 710864, D-60498 Frankfurt; tel: (49 69) 660 3840; fax: (49 69) 660 3831.

# Machinery for lifting and handling

## NACE 325.5

*The manufacturers of lifting and handling equipment basically produce investment goods. Therefore, demand is largely dependent on investment decisions in downstream industries. Manufacturing industries (consumer and capital goods), construction, transport and warehousing are major client industries.*

*R&D and highly qualified labour are essential for the industry. Customisation as well as environmental, ergonomic and safety considerations have increasingly become the driving forces behind technological and product development in the industry. Most companies are specialised in certain kinds of machinery and focus on specific market segments.*

*After years of continuous growth during the 1980s production fell in the early 1990s due to the economic recession. Although market demand is still not satisfying, there are signs of economic recovery. In 1993, the UK production of machinery for lifting and handling started to increase, a trend which is also expected for other Member States in the short term.*

### INDUSTRY PROFILE

#### Description of the sector

Lifting and handling equipment guarantees the physical flow of goods in all production processes and throughout the whole value chain. The industry covers the following products: conveyers, cranes, pneumatic handling equipment, hoists (electric and pneumatic), elevating work platforms, storage/warehousing and retrieval machinery, and industrial trucks. The industrial trucks industry includes any wheeled vehicle, not running on rails, which is designed to carry, tow, push, or lift any kind of load. Besides these industrial applications, the sector also produces lifting and transport machinery to convey people, such as lifts, escalators, passenger conveyors, ropeways, cablecars and ski-lifts.

Continuous handling equipment (conveying and loading equipment for bulk and unit loads) is the largest segment in Europe with a 26 % market share. Fork-lift trucks, lifts/escalators for passengers and storage/warehousing machinery follow with market shares of about 17 % each, cranes account for approximately 11 % and serial lifting comes in at 7 % of the total. These figures are, however, estimates as they do not fully account for warehousing equipment and does not handle person lifts.

Warehousing equipment includes high-lift trucks/stackers, reach trucks, narrow aisle trucks, medium and high-lift order pickers, pallet trucks and other vehicles.

#### Recent trends

According to FEM, in 1993 EU production of lifting and handling equipment accounted for 15.4 billion ECU and consumption totalled 14.2 billion ECU. Germany, France and the United Kingdom were the primary producing countries with Germany accounting for 47 % of total EU production, France and the United Kingdom each representing 21 % and Italy following at 9 % of total production.

After years of continuous growth in the 1980s, production (in current prices) dropped during the period 1991-93 by 2.3 billion ECU or 13.3 % due to the world-wide economic recession. All Member States recorded production declines over the period; however, the declines were highest in Italy (-41 %) and the Netherlands (-30 %) and relatively low in the 3 major

producing countries of Germany (-3 %), France (-10 %) and the United Kingdom (-9 %).

Due to the economic recession and resulting over-capacity, employment in the industry also decreased over the 1991-1993 period. Labour markets for machinery for lifting and handling in Italy and Germany were hit extremely hard by the recession evidenced by employment drops of 34 % and 23 % respectively. In the Netherlands employment decreased by 14 %. Remarkably, France recorded a 4 % rise in employment.

#### International comparison

The EU is the world's major producer of lifting and handling equipment. In 1992 EU production amounted to nearly 16.5 billion ECU, while production levels in North America and Japan reached 13 billion ECU and 8.3 billion ECU, respectively. With an export share of 35 % (including intra-EU trade), European manufacturers depend heavily on foreign markets, compared to a 29 % share for Japanese exports and 18 % in North-America. In 1992, 16 % of the total EU production was sold in non-Member States. With respect to imports, 30 % of the EU domestic demand was covered by foreign suppliers (including intra-EU imports), as compared to 15 % in North-America and a meagre 5 % in Japan.

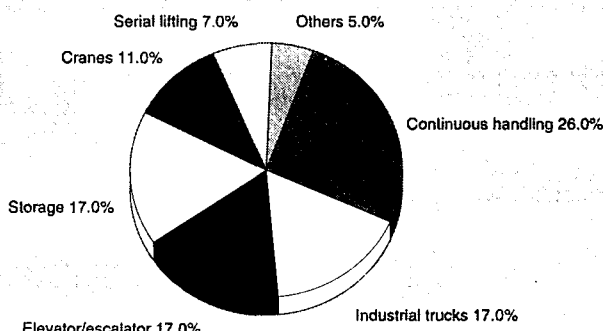
#### Foreign trade

Most of the foreign trade for individual Member States involves intra-EU trade. In 1992, 58 % of total EU exports found their destination in other Member States, while 70 % of EU imports had their origin in other Member States.

In current prices extra-EU trade in lifting and handling equipment has grown by 41 % between 1988 and 1993. Extra-EU exports increased by an average annual rate of 5.1 % and extra-EU imports rose by an average annual rate of 4.4 %. As a consequence, the export/import ratio increased from 2.0 in 1988 to 2.2 1993. Imports actually grew faster than exports between 1988 and 1991, but have since been declining.

Throughout the 1988-1993 period, the EU has been a net exporter of machinery for lifting and handling equipment. Until 1993, the trade surplus ranged from 1.1 to 1.2 billion ECU, but due to a substantial drop in extra-EU imports in 1993 it has grown to 1.5 billion ECU. Germany alone accounted for 47 % of the total EU trade surplus, followed by Italy (19.5 %) and the United Kingdom (16.3 %). In the same

**Figure 1: Machinery for lifting and handling European production by segments, 1993**



Source: FEM

**Table 1: Machinery for lifting and handling**  
National production values and employees in 1989, 1991 and 1993

(million ECU)	National production			National production			FEM Members		
	1989	1991	1993	1989	1991	1993	1989	1991	1993
EU 9 (1)	N/A	17 741	15 709	10 424	11 270	N/A	101 729	114 760	96 131
Belgique/België (2), (3)	N/A	120	100	53	72	N/A	600	900	900
BR Deutschland	5 543	7 426	7 214	4 105	4 951	4 644	52 000	65 000	50 000
España (2)	237	232	210	192	179	N/A	2 800	2 500	2 500
France	2 846	3 599	3 241	1 993	2 610	2 336	28 000	28 500	29 600
Italia	2 268	2 348	1 375	1 782	1 674	995	13 260	12 280	8 121
Luxembourg	N/A	33	31	29	33	31	289	320	310
Nederland	N/A	449	313	347	403	117	3 580	4 060	3 500
Portugal (2), (3)	N/A	22	20	20	22	N/A	1 200	1 200	1 200
United Kingdom	3 502	3 512	3 205	1 903	1 326	N/A	N/A	N/A	N/A
Czechoslovakia	N/A	152	N/A	210	101	N/A	N/A	N/A	N/A
Finland	N/A	559	485	566	433	N/A	3 800	3 600	N/A
Sweden	985	553	N/A	776	443	N/A	6 000	6 300	N/A
Switzerland	726	995	870	670	851	860	6 930	6 590	5 900
Total	N/A	20 000	N/A	12 646	13 098	N/A	N/A	N/A	N/A

(1) Excluding the United Kingdom for employment.

(2) National production for 1993 estimated by NEI.

(3) Employment for 1993 was assumed to equal the level of 1991.

Source: FEM

year only Belgium/Luxembourg. Greece and Portugal recorded negative trade balances with non-Member States.

In 1993 the former EFTA countries and the USA together accounted for almost 32 % of EU exports of machinery for lifting and handling. However, the relative importance of these export markets has declined since 1988. The USA's share has dropped from 15 % in 1988 to 11 % in 1993. In contrast, China, other Far Eastern countries and countries in the Middle East have become increasingly important as export markets for EU equipment. Their joint share in EU exports increased from around 16.5 % in 1988 to 28.5 % in 1993.

Excluding the former EFTA countries, Japan and the USA are the major non-EU suppliers of machinery for lifting and handling, together accounting for 32 % of EU imports. Although this share remained fairly stable between 1988 and 1993, some shifts among the individual countries' shares can be observed. Whereas Japan saw its share decrease from over 24 % in 1988 to 16 % in 1993, the share of the USA remained at a rather stable level of 14 % to 15 %.

However, although it is true that direct official imports from Japan have decreased, "grey" imports of lifting and handling vehicles of Japanese origin increased alarmingly during the same period. In 1994, "grey" imports dwindled thanks to Commission monitoring.

## MARKET FORCES

### Demand

The products of this sector are basically capital goods. Thus, demand is highly dependent on investment decisions of downstream industries. The client industries differ by type of machinery with each having their own unique characteristics. Manufacturing industries (consumer and capital goods), construction, transport and warehousing are all of particular interest to the manufacturers of lifting and handling equipment.

Traditionally, the role of warehousing within the manufacturing industry has been to achieve the three objectives of: storing products manufactured at an optimum production rate against perceived customer demand; setting up stocks against production shortfalls; and anticipating seasonal demand patterns. Nowadays however, the importance of these factors is diminishing as more flexible production planning is developed, better information on customer demand is available and more open relationships between manufacturer and customer are established.

As materials handling and logistics are the most effective ways to gain flexibility, this sector is less affected from investment cutbacks in the client industries. Demand, therefore, is expected to increase in the anticipated climate of economic recovery in the immediate future.

**Table 2: Machinery for lifting and handling**  
External trade in current prices

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	2 186	2 452	2 669	2 651	2 668	2 798
Extra-EU imports	1 115	1 349	1 442	1 587	1 559	1 286
Trade balance	1 071	1 102	1 228	1 064	1 109	1 512
Ratio exports/imports	2.0	1.8	1.9	1.7	1.7	2.2

Source: Eurostat



**Table 3: Machinery for lifting and handling  
External trade by Member State, 1993**

(million ECU)	EU	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK
Extra-EU exports	2 798.1	45.5	112.3	1 150.0	2.3	130.4	338.7	29.5	380.5	141.5	2.4	465.1
Extra-EU imports	1 285.9	108.3	57.5	446.2	12.2	77.0	153.3	8.6	85.4	100.0	19.4	218.0
Trade balance	1 512.3	-62.8	54.8	703.7	-9.9	53.4	185.4	20.8	295.1	41.5	-17.0	247.1
Ratio exports/imports	2.2	0.4	2.0	2.6	0.2	1.7	2.2	3.4	4.5	1.4	0.1	2.1

Source: Eurostat

### Supply and competition

The EU industry for lifting and handling equipment is highly diversified. Despite the cyclical character, profit rates have remained fairly stable and even improved at the end of the 1980s, reflecting the fairly limited role of price competition. In contrast, competition concentrates on quality (assurance) and customised production, enabled by automated, highly flexible production processes. Customers are willing to pay more for high quality products when efficiency improvements by these products offer higher returns on investment.

Technological progress has also resulted in economic, flexible and highly automated cranes, which play a major role in logistics. Remote control systems permit crane and load operations to form a better and more ergonomic working environment. Such ergonomic and safety aspects will also continue to be the driving force in innovation for serial lifting equipment, used in workstations to reduce body strain and to improve the flow of work.

For storage equipment, racks, shelves and warehousing the trend towards future storage systems is relevant. This trend is aimed at maximising space utilisation, minimising use of manpower (particularly in hostile environments such as cold stores), easy location and retrieval of stock, as well as accuracy and order assembly. Finally, in the market for lifts and escalators up-to-date technology is directed towards user-friendly, safe and efficient lifts.

As a whole, there are numerous specialised companies operating in the market for lifting and handling machinery. Competition intensity varies between market segments though. World-wide competition is probably strongest in the market for forklift trucks, which is dominated by a few international companies offering standard products in all shapes and sizes

for any conceivable application. The world-wide market for lifts and escalators is also dominated by a few large companies, two of which are the European companies - Schindler and Kone - together accounting for more than 50 % of the world market. In storage equipment, racks, shelves and warehousing a number of companies are active and there are some 100 manufacturers of mobile and loader cranes in Europe.

European manufacturers are leading in the world market for electrically operated trucks, although the USA is the market leader in the sub-market for narrow aisle trucks. Japan is the incontestable leader in the market for combustion powered units; whereas EU market share is 'only' 21 %, due to the strong environmental considerations prevailing in Europe.

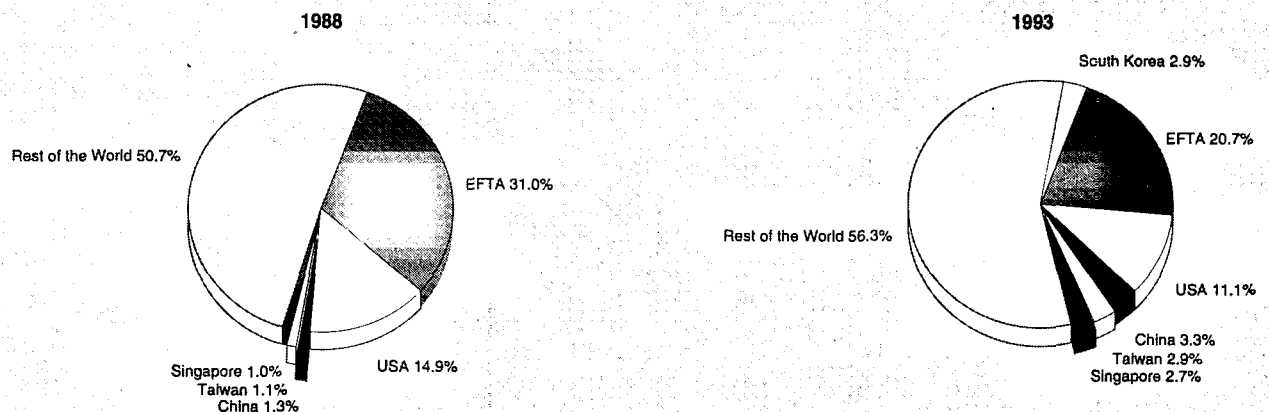
### Production process

CAD/CAM systems are used to design and manufacture machines. Automation and application of advanced electronics have become basic features in new machinery, not only to improve the efficiency of the machine itself, but also for machine safety, pollution control, precision in operations, etc. Hence, innovation has become top priority in maintaining competitive advantages.

The industry requires highly qualified employees, which have knowledge about modern technologies in machinery and equipment. Some companies have education facilities for their employees to keep them up to date with these technologies.

Enabled by a modular production process which uses standardised parts and components, the lifting and handling equipment sector has become customised rather than standardised. By combining different modules, customisation has become possible. The required increase in production flexibility has been obtained by applying modern technology in the produc-

**Figure 2: Machinery for lifting and handling  
Destination of EU exports**



Source: Eurostat



tion process. Technological development is also proceeding in lifting and handling material itself. For example, as a result of factory automation and automated warehousing, industrial trucks have to be equipped with electronic devices for advanced handling systems. An example of a modern industrial truck is the automated straddle carrier which is able to locate and move containers without human interference.

## INDUSTRY STRUCTURE

### Companies

The lifting and handling sector consists of many small companies and a few large groups. The total number of companies is estimated at 1 500 with total employment at 160 000. The average number of employees per company varies between 100 to 110. Large multinationals dominate the industrial truck market. European suppliers like Linde/Fiat (D), with 30 % of the fork-lift market, Lansing (UK), Jungheinrich (D), Lancer-Boss (UK), and Manitou (F) compete with leading suppliers from Japan, such as Toyota, Komatsu, and Mitsubishi-Caterpillar (JPN/USA) and from the USA, such as Hyster and Clark. An important new EU supplier is Valmet (Scandinavia), which accounts for 60 % of the world market for straddle carriers.

In the warehousing equipment sector, the largest EU supplier is Jungheinrich (D), with slightly more than 30 % of the market, Linde/Fiat (D) with around 30 %, followed by BT (S) with 15 %, and at some distance by Crown, Nissan, Toyota and Vestergaard.

### Strategies

In order to anticipate and cope with the opportunities and threats following from the creation of the Single Market, EU companies have been, and still are, restructuring their operations. This has resulted in a flow of mergers, acquisitions and strategic alliances with other companies. Also, non-EU companies are trying to maintain or improve their positions in the EU by concentrating supply.

Japanese manufacturers have responded to the establishment of the Internal Market by building production facilities in EU Member States. For example, Nissan set up a production line for industrial trucks in Spain in 1989 and Toyota, Komatsu and Mitsubishi have signed cooperative agreements with EU companies. JCB (UK) has linked with Sumitomo; and Fiat (I), Hitachi (J) and John Deere (USA) have considered a joint venture. Moreover, Krupp (D) concluded an agreement with

Komatsu for selling Krupp's mobile cranes in Japan. US manufacturers have also expanded their activities in Europe: Clark and Caterpillar relocated production facilities to Europe in 1986. Additionally, other important examples of industrial co-operation are the Mitsubishi/Caterpillar joint venture, Manitou's manufacturing of trucks for Toyota and the cooperation agreement between Komatsu and Lancer Boss.

Most of the manufacturers of lifting and handling machinery tend to be highly specialised because, with the exception of the few big companies, they are too small to cover all the market segments. Specialisation permits manufacturers to: remain up to date with respect to trends in technology and customer needs; respond in a quick and adequate way to the ever changing technology and consumer focus; and, direct research and development towards envisaged future developments.

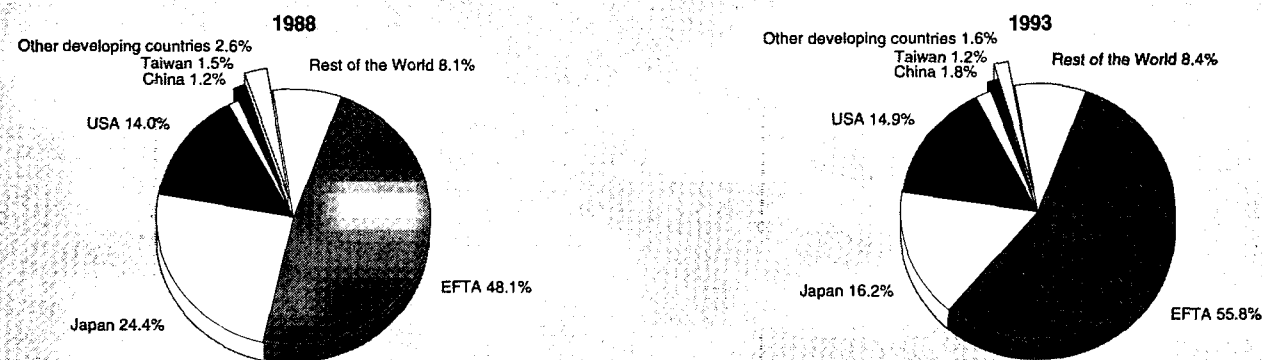
### Impact of the Single Market

The impact of the creation of the Single Market has been limited so far. An EU Directive of particular relevance to the manufacturers of machinery for lifting and handling is the Directive on Machine Safety, which came into effect on January 1, 1995. Four issues are of extreme relevance to this industry: the free movement of goods, the freedom to provide services and the right of establishment, the community trade mark, and policies concerning small and medium-sized enterprises (SMEs). The industry fears that some internal barriers will remain due to wrong interpretation and implementation of the directives by the Member States, thereby hindering harmonisation. The first priority at this moment should be the enforcement of EU legislation at the Member States level, and a period without amendments in the EU legislation to enable SMEs, the majority of the companies in this industry, to adapt to new legislation.

## ENVIRONMENT

Customisation as well as environmental, ergonomic and safety considerations have increasingly become the driving forces behind technological and product development in the sector. For industrial trucks, technological progress has enabled the sector to cope with the widely varying and fast changing needs of its varied client base. At the same time, because industrial trucks are basically mature products, environmental issues such as noise, vibration, emissions and energy consumption are important potential areas for further improvements.

**Figure 3: Machinery for lifting and handling  
Origin of EU imports**



Source: Eurostat

Demand from the client industries for energy efficient and less polluting machinery and equipment is increasing. The client industries want their production processes to be as clean as possible, not only as a result of consumer demands, but also to anticipate restrictive national and European regulations. Consequently, R&D is focusing to an increasing extent on these environmental issues.

For fuel-powered equipment, such as industrial trucks for outdoor use, restrictions on pollution from exhaust fumes have become increasingly important. As a result, industries are trying to improve on energy efficiency and exhaust pollutants. For electrically operated trucks, new concepts such as fuel cells and high energy content batteries will provide a technological push and a reduction of combustion-powered units. European companies currently spend as much as 5 % of their turnover on research in this field. Other environmental areas of concern are noise and vibrations.

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## REGULATIONS

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The EU Directive on machine safety is of particular relevance to the manufacturers of machinery for lifting and handling, as it is to the other mechanical engineering industries. This Directive, adopted in 1989, envisages the application of safety standards for EU produced machinery by January 1, 1993. In 1991 the coverage of the Directive was extended to apply to lifting equipment for goods and mobile machines, and in 1993 to person lifts. Since January 1, 1995 the Directive is in total application, except for equipment for lifting persons for which manufacturers can choose until December 31, 1996 to comply either with the Member States' regulations in force on June 14, 1993 or with the Directive. Machinery and equipment complying with the new Directive will, however, obtain the CE mark. Products labelled with a CE-mark will have free access to the markets of all EU-countries.

Although the validity of this mark is limited to the EU-market, it can also become beneficial for EU-manufacturers with respect to their extra-EU export markets. While technology and know-how are becoming increasingly important for survival, strict EU-regulations will inspire manufacturers to innovate. In Western economies the CE-mark will stand for safe and environmentally friendly machinery and equipment.

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## OUTLOOK

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Investments in handling and storage equipment are becoming increasingly important. Materials handling plays a crucial role in all modern production processes where goods are to be moved and stored in order to optimise logistics, to save on operating expenses, to reduce inventories and to add to the much needed flexibility. Investments in handling and storage equipment, therefore, are decisive determinants of profitability for the manufacturing and processing industries.

Due to the ongoing downswing of the business cycle, 1993 demand for lifting and handling equipment remained depressed both within and outside the EU. Furthermore, the positive impact of German unification on demand has virtually disappeared. However, preliminary figures for 1994 showed a turnaround which is to be confirmed in 1995. Whereas the United Kingdom and the Scandinavian countries already recovered in 1993, other countries are showing an increase in export orders, fuelled by the strong demand from Asia and recovery in the United States. However, these gains are too small to offset the slow business in Europe.

The domestic situation in Germany, France and Italy is still unsatisfactory. Although obviously the downward trend has been stopped, unemployment rates are still high and huge deficits in the public domain exist. Hence, though demand is expected to pick up, a further economic recovery is not expected until after 1994.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Federation of Handling Industries (FEM). Address: Case Postale 179, Kirchenweg 4, CH-8032 Zurich; tel: (41 1) 384 4844; fax: (41 1) 384 4848.

# Transmission equipment

## NACE 326.1 and 326.2

Despite the structural and growing need for transmission equipment, the industry has proved to possess a strong cyclical character. The economic recession in 1992 and 1993 had a negative impact on EU internal demand. In 1994, however, some signs of economic recovery can be seen which will positively influence demand for transmission equipment in the short and medium term. In the long run, a higher degree of mechanisation in most downstream industries is the basis for growing use of transmission equipment. Mechanisation will be steadily raised for technical and cost reasons. EU competitiveness will increasingly depend on a high level of technological knowledge in combination with product and service features, such as high quality, product innovation, reliability, and flexibility which means adaptability to the needs of the market. On this account, importance should be attached to research and development (R&D) and the training and education of employees.

### INDUSTRY PROFILE

#### Description of the sector

This industry encompasses the manufacture of transmission equipment for motive power (NACE 326.1); and manufacture of ball, roller and similar bearings (NACE 326.2).

The manufacture of transmission equipment includes the manufacture of gears, gear assemblies (gear-boxes, variable speed gears, industrial gear-boxes, high-speed gears and differentials), transmission chains (including bicycle chains) and other transmission equipment. Not included are transmission equipment manufactured for the automotive industry nor hydraulic or pneumatic transmission equipment. Some companies in the industry deliver to both the automotive industry and other manufacturing industries, or offer a wide product range, thereby covering other products than transmission equipment, gears and bearings.

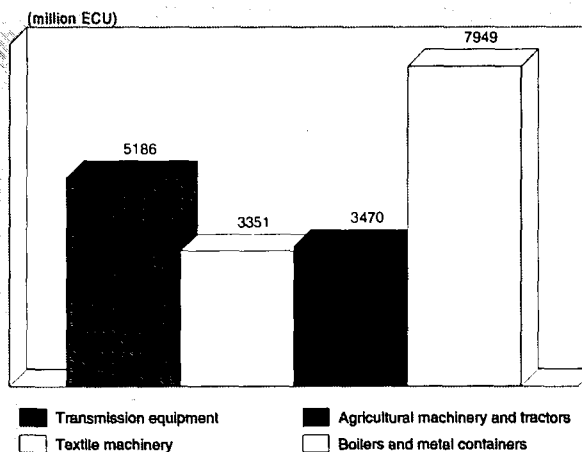
In comparison with related industries, the transmission equipment industry is of considerable size with value added for the EU (excluding Portugal, Ireland and Luxembourg) equaling nearly 5.2 billion ECU. Germany alone accounts for 51.5 % of this total value added, followed by Italy (16 %) and France (12 %).

#### Recent trends

From 1984 to 1990 the industry recorded production growth of 58 % in current prices, or 8.1 % on average per annum. Since 1990, however, production of transmission equipment has declined putting production back to 1988 levels of less than 11 billion ECU. This drop in production has mainly been caused by weak domestic demand in most Member States, which could not be completely compensated for by export-induced production growth. Consequently, there has also been a loss in employment. Since 1990, the number of people employed in the industry has decreased from 178 300 to 140 600; a drop of 21 %. Employment was expected to drop further, to 129 800 in 1994.

Compared with the total manufacturing industry the sector has clearly been underperforming. Where the total manufacturing industry recorded a drop of 3.1 % in production (in constant prices) from 1990 to 1993, production of transmission equipment declined by 20.6 %. Also, losses of employment

Figure 1: Transmission equipment  
Value added in comparison with related industries, 1993



Source: DEBA

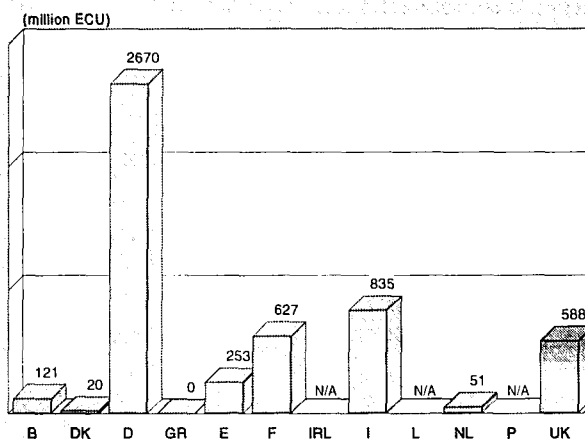
were more drastic in the latter industry than in the manufacturing industry as a whole.

#### International comparison

Since 1984, Japanese production of transmission equipment (measured in ECU) has grown by 71.7 %, resulting in a leading position on the world market. In contrast, the USA has lost its market leadership and now ranks third after the EU. These production shifts, however, are influenced by changes in exchange rates. EU production dropped by more than 5 % in 1993, but the Japanese production figure is influenced by the appreciation (by more than 20 %) of the yen in 1993. As a result, Japanese production increased from 9 billion ECU in 1992 to more than 12.5 billion ECU. Nevertheless, Japan recorded growth in its own currency, while European production dropped in ECU.

The Japanese transmission equipment industry also constitutes 24.6 % of total extra-EU imports. Production growth in this country, however, mainly stems from economic developments

Figure 2: Transmission equipment  
Value added by Member State, 1993



Source: DEBA

**Table 1: Transmission equipment  
Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	7 388	8 273	8 683	8 588	9 288	11 095	11 825	10 845	10 403	9 457	N/A
Production	8 213	9 251	9 718	9 630	10 470	12 310	12 996	11 909	11 542	10 898	12 268
Extra-EU exports	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014	3 000	3 218	N/A
Trade balance	826	978	1 036	1 042	1 181	1 215	1 171	1 064	1 138	1 441	N/A
Employment (thousands)	165.1	171.9	174.7	171.3	168.6	172.5	178.3	167.5	155.0	140.6	129.8

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

Source: DEBA

**Table 2: Transmission equipment  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.32	-6.78	-0.76	-8.86
Production	4.54	-5.59	-0.09	-4.90
Extra-EU exports	4.40	-1.99	1.51	3.65
Extra-EU imports	3.00	-6.39	-1.28	-13.36

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Transmission equipment  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014	3 000	3 218
Extra-EU imports	1 268	1 443	1 398	1 360	1 519	1 880	2 065	1 949	1 861	1 777
Trade balance	826	978	1 036	1 042	1 181	1 215	1 171	1 064	1 138	1 441
Ratio exports / imports	1.65	1.68	1.74	1.77	1.78	1.65	1.57	1.55	1.61	1.81
Terms of trade index	105.1	101.0	102.2	100.6	100.0	98.0	100.0	97.8	95.5	89.7

Source: DEBA

**Table 4: Transmission equipment  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	86.4	89.1	88.2	87.1	94.1	103.3	100.0	93.7	96.0	100.6
Unit labour costs index (3)	83.4	85.4	91.3	96.1	93.6	92.3	100.0	112.5	117.7	115.3
Total unit costs index (4)	79.4	82.5	86.8	89.6	90.4	94.2	100.0	106.8	110.4	109.3
Gross operating rate (%) (5)	9.85	10.43	9.42	7.98	9.95	10.71	9.68	6.92	5.81	6.07

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

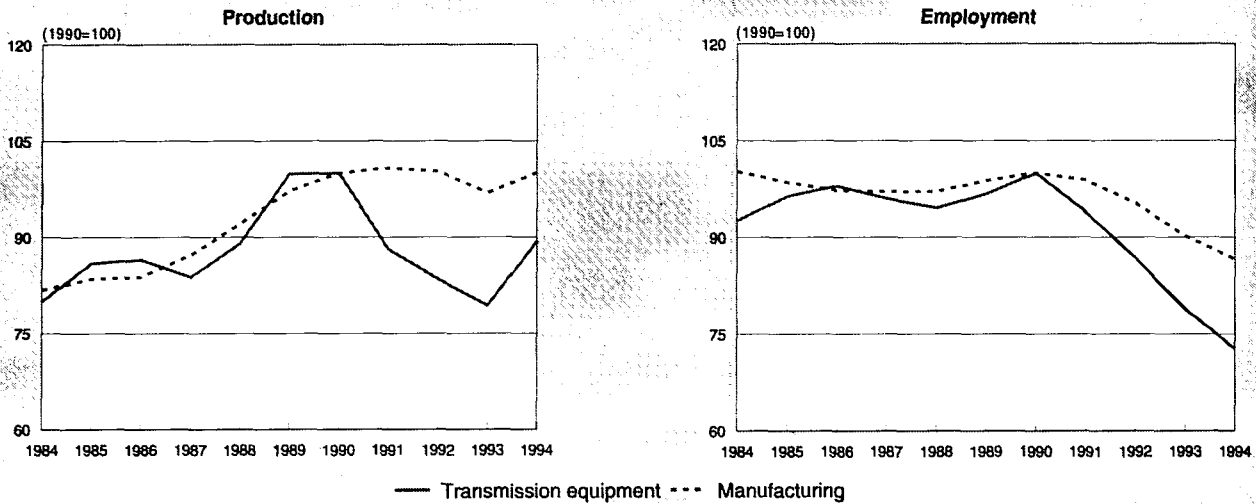
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Transmission equipment  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

in the Far East. The drop in US production of transmission equipment is also reflected in the share of extra-EU imports. While the USA accounted for 27.7 % of total imports in 1988, in 1993 this share dropped to 23.2 %.

**Foreign trade**

The EU is a net exporter of transmission equipment. The trade surplus increased on average by 6.9 % per year between 1984 and 1993. The export and import penetration rates changed little between 1984 and 1992, although a slightly increasing tendency can be observed. The export rate was 25 % to 26 %, and the penetration rate was 16 % to 18 %. These rates reflect the international character of the sector. The international character is further emphasised if it is considered that export figures do not include indirect exports; transmission units incorporated in machinery products, which are in turn exported.

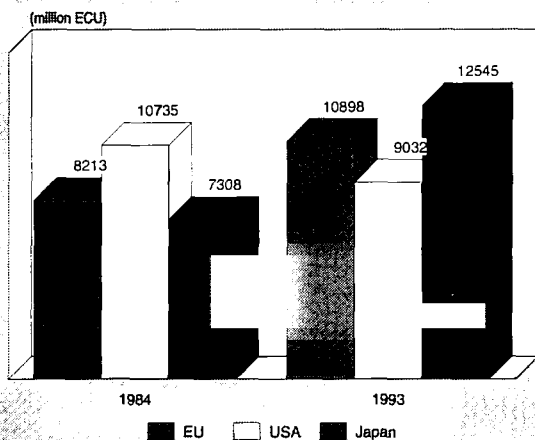
In 1993, the trade surplus increased by 26.6 % thanks to weak domestic demand within the EU. This increase was a

result of a 4.5 % decrease in imports and a simultaneous increase of 7.3 % in extra-EU exports caused by EU manufacturers efforts to penetrate foreign markets of transmission equipment. The growing importance of exports is reflected in the 1993 higher export rate of 29.5 % against 26.0 % in 1992. In current prices, the trade surplus in 1993 increased by 303 million ECU reaching a value of 1 441 million ECU. As a consequence, the exports/imports-ratio increased from 1.61 in 1992 to 1.81 in 1993.

As regards exports, EFTA countries are the EU's principal trade partner followed by the USA. In 1993, these two trade partners accounted for 50 % of total EU exports. In 1988, however, this share was slightly higher at 53.7 %. Japan is only of marginal importance for EU exports of transmission equipment.

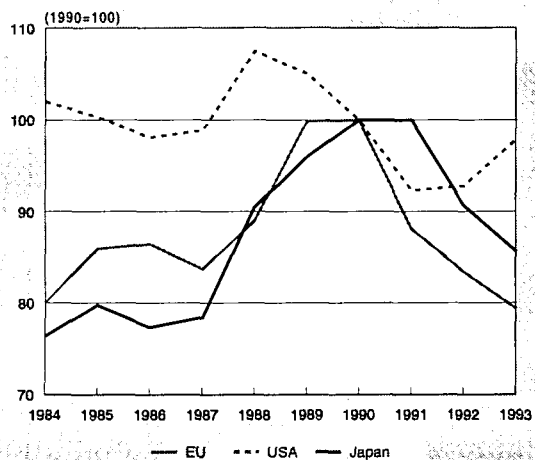
EFTA countries, Japan and the USA play a major role in EU imports of transmission equipment, together accounting for 77.9 % of total EU imports in 1993 against 84.6 % in 1988.

**Figure 4: Transmission equipment  
International comparison of production in current prices**



Source: DEBA

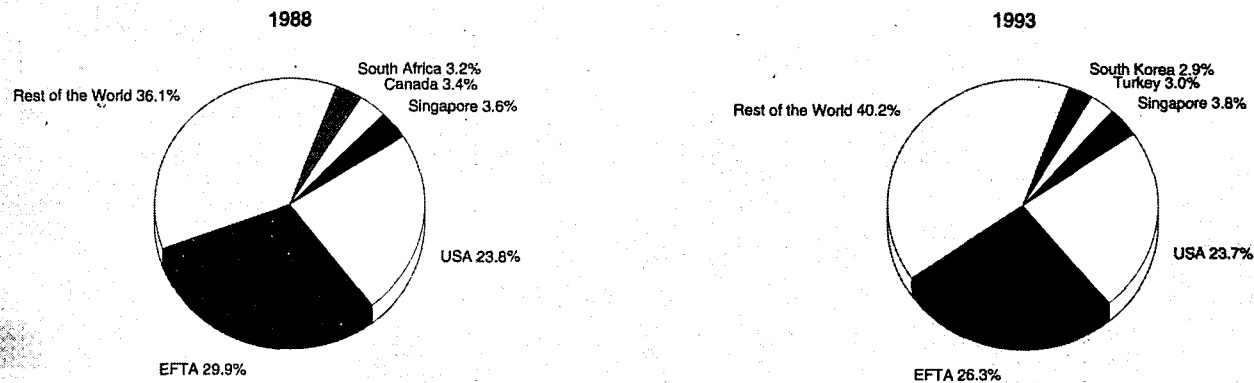
**Figure 5: Transmission equipment  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Transmission equipment  
Destination of EU exports**



Source: Eurostat

The decline is due to decreases from both the USA and EFTA countries. As a consequence, the USA lost its second position to Japan.

## MARKET FORCES

### Demand

The transmission equipment industry is decidedly a supplier industry with a variety of client industries. Demand for transmission equipment depends, to a large extent, on investments in capital goods made by downstream industries. The economic downturn which emerged in the early 1990s resulted in disappointing growth rates for global downstream markets and declining profits. This situation, together with high capital costs, did not encourage investments in capital goods. The downturn came after a period of booming investments in the second half of the 1980s by most client industries. For 1994, however, prospects are again positive. Production of transmission equipment is expected to grow as domestic demand in most Member States is recovering.

Customers of the industry are chiefly involved in mechanical and electrical engineering. The variety of products is a reflection of the broad range of applications. Wherever some-

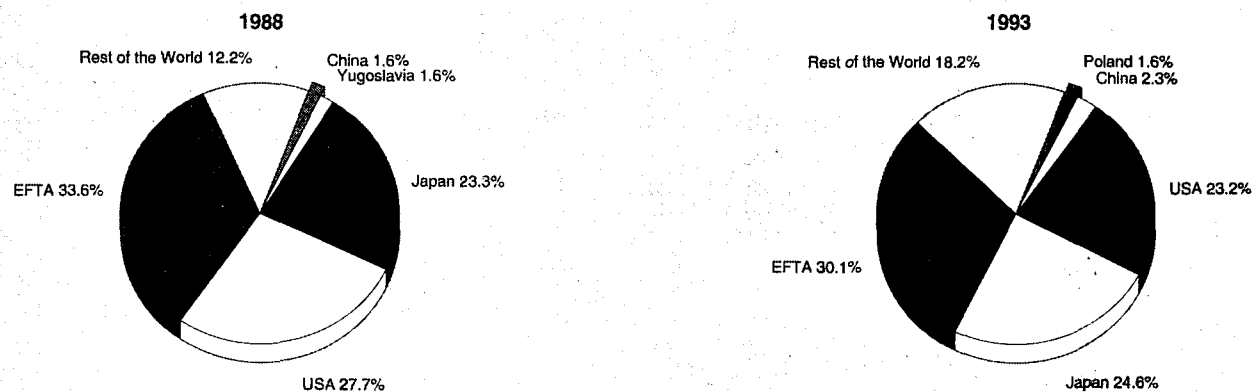
thing turns or moves, transmission equipment is at work. The product range of the industry comprises rather classical machine elements, such as bearings, cranks and chains.

Increased electronics content and greater use of miniaturisation in the products of downstream industries could directly reduce demand for mechanical transmissions, since in some cases they may be less suited to meeting the new customer needs which result. The extent to which demand for mechanical transmissions is displaced will depend on the extent to which these needs are better met by equipment using other (electrical, hydraulic or pneumatic) means of transmission. The changing nature of the equipment itself, which increasingly combines different transmission techniques, makes it difficult to predict the effect of this changing demand on producers.

### Supply and competition

Enterprises in the industry offer a wide range of products. In most cases, manufacturers of transmission equipment also supply other investment goods. Most downstream markets have a high degree of capital asset utilisation. This is the major reason why manufacturers are concentrated in countries with an emphasis on the production of investment goods: Germany, France, Italy and the United Kingdom. All these

**Figure 7: Transmission equipment  
Origin of EU imports**



Source: Eurostat

countries recorded production growth in 1993 after a period of declining output since 1990.

Weak downstream markets in the early 1990s caused lower labour productivity due to lower capacity utilisation. The resulting decline in employment, however, could not prevent an increase of unit labour costs. From 1990 to 1993 these costs increased by 15 %. Fortunately, the competitiveness of the EU industry does not seem to have been seriously affected by these developments. Although the import penetration rate demonstrates a slightly increasing figure during this period, faster growing extra-EU exports reflect improving competitiveness of the EU industry.

EU competitiveness depends on a high level of technological knowledge and other product and service features, such as high quality, product innovation, reliability and flexibility; which means adaptability to the needs of the market. Due to the high demands of European downstream industries, European manufacturers have been stimulated to give priority to these features, resulting in a technological lead throughout the world.

### Production process

Of particular importance for the efficiency of the industry is the quality of the technical solutions that it offers. On this account, great importance is attached to research and development (R&D). In Germany, besides the R&D efforts of individual firms, joint research projects have been established. As a result of these joint research projects, technological developments have been obtained in the fields of: materials (properties, application and heat treatment); stress and durability of components; safer designs; and production process (more geometrical shaping of components thereby achieving higher utilisation of materials). The application of this research to transmission equipment results in better performing, more environmentally friendly, less noisy, energy-saving products. These developments help to secure market and technological leadership.

Technical criteria are not the only decisive factors in international competition though, products must also be competitive from a cost angle. Developments in labour productivity, unit labour costs and total labour costs indicate that efficiency of production processes increased over the period 1984-1989. Labour productivity, in current prices, increased at a faster

rate than unit labour costs. Since 1990, however, the labour productivity index demonstrates zero growth, while the unit labour costs index has increased by 15 %, despite the reduction in employment. This has caused a drop in the industry's gross operating rate. Competitiveness of the industry can only be maintained if production costs are controlled.

## INDUSTRY STRUCTURE

### Companies

Apart from a few large companies, the industry's structure is mainly characterised by small and medium-sized enterprises. In Germany, for instance, about 80 % of the firms employ less than 500 people. The product spectrum has a wide range but is well diversified. In addition to some specialised companies with a narrow product range, there are companies which offer multi-products and which are broadly diversified.

Enterprises often do not operate plants in other countries. Only a few EU enterprises are present in several Member States. German companies, such as FAG Kugelfischer and ZF Friedrichshafen, are two large companies active in several Member States. In the market for speed changers, industrial high speed drives and gears, A.F. Flender AG is an important manufacturer.

The Swedish enterprise SKF already has a strong foothold in the EU with production facilities in major EU countries. Like its main competitor FAG Kugelfischer, SKF has also invested in former East Germany. In contrast, Japanese production is still concentrated in Japan and other Asian countries. Within the EU, only a few production plants are Japanese owned. Japanese exports, however, account for a growing share in EU demand.

### Strategies

In order to remain competitive, most manufacturers have chosen the strategy of constantly improving the adaptation of specific problem solutions to the respective applications, while paying attention to quality, reliability and flexibility, and simultaneously reducing design and production costs. This leads to the incorporation of electronics in product application, design and construction. This means consistent expenditure on R&D and constant adaptation to customer requirements in domestic markets and foreign markets.

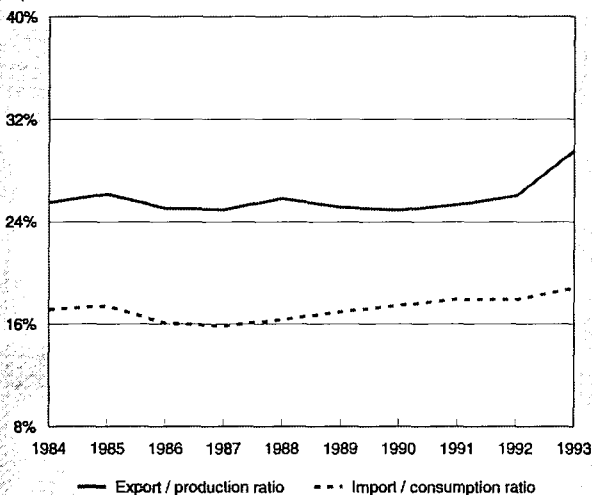
The importance of R&D also highlights the importance of the present and future supply of highly qualified engineers and employees. In Germany, great efforts are made to secure the supply of engineers. Organisation of practice-related seminars at universities and institutes of higher education, as well as the initiation of industry-related diploma theses, practical studies, and the provision of trainee places, are all examples of this.

### Impact of the Single Market

The overall impact of the Single Market on the sector is positive, albeit small. The freedom of movement of goods and harmonisation, indeed, have a larger effect on the companies which used to operate nationally or regionally (mostly SME's and manufacturers of transmission equipment). Most bearings manufacturers operate internationally and are large-sized and are therefore less dependent on the effects of the single market.

Many of the expected effects of the Internal Market programme, such as harmonisation of technical standards etc., only have a potential effect. The EU should first enforce its regulations to the Member States and prevent discriminatory exceptions per country. A legal regulatory framework at an European level which would stimulate competition is considered highly relevant, especially for the SME's.

**Figure 8: Transmission equipment Trade Intensities**



Source: DEBA

**Table 5: Transmission equipment  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.53	0.75
Danmark	0.19	0.22
BR Deutschland	1.59	1.49
Hellas	0.06	0.00
España	0.35	0.73
France	0.71	0.69
Ireland	N/A	N/A
Italia	1.33	1.32
Luxembourg	N/A	N/A
Nederland	0.21	0.22
Portugal	0.00	N/A
United Kingdom	0.84	0.76

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## ENVIRONMENT

The industry does not seriously threaten the environment. The hardening and galvanising stages of the production process could cause serious harm to the environment, but measures have already been taken to prevent this. Client industries, however, are becoming more aware of safety and environmental issues induced by developments in the industry's regulatory environment. In an attempt to meet customers' requirements, manufacturers of transmission equipment put high efforts in to product innovations concerning both issues. As far as products in mechanical power transmission are concerned, noise might be a problem. However, noise levels have been largely reduced as a result of improvements in production techniques.

## REGULATIONS

The Machinery Directive (89/392/EEC) sets out safety requirements for all machinery. As regards its application to transmission equipment itself, and to many types of machines which incorporate it, the transitional period expired on January 1, 1995. It is therefore now mandatory.

In anticipation of this EU Directive and in response to customer requirements for a safer working environment, the industry has already put much effort in to R&D for the improvement of safety conditions of equipment. In new technology development, the industry pays a lot of attention to environmental issues, such as reduction of the production of noise and other emissions.

Another Directive of relevance for certain transmission equipment is the Low Voltage Directive (73/23/EEC). This sets out the principal elements of the safety objectives with which equipment designed for use with a voltage rating between 50 and 1000 V alternating current and between 75 and 1500 V direct current must comply in order to be legally placed on the EU market. The Electromagnetic Compatibility Directive (89/336/EEC) lays down mandatory essential requirements concerning emissions of electromagnetic disturbances for electrical apparatus, equipment, systems and installations.

Manufacturers whose products comply with the relevant provisions of these Directives and who have demonstrated this conformity by allowing the applicable procedures set out in the Directives may affix the CE-mark. This allows free movement of the products throughout the European Economic Area.

## OUTLOOK

A high degree of mechanisation is the basis for the use of transmission equipment. Mechanisation will be steadily raised in most client industries not only for technical reasons but increasingly from a cost angle. In all plant and machinery there are machine elements and components that serve to transmit or support power. Demand for mechanical power transmission elements will therefore increase structurally with general technical progress world-wide. New materials and their treatment, electronics, new findings in tribology and a more advanced measuring technology will bring about further technological progress.

Despite the structural and growing need for transmission equipment, the industry has proved to possess a strong cyclical character. The economic recession in 1992 and 1993 had a negative impact on EU internal demand. However, as the economy is recovering, prospects in the short run are improving. 1994 saw a sharp increase in demand, marking the definite end of the long recession. The outlook for 1995 is for this upturn to be maintained. For the years ahead, production increases are expected, resulting from further growth of exports and an increase in domestic demand.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Committee of Associations of Manufacturers of Gears and Transmission Parts (EUROTRANS). Address: Rue Louis Blanc 39/41, F-92400 Courbevoie; tel: (33 1) 47 17 63 69; fax: (33 1) 47 17 63 70; and Federation of European Bearing Manufacturers Associations (FEBMA). Address: Lyonerstrasse 18, D-60498 Frankfurt; tel: (49 69) 6603 1516; fax: (49 69) 6603 1459.



# Woodworking machinery

## NACE 327.1

The sector has recovered in 1994 from the recession suffered in 1992 and 1993. EU demand is rising but foreign competition is intensifying. The European know-how has proved to be an important comparative advantage in maintaining a leading position on the world market. Not only the competitive threat from the Far East, but also European legislation forces the European industry to put much effort in innovation and in R&D as safety and environmental regulations are becoming stricter.

In 1995, an increase of production is expected, especially borne by a recovery of the export markets and domestic demand in most Member States.

### INDUSTRY PROFILE

#### Description of the sector

The manufacture of woodworking machinery is part of NACE 327. NACE 327 includes the manufacture of machinery and equipment for use in specific branches of industry. Under this chapter the following industries are categorised:

- manufacture of machinery for working wood and similar materials (NACE 327.1);
- manufacture of paper, paper goods making, printing and bookbinding machinery (NACE 327.2);
- manufacture of laundry and dry cleaning machinery (NACE 327.3);
- manufacture of plant for the leather industry, including boot and shoe machinery (NACE 327.4).

The worldwide production of woodworking machinery attained an estimated value of 5.8 billion ECU in 1993. Production in the sector is relatively small if compared to the wood processing industry with a production value of more than 36 billion ECU in the EU.

Germany is the world market leader, its production totalling 1.8 billion ECU or 31 % of total worldwide production. Italy

is the second largest manufacturer of woodworking machinery at world level, with a production value of 1 billion ECU in 1993.

Germany and Italy together account for an estimated 49 % of world production (excluding China and the former USSR) of woodworking machinery. Other major manufacturing countries of this machinery are Austria, Finland, France, Japan, Sweden, Taiwan and the USA.

#### Recent trends

During the 1980s, strong production growth was achieved thanks to rapidly growing intra-EU trade. The economic downturn in 1992 and 1993 resulted in a drop of demand, especially in Italy and Germany. During 1993 and in the first half of 1994 improving export markets seem to have become the driving force behind the recovery of the EU woodworking sector.

#### Foreign trade

Most European countries are characterised by high export intensity, as more than 50 % of production is destined to foreign markets. More than 45 % of total EU trade finds its destination in other Member States. Major client countries outside the EU are the EFTA countries with a share of 18.8 % of total extra-EU exports in 1993 and the USA (14.8 %).

Figure 1 shows a major shift in demand. In 1988, the Western economies accounted for nearly 50 % of total EU exports. In 1993, this share had dropped to only 36 %. Especially Eastern Europe and the Far East have increased their demand, along with South Africa and Latin American countries.

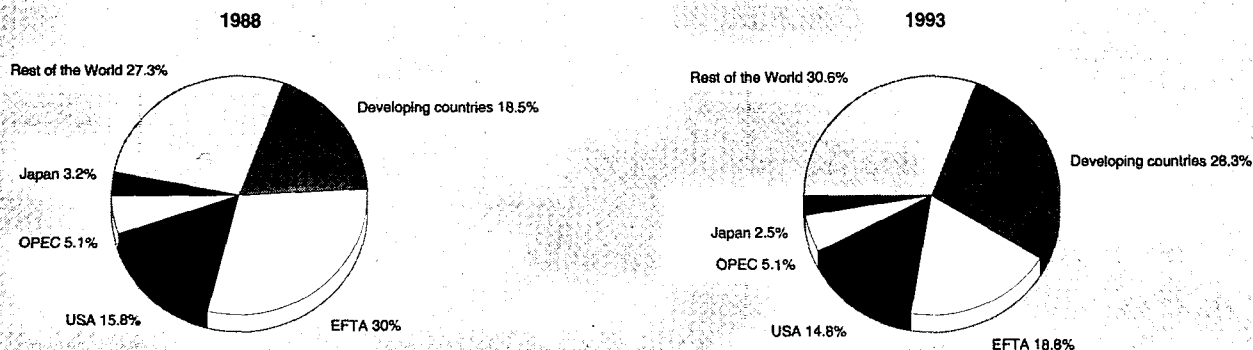
Overall, extra-EU imports have been rising during the 1988-93 period, although with some ups and downs. Austria remains the largest supplier of woodworking machinery to the EU, with a share of 41.2 % in 1993, followed by Switzerland with 17 %.

### MARKET FORCES

#### Demand

The industry is strongly cyclical, following the ups and downs of major client industries such as the sawmilling and furniture industry. As a result, the economic recession in 1992 and 1993 has affected EU demand for woodworking machinery. In 1993, domestic Italian demand dropped by 22.5 %, while a weak domestic German demand could only be partly com-

**Figure 1: Woodworking machinery  
Destination of EU exports**



Source: Eurostat

**Table 1: Woodworking machinery**  
**External trade in current prices**

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	695	932	942	827	760	892
Extra-EU imports	133	159	185	215	188	179
Trade balance	563	773	757	612	572	713
Ratio exports / imports	5.2	5.9	5.1	3.9	4.0	5.0
Terms of trade index (1)	96.5	97.6	100.0	94.2	94.8	96.5

(1) NACE 327  
 Source: Eurostat

compensated by increased demand from the former East Germany. In the first quarter of 1994, German domestic demand has dropped again (13%). This drop, however, has been fully compensated by a considerable increase of exports in the same period (+60%). By contrast, domestic Italian demand has recently showed a mild recovery, as Italian domestic sales increased by 11% (calculated in local currency) in the first three months of 1994. Throughout the rest of the EU, 1994 has generally been a recovery year, with demand driven up by exports and a mild improvement of internal demand.

In the woodworking machinery industry, there is a visible trend towards further automation in order to save on the use of raw materials, to cut energy cost and to increase productivity and competitiveness. Market demand is strong for specialty machinery and custom-made solutions, as well as for standardised machinery.

Among small and medium-sized client firms, there is growing demand for small, fast and quickly convertible machinery and equipment for the secondary transformation of massive wood.

The economic recession and the resulting overcapacity has directed the attention of manufacturers towards efficiency improvement in assemblage, construction and intra factory transportation. With respect to intra factory transportation, demand for integrated machinery is increasing at the expense of simple conveyor belts and loading platforms. This also improves the safety conditions.

Developments in the whole value chain, from raw material production to client industries and to consumer markets, will influence the market for woodworking machinery. The trend,

for instance, towards "cocooning" in the house furniture market together with the demographic trend towards more but smaller households will imply a real stimulus for demand for furniture and for house decoration products. The manufacturers of woodworking machinery will benefit from the developments in these important client industries.

In geographical terms, the opening up of Eastern Europe have already led and will further lead to stronger demand. The industry can benefit especially from new investments in construction and housing as it did in former East Germany.

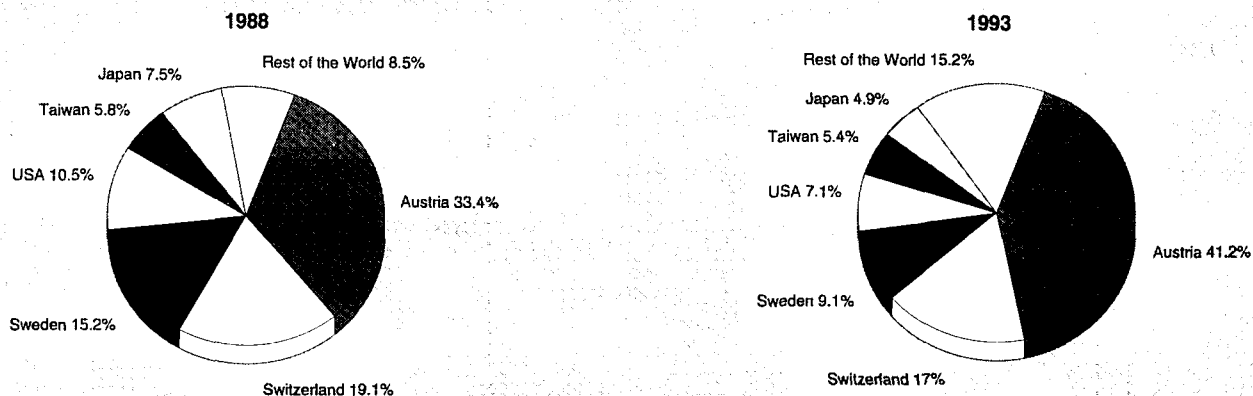
### Supply and competition

Germany and Italy are the main competitors on the world market. The strong position of German manufacturers is a result of the high quality products, increasing attention for after-sale service and technological advantages. The German know how is reflected in the number of patents held by German companies (31% of total at world level), against 3% by Italian manufacturers.

To an increasing extent, Italian manufacturers are becoming competitors in know-how. Italy already dominates some high-tech segments of the furniture industry. Still, as far as the Italian machinery is concerned price plays the most important role, helped by the recent devaluation of the lira.

Custom-made solutions require know-how, high product flexibility and service quality. In these areas, the EU woodworking machinery industry is still ahead of the competition from Japan and Taiwan. With respect to standardised machinery, however, the price is still the most important factor. This means that low wage countries in Eastern Europe and the Far East have a comparative advantage.

**Figure 1: Woodworking machinery**  
**Origin of EU imports**



Source: Eurostat

The EU furniture industry, one of the major purchasers of woodworking machinery, is increasingly being threatened as foreign companies enter the EU market. As competition intensifies, the EU furniture industry is increasingly transferring labour-intensive activities to low-wage countries. This trend, which applies to the wood sector as a whole, might have serious consequences for the European manufacturers of woodworking machinery. Although most of the EU manufacturers are already internationally oriented, the transfer of these activities will require increased marketing efforts and a better knowledge of foreign market developments. The concentration of the manufacture of furniture in the Far East will ease the path for the regional production of woodworking machinery and will lead to a loss of EU market share in low tech segments of the furniture industry. In the high-tech segments, the European industry will only be able to retain its market position if innovation and marketing efforts will be maintained at a high level.

## INDUSTRY STRUCTURE

### Companies

In 1993, some 923 companies employed 47 396 people in the manufacture for woodworking machinery. The German and Italian industry encompassed around 540 companies in 1993, employing 34 000 people. The average size of the Italian companies used to be much smaller than other European manufacturers: through several mergers and acquisitions in recent years, the sector has become more concentrated.

### Strategies

The European woodworking machinery sector is composed by a large number of relatively small companies, along with some large companies such as Mannesmann (D), BTR (UK) and BICC (UK). In recent years, in Germany company growth has been achieved mainly through acquisitions. In their search for concentration and expansion of sales networks, a few larger groups have been created, such as the Homag group, encompassing twelve affiliates: the IMA group with five partners and the Wehrmann group, including, besides traders, six producing companies.

Supply in Italy used to be highly fragmented. As a consequence of the recent economic recession and weak domestic demand, Italian manufacturers have been forced to concentrate operations. A series of mergers and acquisitions have resulted in the creation of industrial groups such as SCM, Biesse, Delmac, Costa and Omga. Along with these groups, there is still a high number of specialised manufacturers in Italy.

Also in Germany the tendency is towards more concentration. The German company Michael Wenig AG (the world market leader on the market for massive woodworking machinery) acquired Dimter GmbH, a manufacturer of equipment for the improvement of wood quality. As wood prices rise, demand for such equipment will increase.

As technology is becoming increasingly important for European manufacturers to survive, further concentration is expected to finance rising R&D costs. High efforts in R&D and marketing are necessary in order to maintain strong market positions within the EU, but also on major export markets such as the USA.

### Impact of the Single Market

The creation of the Single Market has resulted in a fairer competition throughout the EU, and in this respect the impact is positive. Some internal barriers still exist with respect to woodworking machinery, in that the Machine Directive is not enforced enough. In certain Member States, own labels and standards continue to exist or have been created which imply barriers to operate in these countries. The European manufacturing industry of woodworking machinery has always been

and still is number one in the world. In this respect competition from non-EU suppliers is relatively limited but exists. Mutual recognition of regulations is still a barrier to overcome.

Within the EU, the highest priority for the future is a better enforcement of the Machinery Directive. As the industry consists of many SME's, another priority deals with policies concerning these firms. Especially the access to these programmes for SME's should be eased, and measures should be taken to facilitate the creation of new companies. At this moment companies disappear but no new ones enter the market, which is a worrisome development.

## REGULATIONS

Machine safety is of particular relevance to woodworking machinery. In this respect, it is important to note that in 1995 the EU Directive 89/392 has attained a definite character. This directive defines essential requirements concerning machine safety and health provisions for workers and the environment. Provisions relate to the design, the materials used, machine operations, safety against mechanical risks, maintenance and machine indications and identifications. Most woodworking machines fall under Annex IV of the Directive and therefore have to be submitted to type approval by notified bodies.

In anticipation of this EU Directive for a safer working environment, the European manufacturers have already put much effort into R&D for the improvement of safety conditions of their machinery in recent years. In the manufacture of woodworking machinery, the trend towards more automation also implies less dangerous working conditions. In new technology development the industry pays a lot of attention to environmental issues such as a reduction of the production of dust, noise and other emissions.

In 1992 the directive for electromagnetic compatibility (89/336) came into force. The transition period will last until January 1, 1996. The directive applies to all electric and electronic equipment, systems and installations which can cause electromagnetic disturbances, or which can be influenced by such disturbances.

Products being labelled with a CE mark will have free access to the markets of all EEA countries. Although the validity of this mark is limited to the EEA market, it can also become beneficial for EU manufacturers with respect to their export markets. While technology and know how is becoming increasingly important to survive, the strict EU regulations inspire the manufacturers to innovate.

## OUTLOOK

The industry is characterised by a strong cyclical character. The economic recession in 1992 and 1993 has resulted in a drop of EU demand. However, as the economy is recovering and as the figures for the first quarter of 1994 are rather positive for the German and Italian industry, prospects in the short run are improving. Hence, for 1994 and 1995 a production increase is expected, especially borne by a recovery of the export markets and domestic demand in some Member States. In 1995, also German domestic demand will recover and further support growth. Until 1998 the European manufacturers are expected to enjoy positive growth rates, but their position on the world market will be increasingly threatened by Far East countries.

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The industry is represented at the EU level by: European Committee of Woodworking Machinery Manufacturers (EUMABOIS). Address: Defense 1, Cedex 72, F 92038 Paris La Defense; tel (33 1) 47 17 67 17; fax: (33 1) 47 17 67 25.



# Liquid pumps

## NACE 328.3

In recent years, reduced demand on the Internal EU market, due to the cyclical downswing, and increased non-EU competition accounted for a fall in production. In 1993, however, production recorded growth of 2.1 % resulting from improving extra-EU export markets. Above-average export growth was recorded to Asia. As further recovery of the economy is expected, prospects in the short run are favourable. For 1994 and 1995, slight production increases are expected, resulting from export growth and a recovery of demand in most Member States. In 1995, German domestic demand will also recover and support further growth.

### INDUSTRY PROFILE

#### Description of the sector

This NACE includes the manufacture of compressors, pumps and equipment for operating machinery by hydraulic or pneumatic means. Besides liquid pumps, the sector also covers compressors and vacuum pumps. However, for these latter product groups little statistical information is available. Consequently, the description of the sector will mainly cover liquid pumps.

Liquid pumps can be divided into six classes: hand pumps; reciprocating pumps; rotary displacement pumps; centrifugal pumps; other pumps (not elsewhere specified); and parts for pumps. Liquid pumps are mainly used in the fields of: sewage and industrial waste-water disposal; drainage and the prevention of water pollution; chemical and petrochemical industries; energy and offshore technology; industry generally; processing techniques; shipbuilding; mining; water conservation; and construction.

#### Recent trends

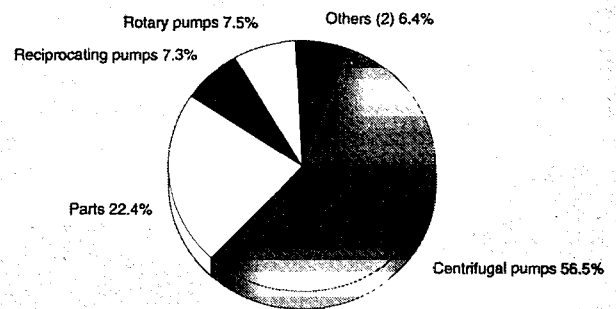
Until 1992 the world market for liquid pumps grew for many years by an average of 6 % per annum. From 1988 to 1993 EU production (in current prices) increased at a slightly higher annual rate than demand: 6.8 % versus 6.4 %. Due to the economic recession, both production and consumption dropped in 1992. In the same year, excess demand resulting from German unification and high German export quotes, the leading manufacturer of liquid pumps world-wide, somewhat compensated for weak EU demand. In 1993, however, a further drop in demand of 2.2 % for liquid pumps and parts could be observed. EU production, however, recorded growth of 2.1 % resulting from improving extra-EU export markets, stimulated by an appreciation of the US dollar and the Japanese yen against the ECU.

In 1993, German production increased by 8.3 %, recording above-average export growth to Asia. The Netherlands, Belgium and Denmark also recorded strong production growth in 1993, varying from 7.8 % to 18.8 %, while production in Italy declined by 8.2 %.

#### International comparison

The EU is the world's largest producer of liquid pumps. Within the EU, Germany was the world's second largest producer in 1993 at 2.2 billion ECU after the USA (2.9 billion ECU) and ahead of Japan (1.8 billion ECU). In the world export market, Germany is even the largest exporter holding a 23 % share, followed by the USA with 16 % and Japan with 13 %. Other European exports are accounted for by Italy, the United Kingdom and France with respective market shares in the world export market of 10 %, 8 % and 7.5 %.

**Figure 1: Liquid pumps**  
Production by major product line, 1993 (1)



(1) Excluding Greece, Ireland, Luxembourg and Portugal.  
(2) Including hand pumps.  
Source: Europump

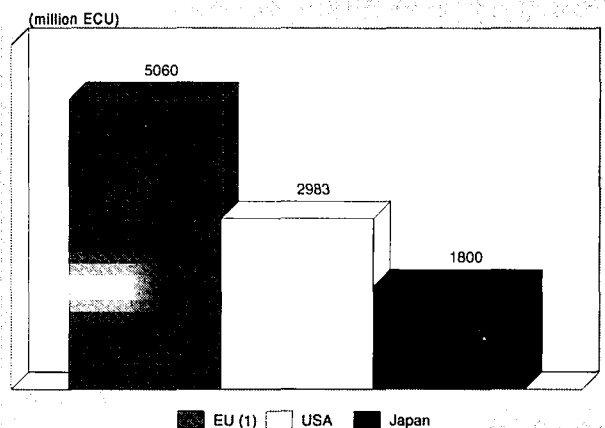
#### Foreign trade

Throughout 1988-1993 the EU was a net exporter of liquid pumps. Extra-EU imports grew faster than demand, demonstrating the growing importance of foreign suppliers on the EU market. The penetration rate increased from 15.4 % in 1988 to 16.6 % in 1993. In 1993, however, extra-EU imports remained fairly stable only increasing by 0.9 %.

In 1992 net exports amounted to 891 million ECU, while in 1993 net exports increased by 18.4 %, reaching a value of 1 055 million ECU. Against the background of stabilising imports, growth in extra-EU exports caused the export/import-ratio to increase from 2.4 in 1992 to 2.6 in 1993.

Germany accounts for the highest share in total extra-EU exports with 48.4 %, followed by the United Kingdom with a 23.5 % share. The most important German export markets outside the EU are the EFTA countries and the USA. Within Europe, France and Italy are the most important export markets for Germany.

**Figure 2: Liquid pumps**  
International comparison of production in current prices, 1992



(1) Excluding Greece, Ireland, Luxembourg and Portugal.  
Source: Europump

**Table 1: Liquid pumps**  
Main indicators in current prices

(million ECU)	1988	1989	1990	1991	1992	1993	1994(1)	1995(1)	1996(1)	1997(1)
Apparent consumption (2)	2920.6	3268.2	3866.6	4108.4	4011.7	3923.3	4 000	4 120	4 230	4 330
Production (3)	3744.6	4161.3	4869.4	5106.1	5059.5	5165.0	5 300	5 450	5 600	5 750
Extra-EU exports (2)	1162.8	1279.1	1458.0	1475.8	1538.1	1708.2	1 900	2 100	2 250	2 400
Trade balance (2)	712.3	763.8	875.6	858.6	890.9	1055.3	1 300	1 330	1 370	1 420

(1) NEI forecasts.

(2) Excluding Greece, Ireland, Italy, Luxembourg and Portugal. Excluding Denmark in 1988 and 1989.

(3) Excluding Greece, Ireland, Luxembourg and Portugal. Excluding Denmark in 1988 and 1989.

Source: Europump

**Table 2: Liquid pumps**  
Breakdown of production by major product line and Member States, 1993

(%)	Hand pumps	Reciprocating pumps	Rotary pumps	Centrifugal	Other pumps	Total original equipment	Parts	Total production
Belgique/België	0.0	0.5	0.7	1.1	2.7	1.1	2.3	1.4
Danmark	0.0	1.0	3.2	6.2	2.6	5.1	12.5	6.4
BR Deutschland	92.2	72.1	40.3	41.4	34.8	44.7	35.6	42.8
España	0.0	0.1	0.6	3.1	3.1	2.5	2.0	2.4
France	4.6	7.8	15.6	14.9	1.5	13.3	10.8	12.8
Italia	0.0	13.3	29.4	18.8	0.0	17.7	10.8	16.2
Nederland	0.0	0.0	0.0	2.8	18.0	3.2	5.1	3.6
United Kingdom	3.2	5.1	10.2	11.7	37.2	12.4	21.0	14.4

Source: Europump

## MARKET FORCES

### Demand

Liquid pumps are often compared to the human heart because they discharge, with precision and reliability, the most varied tasks in the transport of liquids vital for a modern economy. Market demand can be divided into two categories of liquid pumps: standardised pumps and engineered pumps. Both groups encompass a wide range of products and applications. Major markets for standardised pumps are the chemical industry, process industry, construction industry, food industry, shipping, horticulture, civil engineering, and the original equipment manufacture (OEM) sectors. Special, highly engineered pumps are used in the petrochemical and chemical industries, power stations, and irrigation and water supply. Both markets require custom solutions for which efficient production is needed.

The diversity of technical demands made on pumps have led to a high degree of specialisation in the pump-manufacturing industry. This requires know-how and R&D efforts which not only lead to comparative advantage but also to new ingenious applications that promote the safety and profitability of industrial processes, as well as the conservation of global resources and protection of the environment.

Sales of pumps to the chemical industry have been negatively influenced by reduced investment programs. The only area of expansion world-wide, with reasonable expectations, is petrochemicals. The water supply sector suffered its first losses in 1993. In recent years, demand from this segment was stimulated by German reunification, but these effects are petering out. In contrast, the power engineering sector has drawn some short-term profits from a number of large orders for power station retrofits in former East Germany.

**Table 3: Liquid pumps**  
Production in current prices by Member State (1)

(million ECU)	1988	1989	1990	1991	1992	1993
EU8 (2)	3 744.6	4 161.3	4 869.4	5 106.1	5 059.5	5 146.7
Belgique/België	51.7	58.7	75.3	61.4	62.7	52.7
Danmark	N/A	N/A	282.6	295.7	305.5	329.3
BR Deutschland	1 532.7	1 696.5	1 937.8	2 099.1	2 044.1	2 213.2
España	70.0	90.0	99.8	81.5	130.9	124.8
France	571.6	611.1	644.6	672.7	664.4	659.1
Italia	739.6	820.9	913.3	952.3	913.9	839.0
Nederland	111.7	129.3	127.2	139.1	156.9	186.4
United Kingdom	667.3	754.8	788.9	804.3	781.1	742.3

(1) Including parts.

(2) Excluding Denmark, 1988-1989.

Source: Europump

**Table 4: Liquid pumps**  
**External trade in current prices (1)**

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	1 162.8	1 279.1	1 458.0	1 475.8	1 538.1	1 708.2
Extra-EU imports	450.6	515.3	582.4	617.2	647.2	652.9
Trade balance	712.3	763.8	875.6	858.6	890.9	1 055.3
Ratio exports / imports	2.6	2.5	2.5	2.4	2.4	2.6

(1) Excluding Greece, Ireland, Italy, Luxembourg and Portugal. Excluding Denmark in 1988 and 1989.  
Source: Europump

The civil engineering and construction industries have demonstrated stagnation in demand for liquid pumps in 1993. In addition, pump sales for environmental protection measures showed a far poorer picture in comparison with 1992.

During 1988-1993 the production of centrifugal pumps, the largest item of original equipment, showed growth rates similar to those for original equipment as a whole. In 1993, the fastest growth rate in this market in the EU was recorded in Belgium. However, rotary pumps have been a significantly growing component of total production in several countries.

In geographical terms, major sales markets for EU production are found in Western Europe. Of growing importance though are the Americas and Asia. More than a quarter of German exports flow to Asia and North and South America.

As the quality of liquid pumps is crucial for the EU industry, manufacturers are increasingly meeting the tailor-made requirements of their customers to remain competitive. Customer advice and support through highly-qualified specialists are the base for a lasting customer-supplier relationship.

### Supply and competition

As competition is intensifying, given the growing import penetration of non-EU manufacturers and that customers are becoming more demanding, the industry's attention is drawn to R&D for new product development, innovations, and improvement of the quality of liquid pumps. This has not only strengthened European competitiveness, but has also opened up promising new areas of business.

One example of improved product quality is new pump-diagnosis systems, which serve to enhance operational functions, alleviate work and cut costs. Another example deals with the trend towards customer-oriented solutions effected through complete pump systems. Given the complexity of such systems the supply of special intelligent software is also growing.

In recent years, R&D efforts and innovations have resulted in: the cutting of operating expenditures; the reduction of energy consumption; the lengthening of serviceable product life; and the reduction of noise generation. The importance of R&D also highlights the importance of the present and future supply of highly qualified engineers and employees. In Germany, efforts are made to secure the supply of engineers. Organisation of practice-related seminars at universities and institutes of higher education, as well as the initiation of industry-related diploma theses, practical studies, and the provision of trainee places, are all examples of this.

The increase in extra-EU exports, in contrast, with stabilising extra-EU imports is an indication of the improved competitiveness of the EU industry. This is partly due to favourable exchange rates, but it can also be attributed to a comparative advantage resulting from high quality products, a problem-solving attitude and high service levels.

## INDUSTRY STRUCTURE

### Companies

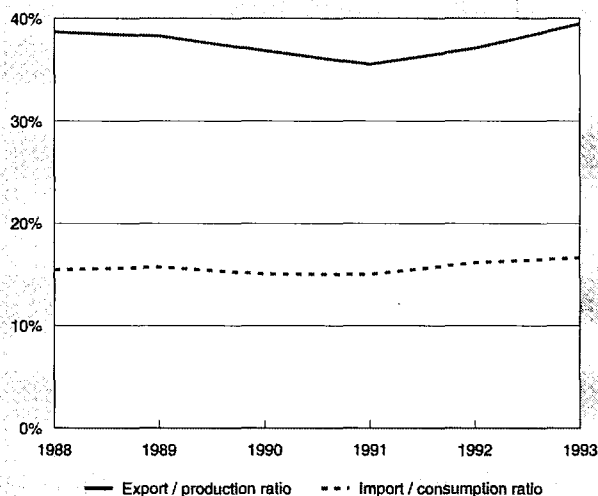
Apart from some large enterprises with production facilities in many parts of the world, small and medium-sized firms are typical for the industry. In recent years, R&D efforts have brought about improvements in energy saving, guaranteed function, production, operation and maintenance, and also recycling potential.

### Strategies

European manufacturers of liquid pumps are increasingly trying to meet customer requirements. These customers or client industries are aware that the safety and full working order of their industrial plants often depends on the reliability and serviceability of pumps that are employed, and that the quality of their products is decisively influenced by such factors.

In order to compete more aggressively on the EU Internal Market, the industry is trying to internationalise. This will bring changes to the structure of the pump sector. In recent years, a number of mergers and acquisitions have resulted in some big pan-European companies, such as KSB (D); SIHI (D); Wilo Salmson (D); Grundfos (DK); GEC Alsthom Bergeron (F); and, Weir (UK). In addition, a number of non-EU companies have production facilities in the EU, such as ABS (S); Ingersoll-Dresser Pumps (USA); Sulzer (CH); and, ITT Flygt (S/USA). For the majority of the enterprises, specialised in smaller market niches, joint ventures with similar companies in other EU Member States should be a better means to benefit from the advantages of the European unification process.

**Figure 3: Liquid pumps**  
**Trade intensities (1)**



(1) Excluding Greece, Ireland, Italy, Luxembourg and Portugal. Excluding Denmark in 1988 and 1989.  
Source: Europump

**Table 5: Liquid pumps**  
**External trade in current prices by Member States, 1993**

(million ECU)	B	DK	D	E	F	NL	UK
Extra-EU exports	36.87	107.36	826.94	27.16	146.00	162.72	401.15
Extra-EU imports	50.06	30.61	283.58	35.28	68.17	87.93	97.31
Trade balance	-13.19	76.76	543.37	-8.12	77.83	74.79	303.85
Ratio exports / imports	0.74	3.51	2.92	0.77	2.14	1.85	4.12

Source: Europump

Weak markets have already forced many companies to reduce capacity and costs to remain competitive. Wide deployment of CAD/CAM/CIM (computer-aided design, computer-aided manufacturing, computer-integrated manufacturing) has resulted in productivity improvements and, consequently, to labour cost savings. This trend is likely to continue.

In the standardised pump sector, widespread and efficient distribution networks on key markets are becoming increasingly important. Most specialised companies will have to put more effort in to product innovation and product modifications to retain a competitive advantage and to comply with the trend towards products which offer better environmental protection. The latter trend provides the industry with extra demand for pumps for water purification, for example. On the other hand, the same trend has induced the industry to produce less polluting pumps (i.e. without leakages).

#### Impact of the Single Market

The Internal Market programme is perceived to have had a positive, but limited effect so far. Some strategic investments have been made by customer industries due to the increased European integration. At this moment, tangible positive results can, however, not be assessed for the industry itself. On the one hand there may have been positive effects on the larger companies (benefits of economies of scale), and on SMEs through measures such as the stimulus and development of R&D efforts on an European level (CRAFT programme), collective actions concerning the export promotion of this EU industry, common fair participation support, and the normalisation as a result of the Machine Directive. On the other hand, there may have been small negative impacts of some EU policies on the sector, in particular of regional support policy.

#### ENVIRONMENT

Customers are now aware of two important issues: safety and the environment. In an attempt to meet customer requirements, manufacturers of liquid pumps put strong efforts in to product innovations concerning both issues. Each market segment requires pumps designed for specific applications that meet certain quality and safety standards. For instance, in the chemicals/petrochemicals industry, pumps are used that guarantee protection from unwanted toxic emissions and make production operations safe where dangerous liquids are involved.

For many years, EU countries have passed environmental laws on their own initiative. Nowadays, the EU is building up its own environmental policy, to ensure that regulations are applied at European scale. However, the industry fears unfair competition if these regulations are not applied on a European scale. Manufacturers of liquid pumps, however, are not expected to suffer from growing environmental pressures. Demand has risen for waste water pumps, partly due to the guideline of March 1991 addressing the management and processing of urban waste water.

Noise pollution has been considered a major problem for the industry, but thanks to steady improvements in production techniques and processes, noise has been and will be further reduced. Furthermore, due to growing environmental pressures, reflected in demand, the industry has been induced to manufacture less polluting pumps with less leakage. Technologically developed manufacturers could take advantage of these environmental pressures if their products can meet the environmental requirements.

#### REGULATIONS

In 1995 EU Directive 89/392 will enter fully into force. This Directive defines essential requirements concerning machine safety. Provisions relate to design, the materials used, the way in which machine operations should be documented, machine operation itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance, and machine indications and identifications. The manufacturer is entitled to affix the CE mark on machines complying with EU regulations. Machine safety is of particular relevance to liquid pumps.

In anticipation of this EU Directive for a safer working environment, European manufacturers have already put efforts in to R&D for the improvement of safety conditions of their machinery. The trend towards more automation also implies less dangerous working conditions. In new technology development, the industry pays attention to environmental issues, such as reduction of the production of noise and other emissions.

Another Directive which applies to liquid pumps is the Low Voltage Directive, which will be amended on January 1, 1995. It states that machines complying with the requirements of the Directive are obliged to wear the CE mark. In 1992 the Directive for Electromagnetic Compatibility (89/336) came into force. The transition period will last until January 1, 1996.

Products labelled with a CE mark will have free access to the markets of all EEA countries. Although the validity of this mark is limited to the EU market, it can also become beneficial for EU manufacturers with respect to extra-EU export markets. While technology and know-how are becoming increasingly important to survive, strict EU regulations inspire manufacturers to innovate. In Western economies, the CE mark will stand for safe and environmentally friendly machinery and equipment.

#### OUTLOOK

The industry has proved to possess a strong cyclical character. The economic recession in 1992 and 1993 had a negative impact on EU internal demand. However, as the economy is recovering, and figures for the first quarter of 1994 are rather positive for the German and Italian industries, prospects in the short run are improving. The year 1994 should see stabilisation, if not recovery, in pump production by Germany

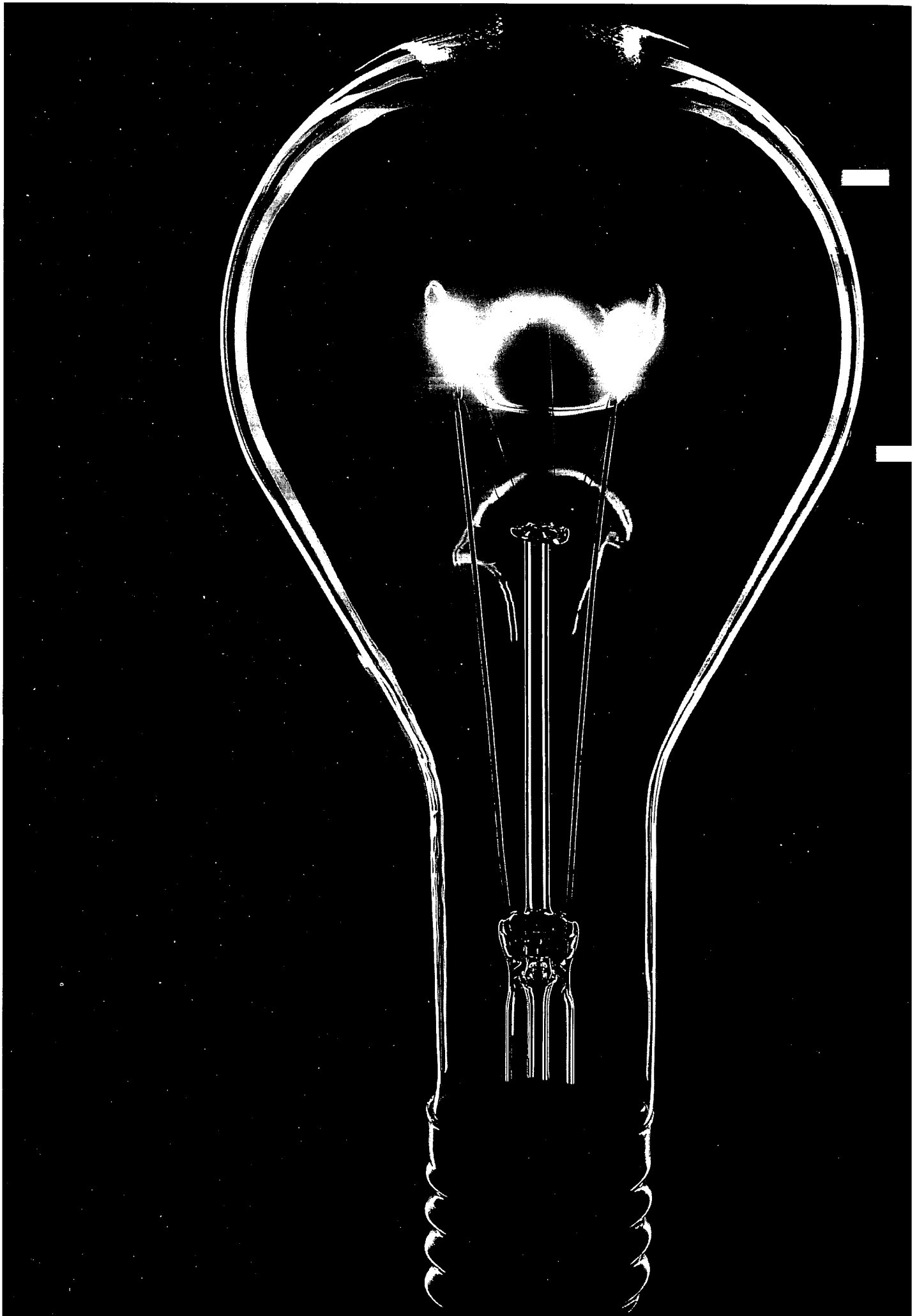
and France, and continuing recovery in other European countries. Hence, for 1994 and 1995 slight production increases are expected, resulting from recovery of the export markets and domestic demand in some Member States. In 1995, German domestic demand will also recover and further support growth. Until 1998, European manufacturers are expected to record relatively high growth rates.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Committee of Pump Manufacturers (Europump). Address: c/o Fabrimetal, Rue des Drapiers 21, B-1050 Brussels; tel: (32 2) 510 2517; fax: (32 2) 510 2301.







## Overview NACE 34

With a production volume of nearly 260 billion ECU and a workforce of 2.3 million, electrical and electronic engineering was one of the largest industrial sectors in Europe in 1994. The sector thrives on the strong growth in high-tech producer and consumer goods, of which the electrical and electronic engineering industry itself is one of the major buyers. The companies within the sector, with their innovative technologies and products, contribute to enriching the European market for electrical and electronic engineering applications for other industrial sectors, and to fostering overall technological development.

### INDUSTRY PROFILE

#### Description of the sector

The electrical and electronic engineering industry accounts for approximately 10 % of total manufacturing output and 12 % of the correspondent workforce in the EU. Given the importance of microelectronics as a driving force of technological progress, industry competitiveness, and the competitiveness of entire economies, depend on the electrical and electronic engineering sector, which is one of the main providers of infrastructure (power supply, telecommunications etc.).

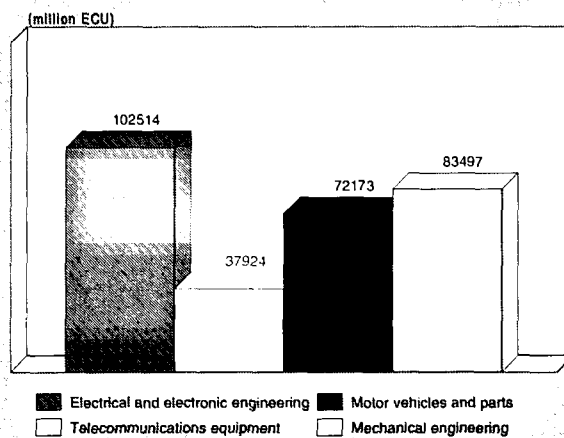
The electrical and electronic engineering industry (NACE 34) comprises the following sectors:

- insulated wires and cables (NACE 341);
- electrical machinery including electric motors, generators, transformers and switch gear etc. (NACE 342);
- electrical equipment for industrial use, batteries and accumulators (NACE 343);
- telecommunications equipment, electrical and electronic measuring and recording equipment and electro-medical equipment (NACE 344);
- radio and television sets, sound producing and recording equipment (NACE 345);
- electric domestic appliances (NACE 346);
- electric lamps and other electric lighting equipment (NACE 347);
- assembly and installation of electrical equipment (NACE 348).

This statistical classification does not always describe the industry's actual market activities which are very broad. In some cases, precise information is hard to come by since the different sectors include a wide variety of product groups. For this reason, only the most important aspects of each sector are covered in this overview.

The electronics sector, i.e. telecommunications, electro-medical devices, equipment for measurement, control and automation, motor vehicle electronics, consumer electronics, and electronic components, has registered strong growth in recent years. Other products also increasingly include electronic components. This "electronification" is accompanied by a vigorous growth in industrial services which are profoundly changing the structure of services offered, which include project planning and engineering, as well as the development of software.

**Figure 1: Electrical and electronic engineering Value added in comparison with related industries, 1993**



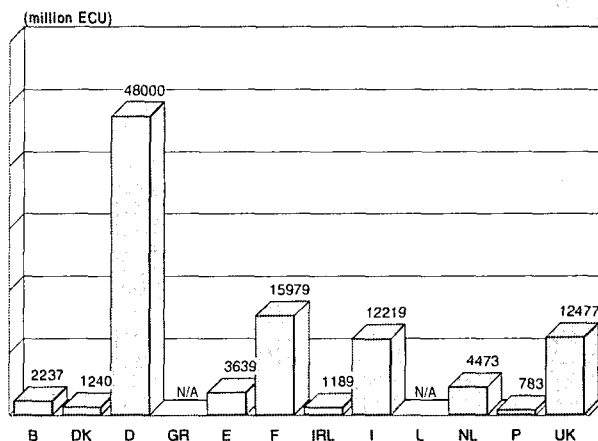
Source: DEBA

Together they have reached nearly one quarter of the industry's total output. In some sectors, e.g. telecommunications, services account for as much as 50 % of the turnover. It should be noted that existing statistics, which only cover hardware production, substantially underestimate the sector turnover by excluding such services.

#### Recent trends

In the period 1984-93, production in current prices rose from 160 billion to 252 billion ECU. This represents a nominal average growth rate of 5.2 % per year. In real terms, the average annual growth rate was 4 %, significantly above that of other EU manufacturing industry which on average grew by 1.9 %. In terms of net output, as measured by value added, Germany had a 47 % share of the total EU market, France accounted for 16 %, the UK and Italy for 14 % each.

**Figure 2: Electrical and electronic engineering Value added by Member State, 1993**



Source: DEBA

**Table 1: Electrical and electronic engineering  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	156 252	216 632	241 047	254 714	266 712	262 851	255 757	254 624	271 810	291 860	313 610
Production	160 256	212 453	235 175	248 768	257 959	257 579	251 973	250 570	267 500	286 300	306 900
Extra-EU exports	29 643	34 216	38 252	39 663	42 487	45 671	49 918	58 553	64 900	71 400	78 400
Trade balance	4 004	-4 179	-5 872	-5 945	-8 754	-5 273	-3 785	-4 054	-4 310	-5 560	-6 710
Employment (thousands)	2 679	2 705	2 753	2 746	2 678	2 549	2 436	2 204	2 230	2 270	2 310

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Electrical and electronic engineering  
Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Consumer electronics	51 660	39 984	10 789
Domestic appliances	23 149	24 287	3 704
Electric lighting	8 178	8 777	1 869
Telecoms, measuring and recording equipment	80 706	83 236	13 889

(1) Apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Electrical and electronic engineering  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	5.59	2.00	3.98	0.38
Production	5.80	1.95	4.07	-0.17
Extra-EU exports	0.54	-1.12	-0.20	-5.61
Extra-EU imports	0.36	-0.43	0.01	-1.80

(1) Some country data for apparent consumption and production have been estimated.

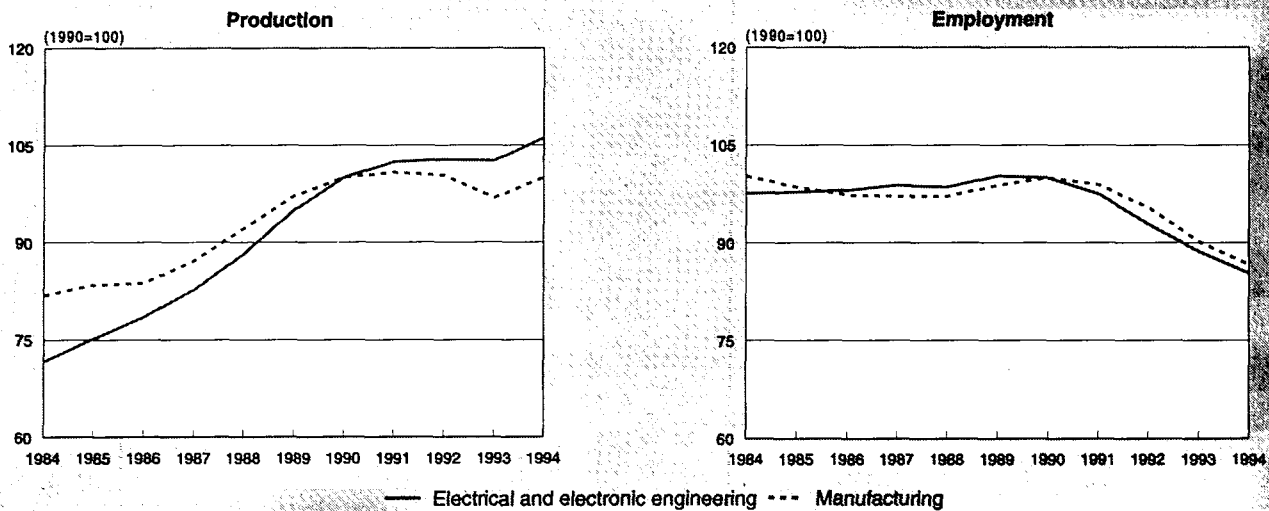
Source: DEBA

**Table 4: Electrical and electronic engineering  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	29 643	33 216	32 228	32 037	34 216	38 252	39 663	42 487	45 671	49 918	58 553
Extra-EU imports	25 639	28 291	28 735	31 826	38 396	44 124	45 608	51 241	50 944	53 702	62 607
Trade balance	4 004	4 925	3 493	211	-4 179	-5 872	-5 945	-8 754	-5 273	-3 785	-4 054
Ratio exports / imports	1.16	1.17	1.12	1.01	0.89	0.87	0.87	0.83	0.90	0.93	0.94
Terms of trade index	135.1	138.7	132.3	118.6	103.3	100.3	100.0	95.1	102.6	110.6	N/A

Source: DEBA

**Figure 3: Electrical and electronic engineering  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

The world-wide slump in 1992 and 1993 affected both production and apparent consumption volumes in the sector. From 1991 to 1993, in line with the decline in production, employment dropped by over 240 000 people, a fall of 9 %. Expected recovery in infrastructure investments should have a positive impact on the industry's production which was forecast to grow by 3 % in 1994.

**International comparison**

The EU, Japan and the USA dominate electrical and electronic engineering and together account for 75 % of the world market (not including Eastern Europe and the former Soviet Union). In 1984, production in the EU, Japan and the USA amounted to some 630 billion ECU. By 1993, it had increased by 40 % to just below 900 billion ECU.

EU production, with a world market share of 28 %, equalled 94 % of US production and 87 % of Japanese. Japan's electrical and electronic engineering industry experienced a deep

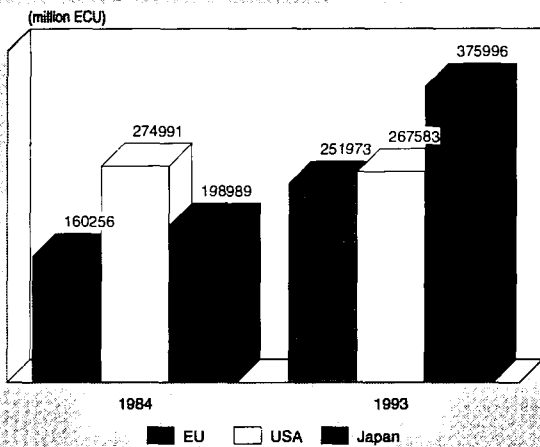
recession in 1992 and 1993, whereas the US industry resumed growth in the same period.

In 1993, the EU electrical and electronic engineering market amounted to 256 billion ECU. With a production value of 252 billion ECU compared to extra-EU exports of 50 billion ECU and imports of 54 billion ECU, the trade balance was in the negative at a deficit of 4 billion ECU. Hence, 79 % of the EU's demand for electrical and electronic engineering products was met by EU production, whereas 21 % originated from extra-EU countries. The United States led the league with a market share of 5 %, followed by Japan at 4 % and the EFTA countries with 3.8 %.

**Foreign trade**

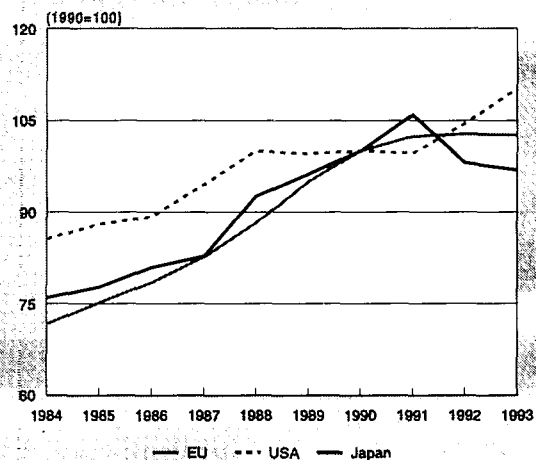
Electrical and electronic engineering has always been an export-intensive sector. The period 1984-93 witnessed a strong expansion in world exports. The three largest exporters, Japan, the USA and Germany, together accounted for around 60 %

**Figure 4: Electrical and electronic engineering  
International comparison of production in current prices**



Source: DEBA

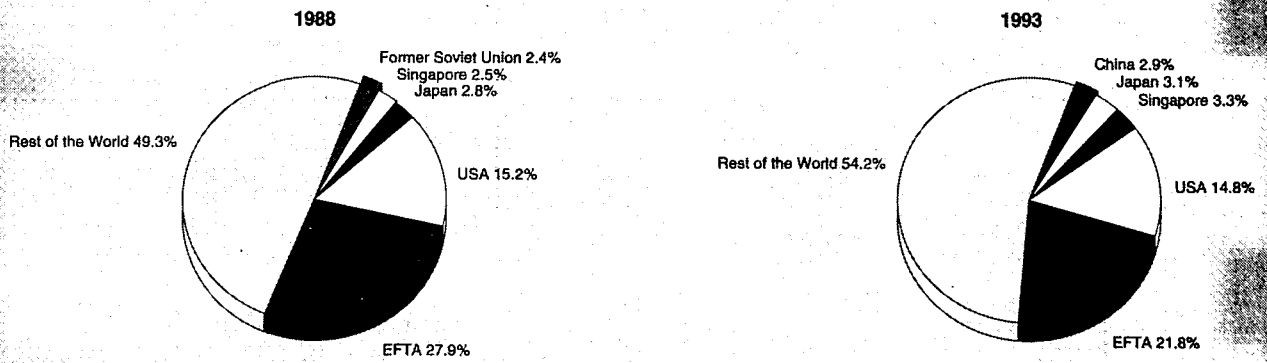
**Figure 5: Electrical and electronic engineering  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Electrical and electronic engineering  
Destination of EU exports**



Source: Eurostat

of all electrical and electronic engineering exports. Other major exporters are the UK, France, Italy and the Netherlands.

In the 1980s, exports of electronic components grew faster than the electrical and electronic engineering sector average, whereas in other segments, such as electronic measurement and control, power engineering, telecommunications and consumer electronics, growth was below average. Producer goods make up nearly two thirds of electrical and electronic engineering exports, whereas consumer goods and primary materials account for less than one fifth each. Export levels vary with individual product groups.

The dependence on external markets is decidedly higher than indicated by the exports to production ratio. If indirect exports were taken into account, i.e. including intermediate products used in other products that in turn are exported, the ratio would be higher. Apart from automotive manufacturing, indirect exports are primarily found in mechanical engineering.

The main end markets for extra-EU exports of electrical and electronic engineering equipment are the EFTA countries (22 % of the total in 1993, down 6 percentage points since 1988) and the USA (stable at around 15 %). The main buyers in the rest of the world category (54 % of extra-EU exports

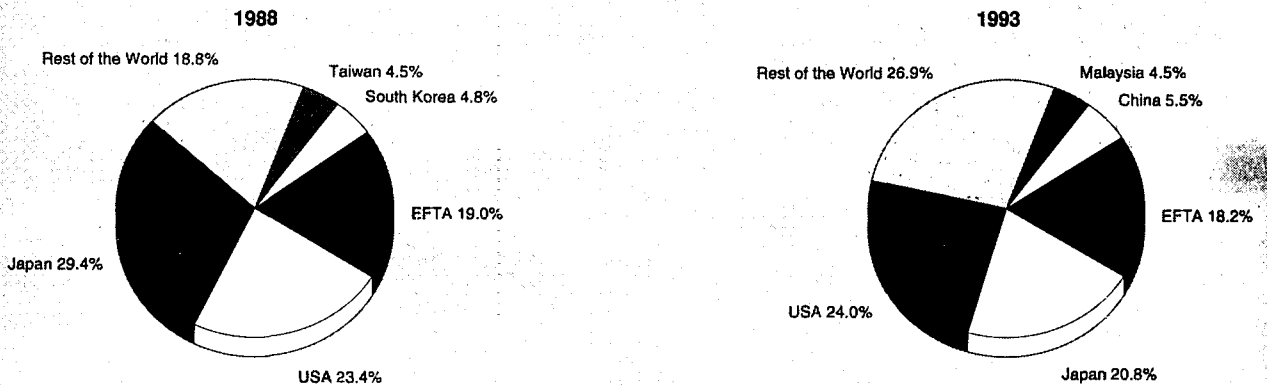
in 1993) are the developing countries, although growth in their imports has levelled off in the last few years.

The convergence of international markets, leading to stiffer competition, has not been without effect on trade in the sector. In the 1970s, imports were already growing faster than exports. This trend continued between 1984 and 1993. With a nominal average growth rate that amounted to nearly 9 % per year, imports from extra-EU countries doubled over the period, whereas exports grew by 6 % per year in the same period. Main suppliers to the EU in 1993 were the USA (24 %), Japan (21 %) and the EFTA countries (18 %). Japan lost almost 9 % market share in imports from 1988 to 1993, to the benefit of other countries, whilst the USA and the EFTA countries managed to retain their shares.

As in the case of exports, producer goods also dominate imports and make up more than 60 % of the EU total. Consumer goods and primary materials represent the remaining 40 %.

The imports to consumption ratio rose steadily in the period, from 16 % in 1984 to 21 % in 1993. The trade balance has been negative since 1988, although the situation improved in 1993 with an exports to imports ratio that rose to 0.93.

**Figure 7: Electrical and electronic engineering  
Origin of EU imports**



Source: Eurostat

**Table 5: Electrical and electronic engineering  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	73.4	76.9	80.0	83.7	89.5	94.7	100.0	105.0	110.7	115.7
Unit labour costs index (3)	97.1	98.3	99.9	101.9	100.2	99.5	100.0	102.9	103.4	102.4
Total unit costs index (4)	89.8	92.3	92.8	93.4	95.8	99.3	100.0	101.6	101.3	99.4
Gross operating rate (%) (5)	10.4	10.3	9.9	10.0	10.7	10.1	9.6	9.1	8.3	8.1

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

The marked growth in external trade in the 1980s in all areas of electrical and electronic engineering reflects the widening international division of labour. The balance of trade for electrical and electronic engineering goods, however, has significantly deteriorated. Whereas in 1988, the surplus totalled 4 billion ECU, the surplus turned into a deficit as imports rose much faster than exports. In 1991, the deficit had reached nearly 9 billion ECU but has since then improved to below 4 billion ECU in 1993.

Intra-EU imports exceeded imports from extra-EU countries over the entire 1984-93 period. Nearly 60 billion ECU of total EU exports, which in 1993 amounted to 108 billion ECU, went to other Member States. One third of these came from Germany, 16 % from France, 12 % from Italy and 12 % from the UK. With more than 22 %, Germany is also the largest buyer in the EU, followed by France (19 %), Italy (13 %) and the UK (12 %). In intra-EU trade, only Germany achieved a trade surplus (6 billion ECU).

## MARKET FORCES

### Demand

Around one third of total production is made up of intermediate products, i.e. supplies for further processing or integration into in other products, in the sector itself or in other industries. Most products are sold within the industry. Other important

buyers of intermediate products are the mechanical engineering, services and automotive sectors.

With producer goods taken separately, the services sector is the most important buyer. Within this sector, transport and communication services (including telecommunications) rank first, before public administration.

### Supply and competition

The electrical and electronic engineering industry is a diversified sector with a product spectrum ranging from micro-components to nuclear power plants. For this reason, the overall growth rate reveals little about the different developments among the individual product groups. It appears that the rise in production value has been particularly high in electronic components, telecommunication equipment, and measurement, control and automation systems. Slow growth has been registered in the areas of electricity supply and distribution, domestic electrical appliances and in consumer electronics.

Production growth is influenced by technological change, the complex processes involved in production - ranging from large-scale mechanical engineering to miniaturisation in precision mechanics - and by the developments in costs and prices.

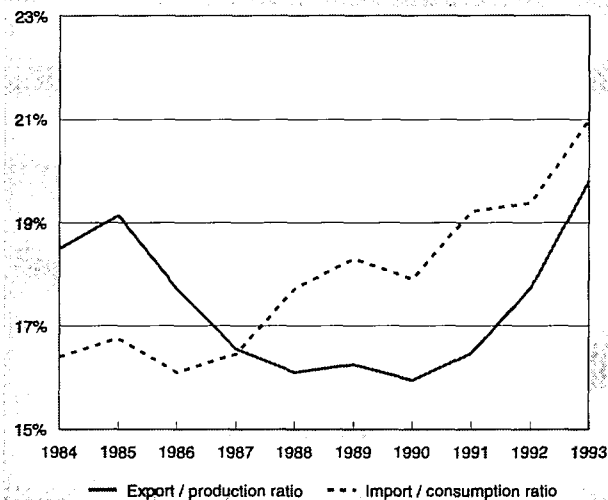
Different growth rates in the individual product groups has led to changes in the production structure. Power engineering, domestic electrical appliances and consumer electronics have declined. By contrast, non-consumer electronics and electronic components have grown.

On account of the very broad spectrum of electro-technical and electronic products, close interdependencies have developed, both on the supply and on the demand side, between electrical and electronic engineering and other industry sectors. Intermediate supplies involve other sectors of the economy. Among these, intra-company supplies constitute nearly 50 %. Intermediate products that are sold outside the sector particularly go to the services sector, with trade and transport and communication services (including telecommunications) in the top of the list.

The most important suppliers in the manufacturing industry are the plastics and non-ferrous metal industries. Similar to the iron and steel industry, they primarily supply raw materials and semi-finished products, whereas primary and intermediate products come from various other sectors (plastics processing, iron, sheet and metal working industries, mechanical engineering, paper and glass industry, etc.).

The share of the services sector in intermediate supplies has risen steeply, whereas primary and producer goods industries have become less important. This is mostly due to the reduction in the quantity of material used in the production process which has been achieved through improved utilisation of e.g.

**Figure 8: Electrical and electronic engineering  
Trade intensities**



Source: DEBA

**Table 6: Electrical and electronic engineering  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	58 948	82.7	9.0	7.6
20-99 employees	9 121	12.8	12.5	12.7
100 or more employees	3 210	4.5	78.5	79.7

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

**Table 7: Electrical and electronic engineering  
The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Siemens	D	41 992	1 675	391.0
Philips Electronics	NL	27 080	2 735	238.5
ABB Asea Brown Boveri	CH	24 180	2 583	206.5
Alcatel Alsthom	F	23 612	2 739	196.5
Electrolux	S	11 020	829	109.4
Thomson	F	10 176	864	99.9
Schneider	F	8 515	732	91.5
General Electric Company	UK	7 424	872	86.1
LM Ericsson	S	6 929	618	69.9
AEG	D	5 694	-355	58.9

Source: DABLE

raw materials, and smaller product dimensions. The share of imports in intermediate supplies has stabilised at around 15 %.

Among the sectors which supply the electrical and electronic engineering industry with producer goods, mechanical engineering is the most important. The second largest supplier is the electrical and electronic engineering industry itself, followed by the construction industry.

### Production process

Among manufacturing industries, the electrical and electronic engineering industry is the largest employer, along with mechanical engineering. Employment in the sector remained more or less stable until 1991, at 2.7 million. In 1992, 129 000 jobs disappeared, followed by another 113 000 in 1993 and an estimated 24 000 in 1994. This translates into a 12.5 % drop since 1991.

Employment levels have developed differently for the individual sectors and product groups. Areas with an above-average growth in production (e.g. measurement, control and automation) also reported above-average employment figures. As expected, employment decreased in areas with below-average growth (e.g. consumer electronics) as the result of rationalisation measures or relocation of production.

The electrical and electronic engineering industry is one of the most research-intensive manufacturing industries. At between 8 and 10 per cent of the industry's turnover spent annually on research, it is in the top in terms of research-intensity (not including the aircraft and spacecraft industry).

## INDUSTRY STRUCTURE

### Companies

In the EU, concentration in the electrical and electronic engineering industry is very high. Approximately 4 % of all firms employ nearly 80 % of the sector's total workforce and

account for around 80 % of the total turnover. It is noteworthy that this pattern is very similar in all Member States (as in other industrialised countries): a number of very large manufacturers cover nearly all product segments and operate on a world-wide basis, followed by a host of small and medium-sized businesses.

In 1993, the three largest EU firms in the sector were: Siemens (D), Philips (NL) and Alcatel-Alsthom (F). The strong presence of ex-EFTA firms among the top twelve is noteworthy, the most important of which are Asea Brown Boveri (CH/S), Electrolux (S) and Ericsson (S).

### Strategies

Apart from expanding exports, the electrical and electronic engineering industry remains distinctly oriented towards foreign investment (establishment of production units and marketing facilities). These investments serve the purpose of developing existing markets or opening up new ones. Attention is focused primarily on the public procurement markets which are subject to the EU utilities directive, and on Southeast Asia which is currently the strongest growth market for electronics. High growth is also expected in the longer term in Eastern Europe.

### Impact of the Single Market

The impact of the Single Market on the Electrical Engineering industry has been on the whole positive; nevertheless, some distinctions have to be made. First of all, the effects might have been greater if Member States had completed implementation of relevant Directives (e.g. "Packaging Directive"). Further, the incomplete adoption of EU legislation has caused problems and delays in Member States' full acknowledgement of the European standards regulation. In this sense, the implementation of the Internal Market program did not spark off any important improvement. In fact, the industry is still confronted with the same obstacles that were indicated by the 1985 White Paper. In the developed world and among



**Table 8: Electrical and electronic engineering  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.71	0.65
Danmark	0.73	0.69
BR Deutschland	1.19	1.28
Hellas	N/A	0.54
España	0.57	0.53
France	1.04	0.95
Ireland	0.73	0.98
Italia	0.90	0.99
Luxembourg	N/A	N/A
Nederland	1.13	1.15
Portugal	0.60	0.68
United Kingdom	1.01	0.83

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

Newly Industrialised Countries, NTBs and trade barriers are major competitive problems. The industry feels that, in addition to complete implementation, simplification of legislation (Molitor group) and elimination of "hidden" NTBs should be the next priorities.

## REGULATIONS

Public procurement plays a decisive role in the development of the internal market for the electrical and electronic engineering industry. In the EU, contracts awarded by governments and state-owned companies, such as public railways, post and telecommunications, and electricity distribution companies, account for a high proportion of the GNP. The liberalisation of public procurement is necessary in order to take advantage of the benefits of enhanced competition offered by a unified market, in the areas covered by the Utilities Directive. Here, care must be taken to ensure that EU regulations are implemented and that markets are opened up as a result. Development of European technical standards is also an essential prerequisite for the expansion of trade.

## ENVIRONMENT

Normally, the production of electro-technical equipment is not harmful to the environment. However, increasing consumption creates the problem of disposal of equipment and appliances no longer used by commercial and private consumers (e.g. refrigerators, TVs, measuring instruments etc.). The electrical and electronic engineering industry, especially in Germany, at an early stage took initiatives to solve the problems of waste disposal and recycling. Design and construction of appliances have been modified in order to achieve significant energy savings. Apart from such activities, the electrical and electronic engineering industry, with a variety of equipment, such as measuring and control instruments, is providing equipment necessary for environmental monitoring and improvement.

## OUTLOOK

The structural environment of the electrical and electronic engineering industry will continue to be marked by the liberalisation and harmonisation of the EU markets, and by continued technological progress. Following the 2 % decline in production in 1993, a 3 % growth was forecast for 1994 which is likely to be followed by continued growth in the following years. However, this growth is unlikely to compensate for the employment cutbacks in 1993 and 1994.

According to estimates, the world market for electro-technical products will have nearly doubled its volume by the year 2000, compared to 1990. In this context, the future-oriented research and product development work of the companies, as well as their investment activity play, a decisive role.

Written by: LEK

The industry is represented at the EU level by: Liaison Group of the European Mechanical, Electrical, Electronic and Metalworking Industries (ORGALIME). Address: Rue de Stassart 99, B-1050 Brussels; tel: (32 2) 511 3484; fax: (32 2) 512 9970.

# Insulated wires and cables

## NACE 341

Demand for insulated wires and cables is influenced by two fundamental factors: development of the infrastructure for electricity and telecommunications and the general health of the economy. The economic downturn that hit the European Union in 1993 impacted negatively on activity in the insulated wires and cables sector. Production in the EU declined for the third year in a row. The outlook for the EU cables sector calls for a slight improvement of market conditions as the sector's main client industries emerge from the doldrums. This relative recovery will particularly be driven by the development of the information technology market and by strong demand for data and control cables. The sector will also take advantage of the liberalisation and privatisation of the telecommunications and energy industries.

### INDUSTRY PROFILE

#### Description of the sector

The markets for insulated wires and cables are extremely diverse with applications in virtually all areas of modern life, from winding wire in the electrical shaver to optical fibre, which provides the basis for the telephone call, to energy cables, which are used in the basic infrastructure of energy generation, transmission and distribution.

Electrical energy cables are fundamental to domestic life and all industrial and commercial activities of the Community. Wires and cables supply energy from the electricity generation centres to the individual points of utilisation, and differ according to the voltage range.

Information cables have two important areas of application: telecommunications and electronic data control and broadcasting. Recent demand for telecommunications cables has been strong, reflecting the massive surge in demand for new telephones associated with the increasing use of fax machines, as well as, demand associated with investment in the telecommunications infrastructure; particularly in Member States which are modernising and extending the optical fibre network. Demand for information cables is also strong in the multi-faceted area of electronic data/control applications and broadcasting. For all the developments in information technology, communications cables, ranging from simple wires to coaxial cables, armoured cables and glass fibres are an important element.

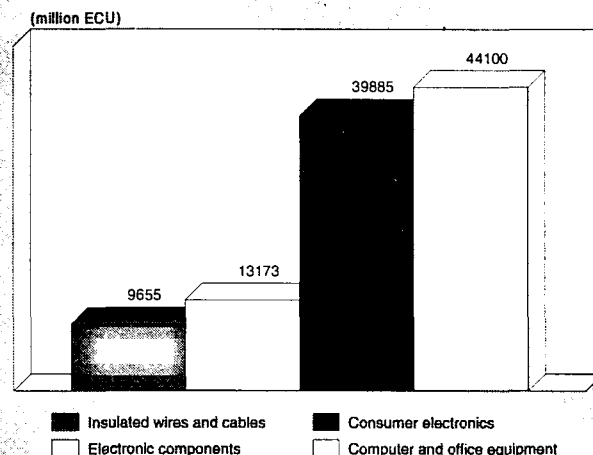
Winding wires are used in all forms of electrical equipment where a magnet is required. Thus, every electric motor, transformer, generator, dynamo, etc. requires a magnet or winding wire that is enamelled or otherwise insulated.

#### Recent trends

The fastest growing segment of the insulated wires and cables industry is that of information cables. Between 1986 and 1993, the share of information cables in total production rose from 23 % to 35 % (although it actually declined from 37 % in 1992), while the share of energy cables declined from 70 % to 56 %. This trend is in line with the recent surge in the demand for telecommunications infrastructure and equipment, coinciding with relatively slower demand growth in the more mature segment of energy cables.

The insulated wires and cables sector in the EU has suffered a year of muted demand, resulting from the sharp downturn in activity experienced by its major client industries. In 1993,

Figure 1: Insulated wires and cables  
Production in comparison with other industries, 1993



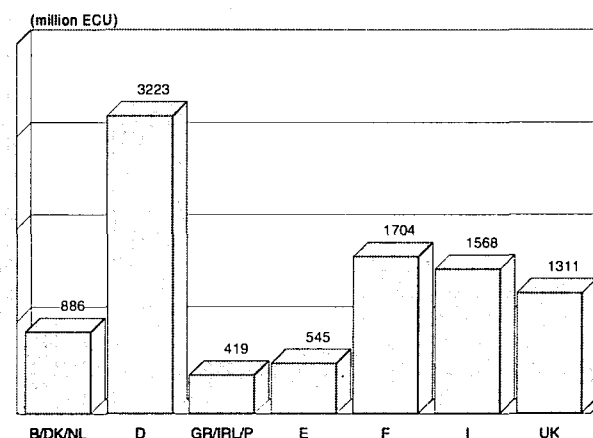
Source: Europacable, DEBA

EU's demand for insulated wires and cables, as measured by apparent consumption, was down for the third year in a row.

In line with poor market conditions, production was also down in 1993, in spite of the encouragement the sector received from its export markets, which posted a 12 % growth in value.

Employment has also been on the decline, falling from 107 000 in 1991 to 71 200 in 1993. However, the decline has been muted in 1993 (-7 000 units) with respect to 1992 (-20 000 units), indicating that the declining trend is not linear. This evolution obviously reflects the recent cyclical downturn in activity. But, it also reveals recent restructuring, productivity gains, the adoption of more capital-intensive production techniques, and less labour-oriented production lines. In particular, the shift away from copper to optical fibre in the production of telecommunications cables has induced changes in the production process, which in turn translated into changes in the profile and level of employment in the sector.

Figure 2: Insulated wires and cables  
Breakdown of production by Member State, 1993



Source: Europacable

**Table 1: Insulated wires and cables  
Main indicators in current prices**

(million ECU)	1992	1993
Apparent consumption	11 033	9 576
Production	11 040	9 655
Extra-EU exports	1 665	1 861
Trade balance	7	79
Employment (thousands)	78	71

Source: Europacable, DEBA

### International comparison

The EU remains the largest producer of insulated wires and cables in the world. Proximity to the market is very important, particularly for heavy industrial cable. Investment in Europe's infrastructure has been a strong source of demand for EU producers.

The USA and Japan are also sizeable producers. Contrary to the EU market for insulated wires and cables, where both supply and demand sides are still fragmented, the USA and Japanese industries have benefited from an early implementation of deregulation and liberalisation of their telecom and energy markets. Quick implementation in the EU of this process will enable EU producers, along with foreign competitors, to increase significantly their geographical market coverage.

### MARKET FORCES

#### Demand

The three main categories of insulated wires and cables (winding wires, information cables and energy cables) are subject to very different forces of demand.

Demand for energy cables is not only dependent on increases in electricity consumption, but also on demand for new generation and transmission facilities, as well as replacement demand. As a result, the demand for wires and cables can be considerably affected by energy policy. In the long-term, demand for energy cables will keep pace with the growth of GDP and the associated growth in electricity consumption. The energy cable industry addresses demand from power utility companies, which in many cases are publicly owned, and from the construction sector.

Demand for information cables is linked to the development of a country's telecommunications market and the level of advancement of its telecommunications infrastructure. The overwhelming portion of the market is accounted for by the public telephone network operators. The strongest growth is in trunk (long-distance) traffic, where technological developments have substantially reduced cable-costs. Demand for electronic data control cables is expected to continue its steady rise.

Demand for winding wires is naturally linked to trends in end markets such as automotive and electro-domestic devices.

#### Supply and competition

Production capacity of the EU cable and wire industry has traditionally exceeded demand. Technological improvements, an increase in capital intensity, which has changed production techniques, and shrinking home demand are key forces which have combined to change the environment in which manufacturers operate.

The EU cable and wire industry has achieved a world lead in numerous technologies which are important for cable production. These include: non-ferrous metallurgy, insulation physics, rubber chemistry, high-tech materials, superconduc-

tivity, electrical engineering for power cables and optical-fibre technology for telecommunications cables. The industry's investment in R&D has also translated into new capital intensive production techniques which have generated higher turnover, and a steady decrease in employment, and a steady increase in productivity, but which have also contributed the declining employment levels in the sector.

The EU wire and cable industry has a strong presence on world markets, and in particular in the USA through local investment. However, the EU wire and cable industry is faced with stiff competition on world markets, not only from its traditional competitors (USA and Japan), but also, increasingly, from emerging producers. As indicated earlier, many former principal export markets have established their own production facilities. In particular, Korea and Taiwan have become sizeable producers of insulated wires and cables, and are emerging as formidable competitors on international markets. China is also emerging as an important world producer, though its production base is still in the hands of western manufacturers. These countries enjoy unit labour costs largely below western levels, thus enhancing their competitiveness on international markets.

#### Production process

Two raw materials are of particular importance to insulated wires and cables production: copper and aluminium. In the EU cable and wire industry, more than 1.4 million tons of copper and about 196 000 tonnes of aluminium were used in 1992. The use of these two main inputs, however, varies according to their price, which fluctuates widely, taking into account the fact that about twice as much aluminium is needed in electrical applications (copper is a better conductor of electricity than aluminium). Thus, while copper is generally preferred to aluminium because of its intrinsic qualities (durability, conductivity), the choice between the two metals is influenced on other factors such as cost, availability and technical suitability for some specific applications.

The trend in copper prices provides an example of the degree of price variability. The price per tonne of copper doubled from 1 592 ECU per tonne in January 1986 to 2 986 ECU in January 1989. The average price per tonne of copper in 1991 was 1 772 ECU. Given these wide price fluctuations, not to mention currency fluctuations, the trends in consumption, production and foreign trade in insulated wires and cables, which appear in this report, must also be viewed in light of the price trends of its main raw materials.

During the last ten years, optical fibre has become another strategic input in the production of telecommunications cables. Optical fibre cables are particularly designed for transmitting data and sound impulses and signals by light generated by laser. Perfect substitutes for copper cables in these types of applications, optical fibre cables also provide higher transmission capacity and are much cheaper than metal cables. The industry performed a major substitution from copper to optical fibre in the production of telecommunication cables. Although there are similarities between the manufacturing and production technologies applied, the production of optical fibre cables requires a clean, laboratory-type atmosphere. In con-

**Table 2: Insulated wires and cables  
Breakdown by sector**

(million ECU)	1992	1993
Energy cables	6 137	5 433
Informations cables	4 026	3 398
Winding wires	877	825

Source: Europacable

trast, the production of copper cables basically remains a metallurgical process. As a result, cable manufacturers tended to construct new plants dedicated to the manufacture of optical fibre cables instead of converting copper cable production facilities towards optical fibre processing. Today, as it is experiencing plummeting demand for copper cable, the EU industry faces a gross over capacity, and is actually operating close to break-even. In addition, the shift from copper to optical fibres has accelerated in the last five years. This acceleration, coinciding with a severe downturn in demand, which followed the boom of the 1980s, led to a dramatic overcapacity in optical fibre.

Thus, restructuring remains on the agenda, even after rationalisation of production facilities, which led to a dramatic fall in employment levels.

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## INDUSTRY STRUCTURE

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### Companies

There are more than 100 firms that produce cables and insulated wires in the EU with 250 production facilities and about 71 000 employees. Production sites are located in all Member States, with the exception of Luxembourg. The major manufacturers of insulated wires and cables are: Alcatel (F), BICC (UK), Pirelli (I), Siemens (D), Nokia (FIN/F) and draka (NL). If all of Europe is considered, ABB (S/CH) should be added to the list. These large companies produce both energy and telecommunications cables, as well as, winding wires. Small enterprises tend to specialise in one product, often in energy cables, although this varies according to country. In the smaller countries, small companies often manufacture the whole spectrum of products. In France, Germany and Italy, however, apart from four of the top five large producers, there are many small specialist producers. As a matter of fact, about 10 % of production volume is accounted for by small and medium-sized companies in the EU.

The increasing share of glass fibre cables in telecommunication cables has led to the fusion of small and medium-sized firms, in order to provide the necessary capital inputs for the technologically advanced production processes. There are now only about a dozen manufacturers of optical fibre cable in the EU.

The EU insulated wires and cables industry is also characterised by its complete independence from its downstream industries, in spite of the close commercial links they have developed in terms of supply. The industry's activities do not evidence any downstream vertical integration in Europe. The only example of such integration can be found in the USA, with the leading telecommunications firm AT&T operating in cable and telecommunications equipment, as well as being a network operator.

### Strategies

To meet the challenges of increased competition, there are three main strategies: investment; research and development; and, cooperation and concentration. The main motive for investment is an increase in productivity and reduction in costs, especially labour costs, in the medium and long term. In the years when the cable business was booming, expansion was an additional objective.

Innovation in new products or new processes and production methods are other strategies for keeping up with the competitors.

Mergers, acquisitions, alliances and joint ventures are organisational methods for increasing, or at least maintaining, competitiveness on the international market. Several large cable manufacturers have made cross-border investments within the EU, either for reasons of cost or for closer proximity to markets. Investments outside of the EU have been made, above all,

by French, Italian, British and German cable producers. These have been primarily in North America (USA, Canada), Latin America (Mexico, Argentina, Brazil and Peru) and Africa (Lebanon, Kenya, Morocco, Nigeria and South Africa). They also have a strong presence in Saudi Arabia, Bahrain, and in Asia (Australasia, Singapore, Malaysia, Indonesia, China and India). As companies have experienced difficulties in 1993, there have not been any significant moves since 1992 by majors in Europe. 1993 and 1994 have been years of consolidation rather than expansion. The recession has not prevented, however, some EU cable producers from preparing the groundwork for further expansion moves. In particular, EU majors and medium-sized companies are active in the emerging economies of China and eastern Europe, where they are setting up joint ventures or greenfield starts. Such investments, outside of the EU, have been primarily made in order to benefit from growing markets, and also aimed at diversifying into new markets to reduce companies' vulnerability to business cycles and over dependence on mature and declining markets.

### Impact of the Single Market

There are two major factors behind the limited impact of the Internal Market programme on the insulated wires and cables industry. First, there has always been substantial cross border trade in this sector, largely facilitated by the establishment of one of the earliest European agreements on mutual recognition of standards (HAR) in 1973. Secondly, two of the sector's main customers (telecoms and energy utilities) are usually best supplied by nearby suppliers of products which are often bulky and for which the existence of skilled installation capabilities and effective after-sales service are important prerequisites.

Over the last five years, the most relevant impacts of the Single Market programme on this sector have been through the progressive liberalisation and deregulation of the telecoms and energy utilities markets. This has greatly increased competition between suppliers in these markets, particularly where this deregulation has been accompanied by the privatisation of the customer industry.

Another set of measures which has a potentially important impact on the cables sector is the opening of procedures for awarding public work and supply contracts. In this area, there is, however, still progress to be made to effectively implement these rules. Although there remain historical examples of different national systems requiring specific national products, cable suppliers are usually capable to supply any technical requirement.

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## REGIONAL DISTRIBUTION

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EU insulated wires and cables production is dominated by Germany, which accounted for 33 % of total EU production in 1993. France, Italy and the United Kingdom are also large producing countries. A glance at the regional distribution gives evidence of the gravitation of production of insulated wires and cables towards the industrial heartlands. Relatively limited by high transportation costs, particularly for heavy industrial cable, producers have tended to locate near their main customers. Central and western regions of the EU accounted for about three quarters of total EU production and of EU employment in the sector in 1993.

The enlargement of the EU in 1995 will somewhat move the hub of EU insulated wires and cable production towards central and northern Europe. In effect, the entry of Sweden, Finland and Austria into the EU in 1995 will expand significantly the base of insulated wires and cables production. In 1993, these three countries represented 7.4 % of the EU-15 output and 7.7 % of current employment levels in the sector.

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## ENVIRONMENT

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Generally speaking, cable manufacturing is not a burden on the environment. The manufacturing process is clean and the materials used are normally non-toxic; those posing potential risks are strictly regulated. The cable industry has been very responsive to environmental concerns. In 1993, the manufacturers actually expressed this environmental consciousness by producing a voluntary code of practice.

The industry puts particular attention on its use of raw materials and its design of products, minimising the potential hazards of their installation and use. Specially designed cables, with reduced flammability, are available and there are already acceptable alternatives to PVC and other compounds in areas with fire risks. Cable makers no longer use materials containing dioxin and are investigating the possibilities of substituting materials containing halogens. Cable insulation without halogens emits little in the way of toxic fumes. This is particularly important in public areas, transport and warehouses, as well as any place frequented by people or housing combustible goods.

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## REGULATIONS

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Regulations that relate to technical standards, the use of dangerous preparations and health and safety all have implications for cable makers, although there are no specific directives which are directed to the industry. The directive (89/336/EEC), for example, lays down mandatory essential requirements concerning emissions of electro-magnetic disturbances and immunity from such disturbances for electrical apparatus, equipment, systems and installations. In so far as cables in systems or installations may produce or transport such disturbances, adequate measures, such as shielding, may be required.

On another front are the public procurement directives which liberalise the awarding of public contracts. A large part of the market for insulated wires and cables has been dominated in the past by the public utilities (both in energy and telecommunications), which often favour national suppliers. With the liberalisation of the tender procedure and procurement, competition within the EU will intensify. Harmonised standards will also allow EU manufacturers and their foreign competitors to penetrate markets other than their own, once the utilities have themselves harmonised their systems.

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## OUTLOOK

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The short term outlook for the EU insulated wires and cables sector is diverse across the three main categories, which are subject to different forces of demand. The market for energy cables remains fairly limited as the energy infrastructure is virtually complete in the Union. Demand therefore consists to a large extent of replacement, maintenance and upgrading of existing infrastructure. Energy cables will, nevertheless, benefit from increased deregulation. Sales possibilities in less developed economies are unlikely to increase significantly. In spite of important needs, improvement in the energy infrastructure is making very slow progress due to limited financial leeway.

The market for telecommunications cables has been stagnating in recent years. In the years to come, this market segment should witness significant improvement, driven by developments in the information technology market and the growth in personal communications, particularly, mobile telecommunications. Privatisation and liberalisation of public procurement in the telecommunications sector should also positively impact on the sector's prospects.

The demand for winding wires will lead the short term outlook, as its main client industries, in particular, the automotive and electro-domestic sector, emerge from a deep crisis. Demand for data and control cables will remain buoyant, based on a dynamic market for office and data processing equipment. However, the EU sector will remain in a fragile competitive position in this market segment, as it faces stiff competition from the world leading computer producers, the USA and Japan.

In the long term, the energy cable segment will benefit from the growth in GDP and the associated increase in electricity consumption. Telecommunications cables will continue to be a fast growing segment, and will benefit from the buoyancy of the information technology market. At last, encouraging prospects for construction and the manufacturing industry will positively impact on the demand for all cables.

On the employment front, the outlook remains rather grim. As the industry is bound to complete rationalisation and is confronted by important overcapacity on both metallic and optical fibre cables, employment will drop further in the next few years.

Written by: DRI Europe

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# Electrical machinery

## NACE 342

Whereas demand for electrical machinery products boomed during the second half of the 1980s, growth has slowed down over the last few years. Overcapacity in the electricity-generating sector and the decline in investment activity are partly responsible for the fall in demand growth.

During the course of the 1990s, demand for the industry's products is expected to grow, mainly boosted by demand from developing countries (South East Asia, China and Eastern Europe). Domestic demand is expected to increase at a slower pace, due to market saturation.

Extra-EU competition has increased, particularly in the segment of mass-produced, standardised equipment. Technical harmonisation in the EU is eliminating barriers between Member States, thereby allowing producers to achieve greater economies of scale. In view of the focus of Japan and the newly industrialised Asian countries on mass-produced standardised equipment, EU firms will need to increase cooperation efforts and intra-EU sales, streamline production and improve cost competitiveness to face up to a further intensification from both within and outside the EU.

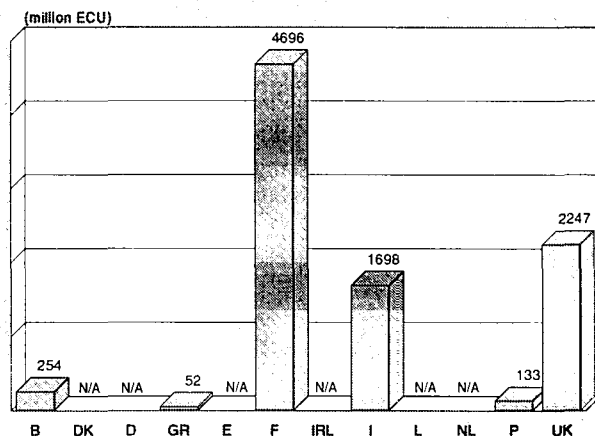
### INDUSTRY PROFILE

#### Description of the sector

The electrical machinery sector comprises two main subsectors: the manufacture of machines, equipment and instruments for the production and conversion of electricity, which includes electrical motors, electricity generators and rotary converters, transformers, current rectifiers, electromagnets and electromagnetic apparatus; and the manufacture of equipment for the distribution of electric power, including equipment for closing, opening, and protecting electric circuits of 1 KV or more (high-voltage switchgear), installation equipment up to 1 KV (low-voltage switchgear), and fixed and variable resistors, including potentiometers

Germany is the most important producer in the EU, with an estimated share of 43 % of total EU production, followed by France (29 %), the UK (13 %) and Italy (13 %). Among manufacturing industries, the electrical machinery sector carries significant economic weight. In 1992, value added in the sector was around 30 % higher than that of consumer electronics.

Figure 1: Electrical machinery  
Value added by Member State, 1993



Source: DEBA

#### Recent trends

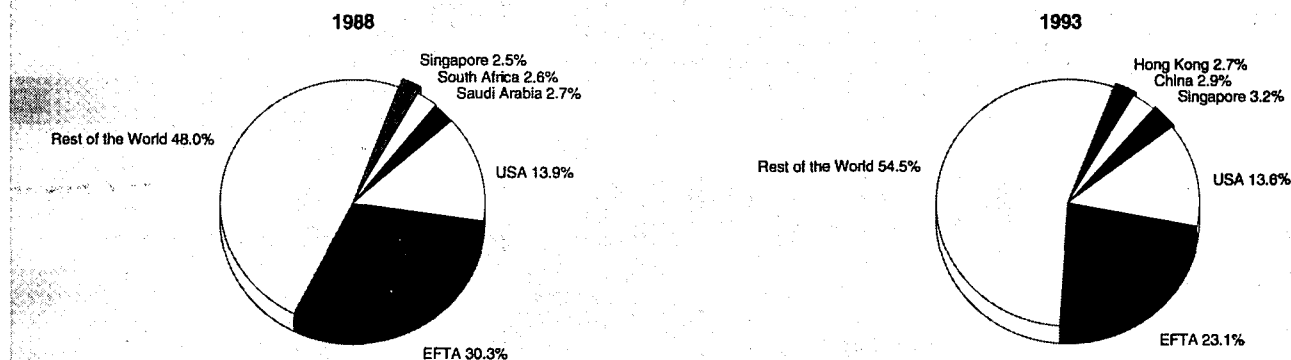
Production volume on average increased by 2.5 % per year from 1984 to 1993, slightly above the average growth rate of the manufacturing industry (+1.9 %). Demand grew at a faster rate, around 3 % per year in real terms. In the last few years, however, the sector has been confronted with strong competition from outside the EU. On average, extra-EU imports grew by nearly 12 % per year in current prices from 1984, to reach some 9.5 billion ECU in 1993 (equalling approximately 25 % of apparent consumption). After slow growth from 1983 to 1988, extra EU exports grew at an average rate of 7 % per year from 1984 to 1993.

The industry is highly-export oriented, with extra-EU exports accounting for 31 % of production in 1993. The trade balance has been positive throughout the last decade.

#### International comparison

The EU is the most important producer of electrical machinery within the Triad. In 1992, Japanese production was the equivalent of 82 % of EU production, whilst US production equalled about 68 %. Japanese production increased the fastest, by roughly 41 % from 1987 to 1991, representing an annual average growth rate of nearly 9 % in real terms. EU production

Figure 2: Electrical machinery  
Destination of EU exports



Source: Eurostat



**Table 1: Electrical machinery  
Production and employment by Member State**

(million ECU)	Production at 1990 prices		Employment (units)	
	1984	1993	1984	1993
Belgique/België	N/A	610	N/A	6 211
Hellas	102	134	3670	2 365
France	10 700	12 008	154 907	115 410
Italia	3 136	5 416	48 648	41 929
Portugal	153	295	6 239	7 103
United Kingdom	4 416	5 313	101 126	73 454

Source: DEBA

**Table 2: Electrical machinery  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	6 996	7 656	8 234	7 779	8 570	9 666	10 286	11 151	11 546	13 119	15 114
Extra-EU imports	3 532	3 891	4 748	4 997	6 030	7 139	7 459	8 461	8 513	9 457	11 706
Trade balance	3 464	3 765	3 486	2 782	2 540	2 527	2 827	2 690	3 033	3 662	3 408
Ratio exports / imports	1.98	1.97	1.73	1.56	1.42	1.35	1.38	1.32	1.36	1.39	1.29
Terms of trade index	97.9	95.2	97.3	96.8	98.0	96.6	100.0	95.9	95.1	88.1	N/A

Source: DEBA

**Table 3: Electrical machinery  
Extra EU trade by Member State, 1993**

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EU
Extra-EU exports	333.7	252.7	5 819.2	14.8	311.5	2 572.8	134.0	1 153.7	492.0	63.1	1 971.7	13 119.2
Share in total EU exports of electrical machinery (%)	2.5	1.9	44.4	0.1	2.4	19.6	1.0	8.8	3.8	0.5	15.0	100.0
Extra-EU imports	274.5	188.3	3 979.7	59.5	294.6	1 031.3	229.2	780.9	467.3	74.4	2 077.1	9 456.8
Share in total EU imports of electrical machinery (%)	2.9	2.0	42.1	0.6	3.1	10.9	2.4	8.3	4.9	0.8	22.0	100.0
Trade balance	59.2	64.4	1 839.5	-44.7	16.9	1 541.5	-95.2	372.8	24.7	-11.3	-105.4	3 662.4
Ratio exports / imports	1.2	1.3	1.5	0.2	1.1	2.5	0.6	1.5	1.1	0.8	0.9	1.4

Source: Eurostat

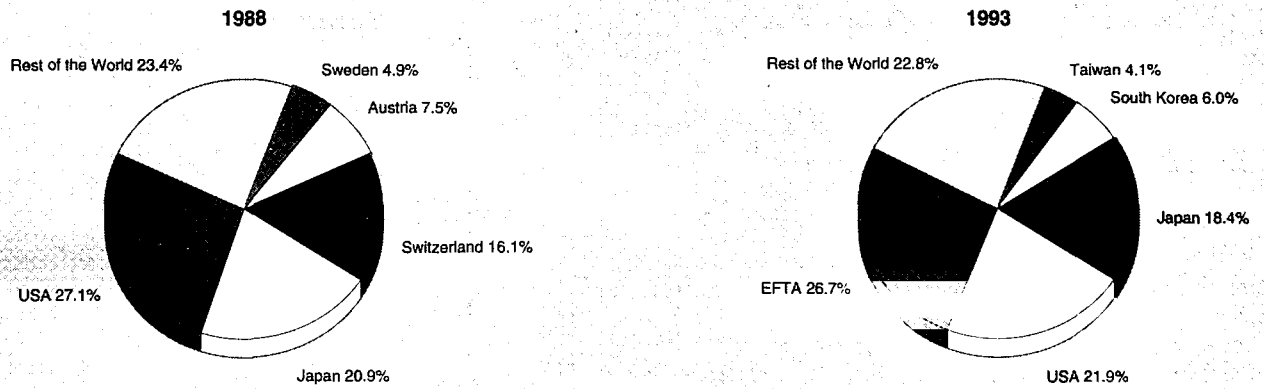
**Table 4: Power transformers  
Trade by Member State, 1993**

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EU
Extra-EU exports	59.1	9.2	211.2	26.6	20.0	169.2	8.0	82.6	20.1	2.5	74.3	682.7
Share in total EU exports of power transformers (%)	8.7	1.3	30.9	3.9	2.9	24.8	1.2	12.1	2.9	0.4	10.9	100.0
Extra-EU imports	9.6	21.7	121.0	2.5	17.3	41.6	15.7	29.2	15.0	3.4	58.4	335.5
Share in total EU imports of power transformers (%)	2.9	6.5	36.1	0.7	5.2	12.4	4.7	8.7	4.5	1.0	17.4	100.0
Trade balance	49.5	-12.5	90.1	24.1	2.6	127.5	-7.7	53.5	5.0	-0.9	15.9	347.2
Ratio exports / imports	6.2	0.4	1.7	10.7	1.2	4.1	0.5	2.8	1.3	0.7	1.3	2.0

Source: Eurostat



**Figure 3: Electrical machinery  
Origin of EU imports**



Source: Eurostat

grew more moderately, at roughly 2.6 % per year from 1984 to 1993. US production has been declining since 1989.

### Foreign trade

The most important feature of trade in the last decade has been the rapid growth in imports, which grew by more than 12 % per year in current prices from 1984 to 1993. The EFTA countries remain the most important origin of imports to the EU, providing around 27 % of total extra-EU imports. Switzerland, in particular, is an important competitor for EU producers. The USA and Japan each hold EU market shares of roughly 20 %. Over the last years, however, all the traditional competitors (with the exception of Japan), have been losing market share in the EU, mainly to the benefit of developing and industrialising countries, the market shares of which increased from 20 % in 1987 to 30 % in 1993 (Taiwan and South Korea held 4 % and 6 %, respectively).

In current prices, extra-EU exports grew by 7 % per year from 1984 to 1993. The most important market for EU producers is the group of developing and industrialising countries (including the East Asian NICs) which accounted for around 63 % of total extra-EU exports in 1993. The EFTA countries represented approximately 23 % and the USA slightly below 14 %. The EU trade balance has remained positive (at 3.6 billion ECU in 1993), with extra-EU exports about 1.5 times the size of imports.

Trade within the EU grew fast, by some 13 % per year, over the period 1983 to 1992. The share of intra-EU trade out of total EU imports remained more or less constant over the same period. The most important intra-EU exporter in the EU is Germany, with about 42 % of the total, followed by France (19 %), the UK (10 %) and Italy (9 %).

## MARKET FORCES

### Demand

Overall demand for electrical machinery has increased significantly over the last 10 years (with growth at 3 % per year) although there have been important variations in the different segments.

Demand for products closely related to manufacturing processes benefited the most from the investment boom of the second half of the 1980s. The EU manufacturing sector made efforts to expand production capacity and improve efficiency in anticipation of the Single Market. This led to strong demand for electric motors, electromagnetic equipment, low-voltage

switchgear, installation equipment and fixed and variable resistors. Product innovation also had a positive effect on demand. One example is the switch from DC converters to three phase converters. In the last few years, however, following the decline in investments, demand has grown more moderately.

Subsectors more closely related to the production and conversion of electricity went through a quite different pattern of development over the last decade. Rapidly growing demand for electrical power in the late 1980s resulted in the expansion of electrical energy supply, as well as of distribution networks. This had a positive effect on the producers of equipment such as electricity generators, transformers and high-voltage switchgear.

In the last few years, however, the picture has changed. With the slowdown in electricity demand growth, due to saturated markets, a fall in fossil fuel prices, and energy-saving measures, demand for products related to the generation and distribution of electricity has declined. Electricity distribution companies have now completed substantial investments in most EU countries, with the result that the industry now has significant excess capacity. For several years to come, investments in these areas will therefore be oriented towards replacement, rather than capacity increases.

In addition, the recent downturn in general economic activity has affected demand for the industry's products, as decisions to invest in power stations are closely tied to expected GDP growth. In view of depressed demand on the domestic market, EU producers have sought to increase their presence on other markets. In some cases, however, this has been hindered by protectionist measures designed to maintain national control over electricity production, which is often viewed as a "strategic" industry.

### Supply and competition

As demand has increased over the last decade, EU production of electrical machinery has grown steadily (at approximately 3 % per year between 1984 and 1993). In many areas of the sector, EU producers may be considered to be market leaders with significant market shares. In 1990, EU manufacturers held a 35 % share of the world market for high-voltage switchgear, followed by the USA with 28 % and Japan with 26 %. In low-voltage switchgear, EU producers held a similar share, compared to the USA at 24 % and Japan at 20 %.



**Table 5: Power transformers**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	488.7	439.1	421.3	376.4	412.4	483.6	510.3	567.7	621.1	682.7
Extra-EU imports	137.0	145.7	157.6	158.9	220.4	271.3	259.0	280.0	303.6	335.5
Trade balance	351.8	293.4	263.8	217.5	191.9	212.3	251.3	287.6	317.5	347.2
Ratio exports / imports	3.6	3.0	2.7	2.4	1.9	1.8	2.0	2.0	2.0	2.0

Source: Eurostat

Technical harmonisation in the EU is eliminating barriers between Member States. In order to face increasing internal and external competition (from Japanese and other Asian producers in the mass market), EU producers will have to increase cooperation and improve their cost competitiveness. This increasing competition is having significant repercussions on several market segments. For example, the exports to imports ratio for transformers fell from 6 in 1982 to 2 in 1993. In low-voltage switchgear, competition from Japan and East Asian NICs reinforced imports from this part of the world. All in all, the imports to consumption ratio rose from 10 % in 1983 to 25 % in 1993, a figure that now seems to have stabilised.

## INDUSTRY STRUCTURE

### Companies

The number of companies manufacturing electrical equipment in the EU has been declining over the last 20 years. However, the concentration has created powerful and competitive manufacturers.

Hence, the sector is dominated by a few very large pan-European manufacturers which operate in a wide range of electrical engineering activities. The most important is ABB (CH/S), which is active in the major electrical machinery segments (turbo-alternators, high-voltage and low-voltage switchgear and motor control equipment), followed by Siemens (D), also active in the main market segments. GEC (UK) is mainly specialised in turbo-alternators and high-voltage switchgear and the joint-venture GEC-Alsthom (UK/F) is present in the main segments of the sector. AEG (D) is a leading firm in low-voltage switchgear and motor control equipment; other major players are Schneider (F) and Jaeger (F).

Precise employment figures for the sector are not available and total employment was estimated at 350 000 in 1993. Approximately 35 000 people were employed in the high-voltage switchgear sector in the EU, and in Germany alone there are 48 000 people employed in the low-voltage switchgear sector.

By promoting intra-EU trade and agreements between European manufacturers, the Single Market has consolidated the EU electrical machinery market. US and Japanese manufacturers, fearing a possible "Fortress Europe", have undertaken huge restructuring of their production and are looking for co-operation agreements with the largest European manufacturers. Both US and Japanese companies are nevertheless powerful on the world market for electrical machinery. They supply an estimated 40 % of world-wide demand.

### Strategies

The largest EU producers have been focusing upon emerging markets for a long time. The relative saturation of many domestic markets has forced them to expand their horizon. China and other Asian countries, as well as South American ones, represent huge potential markets for the largest manufacturers.

However, most internationally active players are attracted to these markets and the battle for market share is fierce. Success

on these new markets is generally dependent on several factors, such as political relations between countries, local presence in the country, previous experiences of foreign markets and ability to sub-contract to local industry.

Today, EU producers have a relatively strong position on their own market but the potential in foreign markets is much higher, and in the medium term domestic market shares will certainly evolve with the ability of companies to tap these emerging markets. At the same time, EU producers continue to restructure the industry. On the one hand, R&D and quality control expenditures are increased to compete on product quality and know-how. On the other, cost reduction and production line modernisation continue, in order for companies to remain competitive vis-à-vis East Asian low-cost manufacturers.

However, such restructuring is often insufficient to stay competitive on the global level and many companies are continuously looking for partnerships and other commercial agreements with local manufacturers to ensure physical presence in certain countries or to take advantage of local opportunities. One recent deal is noteworthy: ABB owns the majority of a joint venture in Vietnam with CTBT, a local transformer manufacturer (according to ABB, the joint venture was the largest in the electro-technical industry to be set up in Vietnam by a foreign company). In general, EU firms are increasingly present in various emerging markets (such as South East Asia, China and Central Europe), through cooperation with local partners (e.g. ABB has set up joint ventures in switchgear in the Czech Republic).

EU producers currently follow three main lines of strategy: to develop sales on emerging markets (mainly China and certain South American countries); to restructure production lines in order to improve quality and reduce costs; and to set up co-operation agreements with local manufacturers or to grow externally through mergers and acquisitions.

### Impact of the Single Market

Demand for electrical machinery has grown over the past few years. This was due not only to general economic recovery and increased demand from developing countries, but also to EU technical harmonisation which has reduced barriers to entry into the market and has resulted in an increased concentration of European firms. Nevertheless, trade is still hampered by other internal and external barriers, such as enlarged testing requirements and certification activities and high protectionist barriers.

The sector, in view of the realisation of the Single Market, has made important production capacity and efficiency improvements which, in due time, will assist the recent boost in demand. Harmonisation of EU legislation has also helped to reduce SMEs' financial burdens and encourage their investments. Finally, an overall assessment of the impact of the internal market on the electrical machinery industry would certainly call for a positive evaluation of its effects on the global business environment.

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## ENVIRONMENT

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Production of electrical machinery does not present particularly relevant environmental issues. In the past, the use of PCB (polychlorinated bi-phenyls) to insulate the wires in the bodies of transformers did represent an a threat to the environment, but their use has since been discontinued.

It is likely that the industry will benefit indirectly from increased concerns regarding emissions from fossil fuels. Coal power plants, for example, may have to be replaced by cleaner methods of electricity generation.

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## REGULATIONS

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Important directives for the sector are the Low Voltage Directive (73/23/EEC), the Electromagnetic Compatibility Directive (EMC; 89/339/EEC) and the Machinery Directive 89/392. Manufacturers whose products comply with the relevant provisions of these Directives and who have demonstrated this conformity by following the applicable procedures set out in the Directives may affix the CE-mark. This allows free movement of the products throughout the European Economic Area.

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## OUTLOOK

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In discussing future demand, the market for electrical machinery may be divided into three categories: developed markets, emerging markets and the replacement market.

Developed markets will continue to grow at a very slow pace and some segments may even decline. Even in the case of a strong economic recovery, many markets cannot expect a growth rate higher than 2 % per year due to the relative saturation of the market. Moreover, the trend towards increasing energy efficiency has a direct impact on the sector.

Demand on certain emerging markets is expected to play a major role in the future for the sector's performance. In the medium term, certain countries in Asia (such as China) and Latin America may represent huge markets and provide rewards for those producers able to get a foothold in these countries. It is difficult to estimate potential market growth, however, even if we know that GDP growth currently is between 6 % and 18 % per year in these countries.

The third driver of demand will be the replacement market, a market highly dependent on economic recovery. In this field,

demand is likely to be stable, with expected growth in Southern Europe and Ireland.

On the supply side, the short-term situation should remain the same. However, it may be affected by the increasing competition from East Asian manufacturers which are very well positioned to play an important part in supplying electrical machinery to our part of the world.

The European electrical machinery sector is likely to grow at a very slow pace over the next five years, although growth may be stimulated by the more buoyant developing markets.

Written by: LEK

The sector is represented at the EU level by: Comité de coordination des Associations de Constructeurs d'appareillage industriel électrique du Marché Commun (CAPIEL). Address: c/o ZVEI Postbox 700 969, D-6000 Frankfurt/Main 70; tel: (49 69) 630 2298; fax: (49 69) 630 2386; Comité des Associations de Constructeurs de Transformateurs du Marché Commun (COTREL). Address: c/o Fabrimetal, Rue des Drapiers 21, B-1050 Brussels; tel: (32 2) 510 2521; fax: (32 2) 510 2561.

# Electrical equipment for industrial use

## NACE 343.1

*Synchronisation in economic growth in the G-7 economies during the fourth quarter of 1994, emphasised by a sharp pick-up in economic activity in Germany, has led to a strong rebound in demand for electrical equipment for industrial use. Structural modification in demand, mainly due to dramatic changes in Eastern Europe, will also support demand through the second half of the 1990's. The inclusion of three new Member States, namely Austria, Sweden and Finland will have an important effect on structural aspects of the industry. For instance, the world leader in the welding equipment sector, namely ESAB of Sweden, will have easier access to other EU markets where major client companies are located. Although major European producers still enjoy a comfortable market position, low cost producers constitute a potential threat. Furthermore, US, Japanese and South Korean multinationals, holding world brands, reacted more positively than EU producers to the globalisation of markets.*

### INDUSTRY PROFILE

#### Description of the sector

The electrical equipment for industrial use sector comprises a number of relatively unrelated subsectors:

- electrical equipment related to internal combustion engines, motor vehicles and other means of transport, and to traffic;
- electrical industrial and laboratory furnaces, ovens and other types of heating equipment;
- equipment, machinery and materials for electric welding and cutting of metals;
- portable electrical tools; and
- other electrical apparatus, appliances and equipment for industrial use.

Due to the number of products covered by this industry, activity is distributed among a large number of competitors who are either highly specialised in a specific product segment or diversified in a number of industries (e.g. Robert Bosch (D), Peugeot (F) or Fiat (I)). However, none of the analysed companies offer a product range covering all segments of the industry.

Two segments dominate the electrical equipment for industrial use sector: power tools and welding equipment. Together, they account for over 50 % of total sales within the EU. Figures for production are not as important due to manufacturing delocalisation.

The power tools industry produces equipment such as drills, planers, circular saws and other tools, which are generally portable. Main consumer segments are professional (e.g. construction, metal-working and wood-working sectors), accounting for 40 % of 1993 revenues, and domestic DIY - Do It Yourself, accounting for the remaining 60 %.

#### Recent trends

Sales of power tools in the EU and EFTA countries reached over 2 500 million ECU in 1993, with drills accounting for 34 % of the total. Germany is the largest consumer, accounting for close to 40 % of total consumption, followed by France, Italy and the UK, all under 15 %.

Total consumption of welding equipment in EU markets for 1993 exceeded 1 300 million ECU including robots and working environment equipment. Arc welding equipment accounted for nearly one third of this figure, while resistance welding equipment represented 30 %, and other types of equipment such as working environment equipment, laser and electron beam machines represented the remaining part. Within the EU, Germany was the largest consumer with over 45 % of the total, followed by France with over 20 % and Italy with 15 %. The main consumer market for welding equipment is by far the automotive industry, followed by the DIY sector.

The 1989-1993 compound annual growth rate (CAGR) of total extra-EU exports of the industry was 3 %, but with inequalities on a year by year basis. CAGR of total extra-EU imports increased twofold, reaching 6 % during the same period. Consequently the trade surplus, as much as 500 million ECU in 1989, fell dramatically to reach 100 million ECU in 1993. Trade among EU Member States has been growing at a CAGR of around 7 % for both exports and imports. Therefore, the share of intra-EU exports out of total EU exports has been growing over the last five years. For 1993, export and import activity in internal EU trade was at least 40 % higher than external EU trade.

In the last four years, power tools imports have grown three times faster than exports, mainly due to a slowdown in the growth of exports outside of the EU. In contrast, extra-EU exports of welding equipment have grown at 1 % CAGR, while extra-EU imports have declined at an average annual rate of 4 %. However, external exports have decreased in nominal terms over the period.

#### International comparison

In the electrical equipment for industrial use sector, China is still a minor producer although it should be seen as the most threatening. While exports to this country represented 3 % of total EU exports in 1993, imports of Chinese equipment were close to 5 %. Also, while 1988-1993 CAGR in exports grew by "only" 15 %, imports grew from 9 million ECU in 1988 to over 260 million in 1993, in nominal value, or a CAGR of 97 %.

EFTA countries are the EU's major destination countries corresponding to 22 % of total exports. For total imports, the EFTA countries share is lower at 18 %. However, imports are increasing at a faster rate than exports. In 1993, 61 % of the welding equipment imported by the EU came from EFTA countries, mainly Switzerland and Sweden (host of the world's leading producer).

In 1993, EU's trade balance was negative both with the USA and Japan: 12 % of EU exports were destined to the USA, while 20 % of EU imports came from that country, with a five year CAGR of 6 %; Japan absorbed only 2 % of EU exports, while it represented over 22 % of EU imports, with a five year CAGR of 8 %. It is in the power tools segment that these countries are particularly strong competitors for EU producers. For instance, Japanese power tools account for 17 % of EU imports, while exports to Japan only account for 2 %. However, Japan has lost market share between 1988 and 1993 in EU imports to the benefit of emerging and low cost producing countries such as China or Hungary.

#### Foreign trade

The trend towards increasing import penetration of electrical equipment for industrial use as a whole is demonstrated by the fact that 1984-1993 CAGR of extra-EU imports grew by 9 %, while extra-EU exports only grew at 4 % CAGR. In 1992, the nominal value of imports was slightly higher than that of exports, leading to a negative trade balance of 51 million ECU.

In power tools, the EU trade balance has suffered a sharp decline since 1988. From 1989-1993, extra-EU imports grew



**Table 1: Electrical equipment for industrial use**  
**External trade at current prices**

(million ECU)	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 339.0	3 552.0	3 533.0	3 630.0	3 547.0	3 979.0	N/A
Extra-EU imports	2 679.0	3 076.0	3 380.0	3 862.0	3 598.0	3 876.0	N/A
Trade balance	660	476	153	-232	-51	103	N/A
Ratio exports / imports	1.25	1.15	1.05	0.94	0.99	1.03	N/A

Source: Eurostat

**Table 2: Power tools**  
**Trade by Member State, 1993**

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EU
Extra-EU exports	4.5	1.4	314.4	0.2	10.7	21.5	1.0	50.3	9.3	0.4	79.2	492.9
Extra-EU imports	24.3	15.1	400.4	6.0	26.5	118.2	11.6	77.6	70.3	5.3	76.1	831.4
Trade balance	-19.9	-13.7	-86.0	-5.8	-15.8	-96.8	-10.5	-27.2	-60.9	-5.0	3.0	-338.5
Ratio exports / imports	0.18	0.09	0.79	0.03	0.40	0.18	0.09	0.65	0.13	0.07	1.04	0.59

Source: Eurostat

**Table 3: Welding equipment**  
**Trade by Member State, 1993**

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EU
Extra-EU exports	14.6	5.3	149.0	0.7	7.0	32.8	4.7	62.0	18.4	1.1	32.7	328.3
Extra-EU imports	5.1	12.6	75.1	3.6	12.8	20.9	1.0	27.3	21.1	3.7	36.9	220.3
Trade balance	9.5	-7.3	73.9	-2.9	-5.8	11.9	3.7	34.7	-2.7	-2.6	-4.3	108.0
Ratio exports / imports	2.87	0.42	1.98	0.20	0.54	1.57	4.55	2.27	0.87	0.30	0.88	1.49

Source: Eurostat

**Table 4: Power tools**  
**External trade in current value**

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	398.9	442.3	452.1	440.5	431.8	492.9
Extra-EU imports	502.5	559.9	609.9	699.7	697.8	831.4
Trade balance	-103.6	-117.7	-157.8	-259.3	-266.1	-338.5
Ratio exports / imports	0.79	0.79	0.74	0.63	0.62	0.59

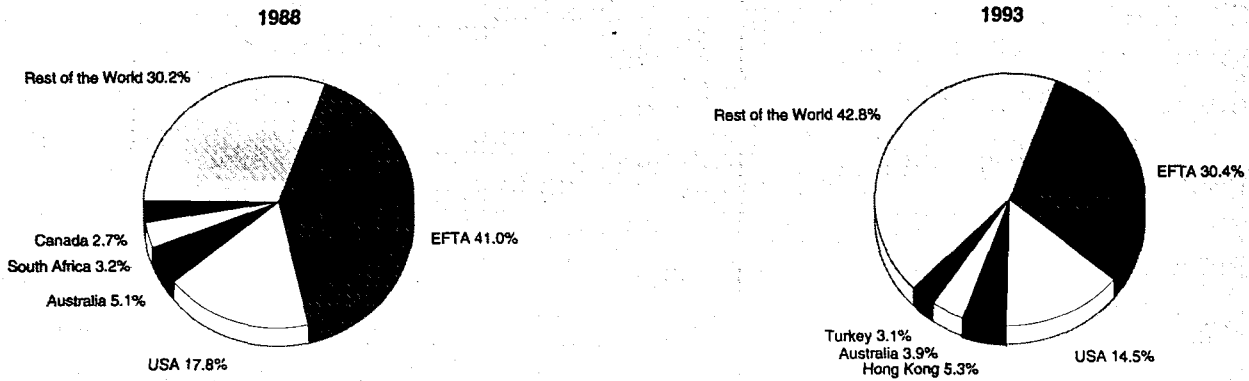
Source: Eurostat

**Table 5: Welding equipment**  
**External trade in current value**

(million ECU)	1988	1989	1990	1991	1992	1993
Extra-EU exports	394.4	333.0	314.8	371.2	285.0	328.3
Extra-EU imports	250.3	273.2	266.5	313.0	298.4	220.3
Trade balance	144.0	59.8	48.4	58.2	-13.4	108.0
Ratio exports / imports	1.58	1.22	1.18	1.19	0.96	1.49

Source: Eurostat

**Figure 1: Power tools  
Destination of EU exports**



Source: Eurostat

three times faster than exports, with Switzerland (host of a large number of Bosch facilities, the EU's leading producer) Japan and China representing a combined share of 71 %. It is also important to note that German imports grew by 15 % per year in the last five years, while exports only grew by 4 %, evidence of an increase in competitiveness of other countries, particularly outside the EU. France, Italy and the UK are also large importers.

Apart from the US and EFTA countries, major clients for EU producers of welding equipment are countries such as China, the former Eastern block, Turkey and ASEAN countries. In 1992, the most important intra and extra-EU exporter was Germany (40 % of intra-EU and 42 % of extra-EU exports) followed by Italy (16 % and 20 %, respectively) and France (13 % and 11 %). With regard to imports, Germany was also the largest importer in 1993 accounting for 34 % of total EU imports, with two-thirds originating from outside the EU, followed by the UK, Italy, the Netherlands (which holds a negative trade balance in this subsector) and France.

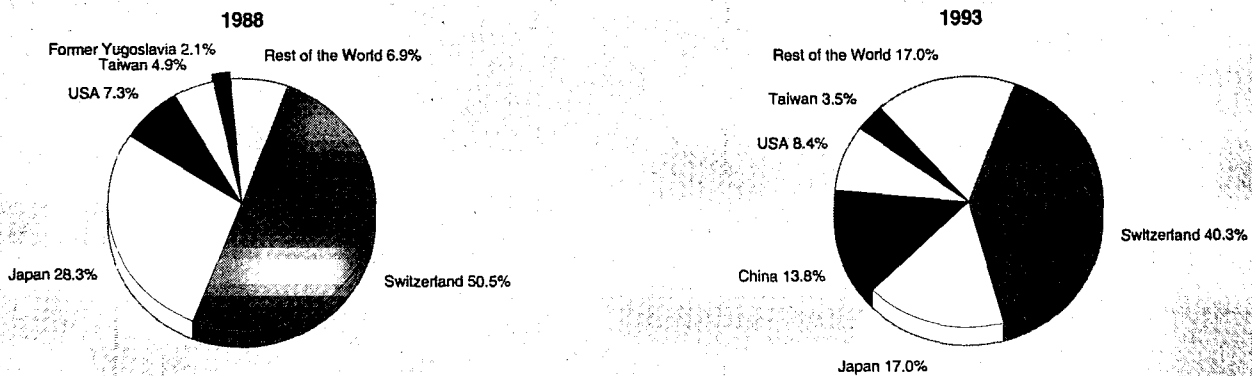
## MARKET FORCES

### Demand

Notwithstanding power tools, whose demand is determined to a large extent by private household expenditure, products from this industry are either intermediate or investment goods. For welding equipment, consumables (filler materials) are not consumed as such, but are used in connection with the production of durable investment or consumer goods, such as cars or ships. Demand for electrical equipment for industrial use is therefore determined mainly by the evolution of production in a large number of client sectors. Investment goods can be classified as:

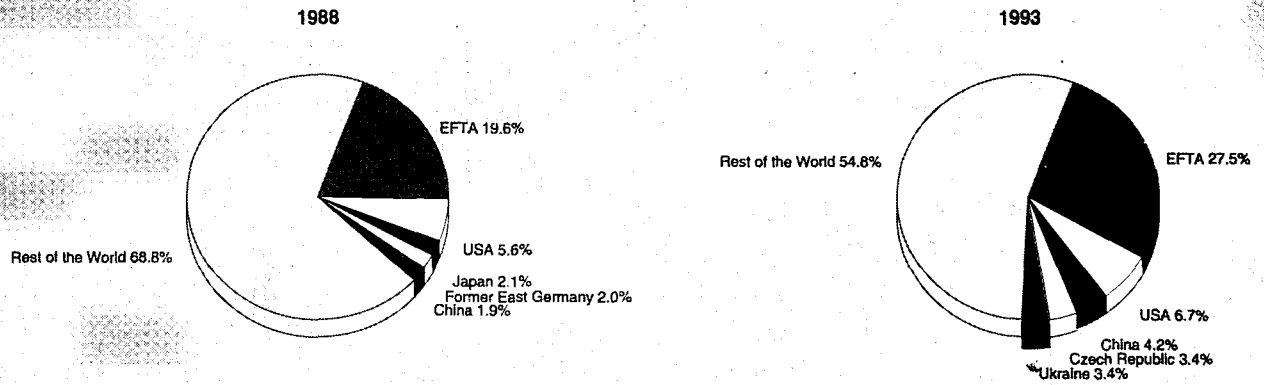
- electrical equipment related to internal combustion engines, motor vehicles and other means of transport, and traffic, where demand is determined by the level of production of transport equipment, and by replacement needs;
- furnaces and ovens, where demand depends mostly on construction activities or replacement in manufacturing plants, as well as, R&D activity;

**Figure 2: Power tools  
Origin of EU imports**



Source: Eurostat

**Figure 3: Welding equipment  
Destination of EU exports**



Source: Eurostat

- welding equipment and materials, where demand depends mainly on activities in the processing industry, power generation and transport industry (which includes the construction of cars, ships and aircraft), but also on a wide range of other activities, such as the production of cans, cross-wire products, steel constructions or pipelines; and
- electrical power tools, where demand is mainly driven by construction, metal- working, wood-working, craftsmanship, small scale manufacturing, maintenance and DIY activities.

Most products of this industry are highly sensitive to variations in general levels of economic activity. As a result, recession was the main cause of the 1990-1993 market slowdown. Major drops in the welding equipment industry were caused by the fall in orders by client industries, which postponed capital investments. In contrast, the power tools market downturn (which was less than 2 % in 1990 and 1991) was relatively unaffected by its high dependency over consumer goods markets. These markets, mainly the DIY sector, are defensive sectors in a recession.

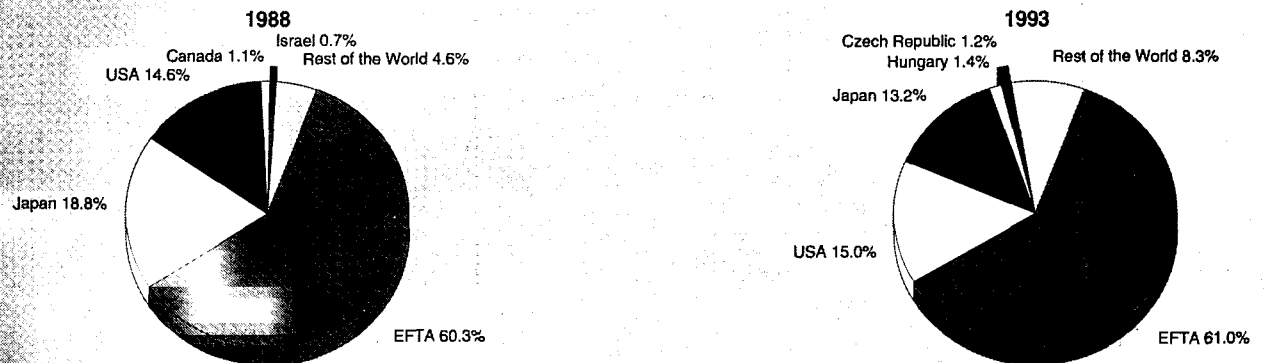
As many EU countries slowly emerge from recession, demand in 1994 is expected to post a small growth in revenues, and growth rates are expected to pick up from 1995 onwards. Main factors affecting future demand will be: a strong contribution of the massive German market, particularly from the former East German region where most companies and consumers will need to invest in equipment goods and where extremely intensive construction, metal- and wood-working activities are expected to occur. Other contributors will be Italy and the Iberian Peninsula, where construction is a major sector of the economy.

Furthermore, power tools sales growth is anticipated in markets where DIY is still relatively underdeveloped and where market shares of the superstore distribution segment are predicted to escalate.

**Supply and competition**

Major companies in this market are based in the EU, the USA or Japan. In the power tools segment, competition in European markets is fierce between these three geographical blocks, mostly because of high product standardisation and easy access to distribution channels. In other segments, EU

**Figure 4: Welding equipment  
Origin of EU imports**



Source: Eurostat



**Table 6: Electric power tools  
EU consumption by Member State, 1993**

(%)	
Belgique/Belgie	3.7
Danmark	1.9
BR Deutschland	48.1
Heilas	1.3
España	4.9
France	15.1
Ireland	0.5
Italia	8.7
Luxembourg	0.0
Nederland	5.3
Portugal	0.9
United Kingdom	9.7

Source: Bosch

producers are less threatened by outside competitors. Most firms active in these segments supply relatively custom-made products and services to their client industries, creating barriers to these markets for non-EU producers. Barriers to entry also exist because strong cooperation and joint research between supplier and customer are more important than pricing.

In welding equipment, particularly the car assembly lines equipment segment, regional producers, or at least EU-based producers, have an edge over suppliers from other countries. "Transplant" production facilities are generally a threat to EU suppliers as they constitute a market penetration opportunity to non-EU companies: transplants are generally equipped by original suppliers from the mother-company. For example, Japanese car transplants in the UK receive most of their equipment from Japan.

In the power tools segment, although EU companies have an intrinsic advantage because they are dealing on home territory and control distribution, Black & Decker (USA) has an entrenched network that places it above most competitors. It is also likely that major distribution expansion will be achieved by Japanese companies, which combine wide product ranges, quality and innovation (particularly in the cordless segment). However, some European manufacturers are at an advantage versus German and Japanese competitors because of currency weakness, allowing them to maintain a price-competitive edge (i.e. Italy).

### Production process

For most of the sector's products, raw materials and energy represent a small portion of production costs. R&D is a very important input as products must adjust to changes in the production process in client industries. A major part of the labour force is skilled. Technological change is rapid, but evolutionary rather than revolutionary. It is interesting to note that the adoption of major innovations in the welding segment, such as laser cutting/welding technologies or electron-beam welding, may be held back by reluctance from client industries to master new, untested products. This also happens when problems such as the high cost of the certification process come forward (e.g. introduction of new technologies in the aerospace industry). In power tools, upcoming major innovations are electronic upgrades, both for professional and DIY segments, and the improvement of cordless and battery-recharging technologies.

## INDUSTRY STRUCTURE

### Companies

The industry is undergoing a concentration process with smaller firms being absorbed by large groups, both within

their countries and across borders, particularly in the welding equipment industry. Activity is distributed among a large number of competitors who are either small companies, highly specialised in a specific product segment, or large corporations, active in a number of businesses (e.g. Robert Bosch (D), Fiat (I) or Atlas Copco (S)).

With regard to the welding equipment sector, there are at least two distinguish fields: arc welding and resistance welding. In the arc welding segment, machines are of relatively small value, but consumption of filler-materials represents a large part of welding cost. Sales are usually made through a network of distributors. Leading competitors have appeared as the result of a consolidation process carried out over the last decade. ESAB (S) is the world's leading supplier of welding equipment and consumables with a total group turnover of over 750 million ECU in 1993, of which 400 million ECU was in West Europe. ESAB was formerly controlled by Incentive (S) of the Wallenberg family and acquired by Charter, the UK industrial group, in 1994. Messer-Griesheim/Norweld/Lincoln (D/I/USA), SAF/Oerlikon (F/CH) Migatronic (DK), Kemppi (FIN) and Hobart & Miller (USA) are also major producers in the European market.

The resistance welding segment is more fragmented. However, some companies have grown out of this activity to become major automation companies and are now mainly involved in the production of transfer lines used for the assembly of automobiles. Major producers are: Sciaky (F) the major independent firm in Europe which offers the widest range of resistance welding equipment, as well as, conveyors and mechanical handling equipment; Renault Automation (F); Kuka (D); Comau (I) a subsidiary of the Fiat (I) group; Lamb-Technikon (UK); and Stadco (UK). Smaller companies (under 150 employees) active in this segment manufacture more standard welding machinery, such as classic spot or projection seam welders. Among others, the following can be mentioned: British Federal (UK); Ideal (D) which produces butt welders and transformers; Elrex (D) which produces transformers; Dalex (D); and PRD (F). Most of the firms in the industry operate in a number of EU countries, if not world-wide.

The power tools industry is less fragmented. The sector is dominated by a reduced number of international producers who are challenged locally by small producers specialising in professional and industrial tools, often custom made. Here, companies can be divided into three categories: multinational; national; and regional.

Multinationals, for which this activity is often only a fraction of total revenues, are geared towards offering a broad range of products to all end-use sectors in all geographic regions. They function by means of manufacturing sites in different international locations, with each site producing a specific range of tools. Distribution is controlled either through direct subsidiaries a joint venture. Examples are Robert Bosch (D), the market leader with portable power tools sales reaching 1 000 million ECU in 1989 and a declared 20 % world market share; Black & Decker (USA), for which power tools contributed to over 25 % of total revenues in 1992; or Rioby (JPN), with sales of over 300 million ECU in 1992. National producers also offer a broad product range, but tend to serve one end-user group in particular or a single geographic area. Production sites can be numerous, but are located in only one or two countries from where products are distributed via subsidiaries for main markets or agents in lesser markets. Examples are AEG Elektrowerkzeuge (D), a former AEG division taken over by Atlas Copco (S), which owns other power tool manufacturing companies; Wickes (UK), more a retailer than a producer with more than 60 stores in the UK and 30 others in France and the Benelux area; and Peugeot (F). Regional producers are generally niche producers with narrow product ranges, often custom made, which satisfy a need too specific for the broadly-based large companies.

## Strategies

Demand for electrical equipment for industrial use is, and will remain, subject to EU and world economic cycles. However, firms in the sector must be able to respond fast to fluctuations in demand. This can be achieved through high levels of automation, component out-sourcing and flexibility in employment. Successful strategies leading to a sustainable competitive edge should combine a mixture of four factors: identification of end-user needs, geographic shifting of production, innovation and product differentiation.

R&D, particularly joint R&D, is also an important factor in maintaining a competitive edge, as well as, close cooperation with client sectors. These strategies allow firms to adapt products to client needs and build up customer loyalty.

On the mergers and acquisitions side, apart from the acquisition of welding equipment world leader ESAB by Charter, Black and Decker divested some non-core business activities such as Dynapert (USA), Corbin & Russwin (USA) and Minicraft (UK) in 1994 for an estimated total of over 300 million ECU. They also announced plans to discontinue manufacturing operations at their Limburg (D) facility in favour of the Spennymoor (UK) site.

## Impact of the Single Market

The impact of the Internal Market on the various areas of legislation of direct relevance to the electrical equipment for industrial use sector is, with important exceptions, fairly weak. Exceptions arise in the free flow of goods. In particular, technical harmonisation has had a positive effect on the sector because product standardisation has stimulated competition amongst pan-European players. Also, full implementation of the Internal Market measures will prevent new barriers from being created. Another important Single Market issue stems from consumer protection; in fact, since some third country products are of poor quality, misleading advertising and producer liability legislation could be used as effective international trade tools. Finally, the Single Market program is bound to have a decisive effect on small and medium sized enterprises, as administrative and financial burdens will be minimised, thus encouraging investment related activities.

## REGIONAL DISTRIBUTION

It is foreseeable that a shifting of production facilities from high-cost to lower-cost regions will increase in the coming years. This is true not only within the EU, but also on a global level.

## ENVIRONMENT

Ecological issues are of small concern to the production processes in electrical equipment for industrial uses as energy consumption is low and emission of noxious fumes or other pollutants is negligible.

Recycling for the industry is rarely a problem because the industry produces relatively low volume and high value added products, with a large share of recyclable metals in the composition of materials. For the arc welding industry, fumes represent a problem at the user's end due to the special composition of the different types of electrodes used in the welding process. Here, the danger is not for the environment in the usual sense but for the workers' health. This is dealt with by the use of aeration systems, filters, and masks, with Nederman (S), member in the ESAB group, as world leading supplier of such equipment.

## REGULATIONS

Major regulations affecting the industry are norms and their homogenisation across the EU. However, only standard components such as transformers, electrodes' sizes, cables, etc. are affected. Most of the equipment produced by the industry is highly specialised and built to suit specific requirements. Thus, there is little scope for exogenously imposed normalisation. However, some types of equipment do produce electromagnetic radiation and the European Commission is working on a regulation to reduce its possible negative effects on workers and the near-by environment. The power tools industry has to comply, in most cases, with general safety regulations.

Key directives affecting the electrical equipment for industrial use sector are: the machines directive (89/392/EEC), the low voltage directive (73/23/EEC), the electromagnetic compatibility directive (EMC; 89/336/EEC) and the March 1994 directive on protection equipment and systems to be used in potential explosive atmospheres (94/9/CE).

## OUTLOOK

The outlook for the industry of electrical equipment for industrial use is closely related to general variations of GDP. Although the present global economic recovery appears to be well on course, and given that final demand from client industries will most likely increase in the next three years, unqualified optimism is still not justified.

With regard to the car industry, global car sales in 1993 fell to their lowest level in six years, but demand has recovered. Global car sales could rise by nearly 6 % in the next three years. This will foster growth in the sectors related to the automotive industry (e.g. electrical components for motor vehicles) and benefit the welding industry. Demand for transport and traffic related equipment has remained strong in a number of EU countries, mainly Germany, France and Spain thanks to important railroad development projects. The development of transport, Trans-European Networks (TEN), promoted by the EC is expected to extend this positive trend to all Member States and boost activity in the EU. For other types of equipment in this industry, demand will benefit from EU and world economic recovery.

Growth rates for the total Western European market are expected to rise from less than 1 % in 1993 to over 2 % in 1994. Growth rates are also projected to experience strong acceleration during 1995-1998. The CAGR for the 1995-1998 period is projected at close to 5 % with production expected to grow at similar rates. Extra-EU imports and exports should follow similar growth paths as demand. In the long run, export growth should outstrip import growth, thanks to the development of demand in Central and Eastern Europe.

Written by: LEK

The industry is represented at the EU level by: European Welding Association (EWA). Address: Varrolaan 100, NL-3584 BW Utrecht; tel: (31 30) 588 588; fax: (31 30) 588 200; and European Power Tools Association (EPTA). Address: Stresemannallee 19, D-60596 Frankfurt; tel: (49 69) 630 2270; fax: (49 69) 630 2317.



# Batteries and accumulators

NACE 343.2

*Concentration of the industry is well under way. In 1994, US manufacturers dramatically consolidated their position in the EU and are now close to controlling the important starter batteries market. Demand for consumer batteries is being boosted by the greater use of remote controlled and battery operated appliances. Starter batteries for the automotive industry suffered from general economic recession, but recovery in global car sales should boost sales in this segment over the next three years.*

*Recent technological improvements have generated a series of dilemmas for the leading companies of the industry. For example, longer lasting batteries have a negative effect on sales volumes; rechargeable batteries affect sales of non-rechargeable batteries; and efforts to develop environment-friendly batteries might, in the short term, affect EU manufacturers price competitiveness.*

## INDUSTRY PROFILE

### Description of the sector

The batteries and accumulators industry can be divided into two main subsectors: the production of primary batteries, which are not rechargeable, and that of rechargeable batteries, i.e. accumulators.

There are six types of primary batteries: zinc carbon batteries (the first type of dry batteries); longer life alkaline manganese batteries; mercuric oxide batteries; silver oxide batteries; zinc air batteries; and lithium batteries.

Accumulators are of two main types: lead acid batteries and nickel cadmium batteries.

Depending on their use, batteries can be further divided into: drive batteries, stationary batteries and starter batteries. Drive batteries are employed to operate electric motors to propel vehicles, in particular handling equipment, but also electric cars. Stationary batteries are used mainly for the operation of emergency devices such as alarms, control systems and back-up units (i.e. Uninterruptible Power Supplies). Starter batteries are utilised in motor vehicles to provide electric power until the internal combustion motor has been started.

The automotive sector is the major client of the batteries and accumulators industry accounting for over 40 % of sales.

In the EU, the most important producers of batteries and accumulators are Germany, France, Italy, the United Kingdom,

the Netherlands and Spain. Important producers are also located in Sweden and Finland.

### Recent trends

Demand for starter batteries from the automotive industry increased at a compound annual growth rate (CAGR) of 1.6 % in volume terms between 1983 and 1992. However, sales in the last five years were hit by the drop in car orders and the slow down of batteries replacement. Demand from other client industries grew at a slower pace (1.2 % CAGR) over the same period, but showed an encouraging 2 % CAGR during the 1988-93 period.

In terms of units, imports of starter batteries from outside Western Europe grew twice as fast as domestic sales, reaching a CAGR of 3.2 % during 1984-93 and stabilising at 28 % of total Western European sales in the last five years.

### International comparison

US and Japanese companies have been extremely aggressive in recent years. Both countries constitute a potential threat to EU firms which seem to have difficulty in adapting to the ever increasing need for global products. Reaching a critical size is apparently considered a key success factor by US competitors, particularly in the automotive batteries and consumer batteries markets. The 1994 acquisition campaign of Exide Corp., one of the largest batteries manufacturers in the US, is a clear indicator of this trend.

The major outside competitor for EU producers is Japan, with just under 35 % of total extra-EU imports. The US and EFTA countries come next with a market share of 20 % each. Developing countries have emerged in the last five years by increasing their share of extra-EU imports from some 15 % to over 20 %.

The EU's balance of trade is positive with EFTA countries, but shows a very strong deficit with the US and Japan. Strong extra-EU exports to less developed countries demonstrate that EU products are currently less competitive than US and Japanese productions.

### Foreign trade

Over the last ten years, the EU batteries and accumulators' industry has been facing stiffening competition from countries outside the EU. The first half of the 1990s were painful for EU producers with extra-EU imports increasing at a 13.7 % CAGR. However, between 1984 and 1993, imports grew at a CAGR of 24 %. In 1993 imports exceeding exports by only 31 % compared to 42 % in 1992. As a result, the trade balance deficit has been improving over the last two years.

The most important exporter to countries outside the EU is Germany, accounting for 37 % of total extra-EU exports in 1993 (a 7 % increase from 1992), while France follows with about 20 %. With regard to imports, the most important EU destination is Germany, with roughly 31 % of extra-EU im-

**Table 1: Batteries and accumulators**

**Main indicators (1)**

(thousand units)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>Domestic sales by Western European producers (2)</b>										
-to car manufacturers	9 452	10 035	10 198	10 745	11 032	11 962	11 576	11 470	11 056	9 940
-to other customers	19 922	21 731	20 955	22 159	20 554	21 111	22 105	23 418	23 044	22 695
<b>Imports (3)</b>	10 707	11 256	11 495	12 888	12 880	13 153	13 584	14 192	13 580	14 069
<b>Total sales</b>	40 081	43 022	42 648	45 792	44 466	46 226	47 265	49 080	47 680	46 704

(1) Austria, Belgium, Denmark, Germany, Spain, Finland, France, the United Kingdom, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

(2) Including imports by battery manufacturers.

(3) Excluding imports by battery manufacturers.

Source: EUROBAT



**Table 2: Batteries and accumulators**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	251.3	489.2	462.5	402.6	449.4	479.5	510.2	550.6	573.2	707.0	N/A
Extra-EU imports	173.9	391.8	401.1	443.9	538.5	629.2	639.7	810.5	811.9	927.5	N/A
Trade balance	77.3	97.5	61.5	-41.4	-89.1	-149.7	-129.5	-259.8	-238.7	-220.5	N/A
Ratio exports / imports	1.44	1.25	1.15	0.91	0.83	0.76	0.80	0.68	0.71	0.76	N/A

Source: DEBA

ports, followed by the United Kingdom, with 20 %. France and Belgium were the only Member States to maintain a positive trade balance in 1993.

Competition between EU producers continues to grow (8 % CAGR in the 1988-92 period), but is less intense than a decade ago (15 % CAGR in the 1984-92 period). However, given the fact that extra-EU imports grew at a faster pace, the share of intra-EU imports out of total imports declined from 72 % in 1984 to 60 % in 1992.

## MARKET FORCES

### Demand

Demand for batteries and accumulators increased considerably during the last decade. In the field of non-rechargeable (primary) batteries, market growth was roughly 2 % per year in volume. Primary or consumer batteries are used in high-fidelity equipment (50 %), games (20 %), lighting (11 %), watches and alarms (11 %) and photo equipment (8 %). Consequently, demand for this product largely depends on private consumer expenditure. Increasing use of battery operated appliances and remote controlled devices, spurred by product innovation, are the main factors for this favourable development of demand. The short-living zinc-carbon battery is gradually being replaced by the longer-lasting alkaline battery; whose life is nearly three times longer. At present, the latter accounts for roughly 40 % of the market in the EU (up to 73 % in France and 57 % in the UK). Newer developments in this context are zinc-air and lithium batteries, which contain no mercury.

Within this relatively optimistic demand context, two issues are of concern to major players. First, while technology is improving the life span of consumer batteries, this affects sales in volume terms. Second, the increasing number of retailer own-brands is affecting prices for both consumer and starter batteries.

Demand for rechargeable batteries (accumulators) has been booming in recent years due to increased usage in portable office equipment and wireless mobile communications; particularly since 1985, when nickel-cadmium rechargeable batteries became available to final consumers. The CAGR of

rechargeable batteries from 1989 to 1993 is estimated to be as high as 15 % to 20 %. Accumulators using the nickel-cadmium technology are not only lighter but also last longer (5-10 years) than conventional accumulators. However, this new technology affects sales in volume terms.

Among accumulators, the most important segment is starter batteries (mainly used for motor vehicles, construction machinery, agricultural machinery and aircraft), which accounts for about 55 % of total production of rechargeable batteries. Drive batteries follow with 25 % of the total and stationary batteries represent nearly 10 %. The market for starter batteries in Western Europe represented some 48 million units in 1992 with about one-third going into new motor vehicles, and the remaining two-thirds representing replacement demand for used vehicles. Replacement demand is rather stable since motor vehicles fleets are not subject to short term variations. In contrast, demand for new starter batteries is highly cyclical, following the fluctuations in motor vehicles' production. As the size of the motor vehicles fleet keeps increasing, replacement demand keeps steadily increasing as well.

### Supply and competition

Increased competition from outside the EU is mainly concentrated on accumulators. The largest producers of primary cell batteries have production facilities in the EU and, therefore, do not need to import these products. Nevertheless, dry batteries producers are faced with a rapid decline in prices: a consequence of over capacities built up on the basis of overestimates of the market's growth potential.

The increased competition for EU producers is coming primarily from Japanese, South Korean and Indonesian firms. As contended by EU producers, the price competitiveness of these products is due not only to lower production costs, but also to subsidies on raw materials and export-dumping policies. Despite the producers' contention, no anti-dumping duties are currently levied on imports of batteries and accumulators into the EU.

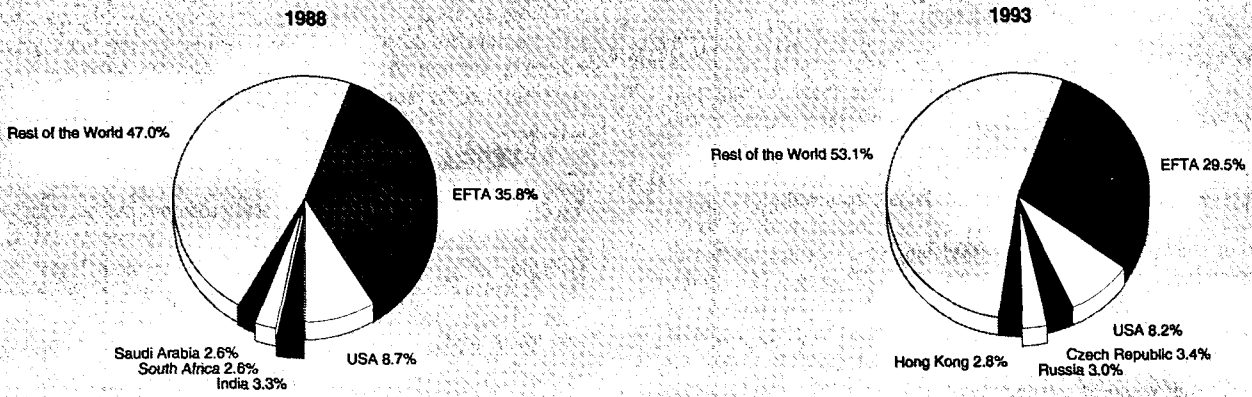
In the face of increasing competition from outside the EU and over-capacities within the EU, the market suffers from strong negative pressures on prices.

**Table 3: Batteries and accumulators**  
External trade by Member State

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EU
Extra-EU exports	66.0	12.1	262.7	2.8	29.7	141.2	1.3	56.4	30.0	4.0	100.7	707.0
Extra-EU imports	46.1	26.4	289.3	17.1	33.0	113.6	26.7	87.0	95.2	4.6	188.5	927.5
Trade balance	19.9	-14.3	-26.6	-14.4	-3.3	27.6	-25.4	-30.5	-65.2	-0.6	-87.7	-220.5
Ratio exports / imports	1.43	0.46	0.91	0.16	0.90	1.24	0.05	0.65	0.32	0.88	0.53	0.76

Source: DEBA

**Figure 1: Batteries and accumulators  
Destination of EU exports**



Source: Eurostat

**Production process**

In 1990, the subsector of primary batteries employed about 15 000 people in Western Europe in about 10 factories. In the accumulator industry, about 40 000 people were employed in some 80 factories. As a result of the need to reduce over-capacity and to improve productivity, employment levels are expected to continue falling over the next few years. Redundancies are brought about by the relatively low level of sophistication of the production process and by the possibility of increasing automation.

With regard to technological progress, increasing governmental pressures in favour of zero-emissions vehicles push companies to develop "super batteries" and test assembly lines for future production. Germany's AEG, a subsidiary of Daimler-Benz (D), claims it is the first company in the world to start series manufacture of high-performance sodium/nickel chloride batteries for electric cars. The battery should deliver up to 4 times more power than the conventional lead-acid units.

**INDUSTRY STRUCTURE**

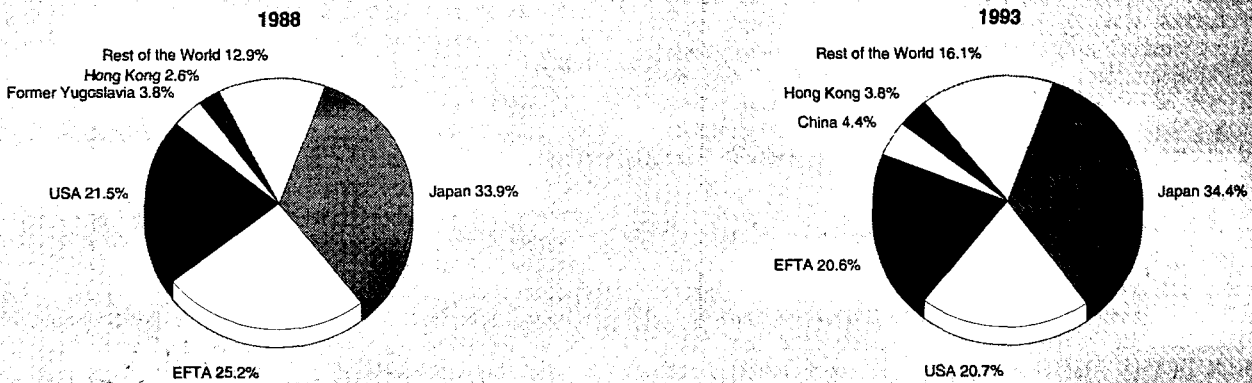
**Companies**

The Western European primary batteries industry is highly concentrated on the supply side, with about 80 % of the market being covered by the four largest manufacturers: the US based Duracell (UK), Varta (D), Philips (NL) and the US based Ralston Energy Systems (CH). Other important players in this field are Kodak of the US, and Sanyo and Matsushita of Japan.

In the accumulators sector, there are about 25 manufacturers in the EU. Major players are: Varta (D), Bosch (D), Saft (F), CEAC controlled by Fiat (I) and Alcatel Alsthom (F) (which has a minority stake), Tudor (E), Fiamm (I) and Hawker (UK). The two leading US firms Exide and GNB also have a strong presence in this segment in the EU.

The largest EU producer is Varta, which is active in both primary batteries and accumulators. Varta has 35 subsidiaries spread around the world, although its traditional markets are Germany and the EU. The group makes roughly 40 % of its turnover in portable batteries, 27 % in starter batteries and nearly 23 % in storage batteries for industry.

**Figure 2: Batteries and accumulators  
Origin of EU imports**



Source: Eurostat



Regarding starter batteries, the number of manufacturers declined from 18 Western European producers in 1988 to 10 in 1991. As a result of increasing concentration, rationalisation and globalisation of their main customers, virtually all EU producers are operating on the European market and most of them are operating globally as well.

### Strategies

In 1994, Exide, the largest battery maker in the US, launched an aggressive acquisition campaign with take-overs in the first half of the year of Gemala and B.I.G. Batteries, two UK starter batteries manufacturers, followed by a successful tender offer for Spain's Sociedad Española del Acumulador Tudor. Tudor is Europe's third-largest battery maker with a 20 % market share in the starter market and 15 % in the industrial market. Tudor operates plants in Spain, Portugal, Germany and Scandinavia (where it controls 30 % of the market as the company is the sole supplier to Volvo). Finally, there was the acquisition from Fiat (I) of CEAC, the largest European industrial and starter battery manufacturer with a strong presence in Italy, Germany, France and Turkey. CEAC owns 17 plants producing starter batteries (11 million units in 1993) and industrial batteries with a total turnover of 580 million ECU in 1993.

In one year, Exide has become the clear leader of the EU battery market, particularly in the starter segment. Other US battery companies have also made recent acquisitions in the EU. The strategic rationale can be summarised as follows: on top of giving access to specific technologies, the acquisitions offer wider market distribution, geographical proximity to clients requiring advanced services (an increasing need), European R&D and production facilities, and future access to R&D programmes funded by the EU.

In August 1994, Autosil, a family-owned Portuguese battery manufacturer, in which George Soros (US) has an indirect minority stake, took a 75 % stake of CFEC (F). The company will control 20 % of the French starter battery market since it is to supply Renault, Citroen and Fiat.

The concentration process is illustrated by the fact that the three companies Varta/Bosch, CEAC, and Tudor together hold a market share of roughly 60 % in the starter market in Western Europe.

The batteries and accumulators' industry in the EU is characterised by surplus in production capacity, and by strong and growing competition from outside the Union. The combination of these factors will probably lead to increasing pressure on prices.

To combat the constraint on margins and to reduce costs, EU companies have rationalised their production process. In particular, efforts are oriented towards a greater concentration of supply in order to gain economies of scale.

Companies are also investing to penetrate new, expanding markets. For example, Japan's Matsushita and Philips (NL) formed a joint venture to build and operate an alkaline battery plant in Poland. Varta, is establishing subsidiaries in countries as diverse as Finland, Argentina, Mexico, Brazil and Singapore. Saft launched a similar strategy in Korea and Finland, from where it will co-ordinate the penetration of South East Asia and Central and Eastern Europe.

### Impact of the Single Market

The prevailing opinion on how the Single Market has hit the batteries and accumulators industry is on the whole neutral. In fact, even though recovery looks set for a new start, this has had more to do with general economic conditions than with the Internal Market measures. The programme has not exerted much pressure on the sector also because it is dependant on main trends of other businesses (e.g. car industry for accumulators).

An important aspect of internal market legislation has been the harmonisation of environmental standards, but the relevant Directives did not have a fundamental impact on the market because, on one hand, Member States started to diverge about interpretation, and on the other, third country competitors did not have to face the same requirements. The effects of the achievement of the Internal Market might have been greater if legislation had been adopted with stricter rules for implementation and enforcement.

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### REGIONAL DISTRIBUTION

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As mentioned above, concentration of the industry is well under way. However, small and medium companies still have an impact on the competitiveness of certain sensitive EU regions (Autosil in Portugal, ASB in Bourges, Central France, or B.I.G. in Wales). These companies are either privately owned or controlled by a large group.

Private SMEs, which survived industry concentration, will soon face increasing difficulties in financing R&D projects. As a consequence, they will lose their technological edge. Therefore, it is essential to foster cooperation in the development of new products and provide easy access to public programmes.

Local factories controlled by large corporations do not face financing problems, but it is key for regional authorities to maintain attractive and competitive business conditions in the area. If not, large corporations might switch production to more attractive areas of the world, provoking additional unemployment and subsequent impoverishment of EU regions.

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### ENVIRONMENT

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Some of the most important product innovations in the industry over the last few years are related to concerns over the environment.

Most important is the reduction of the heavy metals content for non-rechargeable batteries; namely mercury, which has traditionally been used in both saline and alkaline batteries. Two directives of the European Commission in 1982 and 1984 require the reduction of mercury waste. Since 1985, the primary batteries industry in the EU has cut the amount of mercury discharged from batteries into the environment by half, and has undertaken to reduce this by a further 84 %.

Other environmental concerns are oriented towards recycling batteries. Some Member States have already introduced separate waste collection for primary batteries containing mercury. In 1991, the Commission adopted a Directive forcing producers to take back used batteries, in order to collect and recycle harmful substances. In the Nordic countries, a cooperation agreement was signed in 1994 on the collection and recycling of used lead-acid batteries. Each country is to establish a national funding system for the collection and recycling of used batteries, based on the principle of producer responsibility.

With regard to regulations, the problem is that the required low energy and low emissions recycling techniques are not fully controlled at the moment; except for lead recycling. In the field of lead-acid accumulators, the recycling ratio is already close to 100 %, while in nickel-cadmium batteries it is about 60 %. Besides the technological aspects of the problem, the use of recycled materials is likely to increase production costs. In addition, the cost of collecting the products is very high. In July 1994, the Swedish government raised the environment fee for nickel-cadmium batteries by 45 % because previous fees did not cover the cost for handling the collected batteries. Another factor liable to increase costs to customers is the proposal from the EU to impose a deposit on batteries, as an incentive to return them to the seller.



Presently, a debate is being held on the basis that, if international competition is not forced to face the same requirements as EU producers, then EU producers could lose price competitiveness. However, EU producers might gain strong competitive and technological advantages in the long term stimulated by strict regulations.

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## OUTLOOK

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Demand for consumer batteries is being boosted by the greater use of remote controlled and battery operated appliances. This is true both for non-rechargeable and rechargeable consumer batteries. The client industries to which these products are associated are expected to continue their long term growth phase. The "mobility concept" is growing strong in telephoning and computing, as well as, in all electronic devices and high-fidelity equipment. Security is another strong growth area with Uninterruptible Power Supplies (UPS) increasing by over 15 % per year. On the other hand, the decline in the quantity of energy needed in portable devices and longer lasting batteries may dampen demand to a certain extent.

Technology is moving fast. Growth and high margins will only be captured by those companies able to face today's challenges by offering longer life, lighter, smaller, environment-friendly and compatible batteries. Lithium batteries, which last about seven times longer than ordinary batteries, are 30 % lighter and which contain neither mercury nor cadmium will constitute a strong growth segment.

Starter batteries suffer from the general economic recession which has affected most of its client industries (motor vehicles, construction machinery, agricultural machinery and aircraft) since 1989. However, global car sales could rise by nearly 6 % in the next three years, the construction sector is expected to grow around 2 % per year in the next four years and orders for aircraft have shown signs of recovery in the second half of 1994.

In addition, a considerable demand for high energy drive batteries could possibly be created by the development of electrically driven motor vehicles. The first clear indicator is California's adoption of legislation requiring 2 % of new car sales in 1998 to be on non-polluting "zero-emission vehicles" (or approximately 20 000 cars), rising to 10 % by the year 2003.

Written by: LEK

The sector is represented at the EU level by: European Portable Battery Association (EPBA); Association of European Accumulator Manufacturers (EUROBAT). Address: P.O. Box 5032, CH-3001 Bern; tel: (41 31) 382 2222; fax: (41 31) 382 0311.

# Domestic electrical appliances

NACE 346

The domestic electrical appliances industry in the EU has been faced with changing demand patterns over the last few years. High penetration rates in EU households have dampened demand growth in particular segments, although the effects of the recent economic downturn have been partly offset by a positive trade balance. Another important feature is the concentration process that has taken place in the industry.

Short and medium term prospects for the European domestic electrical appliances industry are relatively positive. Expected recovery in both consumer expenditure and residential construction should boost industry output. Product innovation, pushed by environmental concerns, should help to sustain the upward trend.

Competitive pressures are expected to grow further during the 1990s and EU producers will have to reduce their production costs. Rationalisation efforts are likely to result in new mergers and acquisitions.

## INDUSTRY PROFILE

### Description of the sector

The domestic electrical appliances sector comprises the following products for domestic use: electrical refrigerators and freezers; electrical washing-machines and equipment; electrical dishwashers (including parts); other equipment with electrical motors (including vacuum cleaners, floor polishers, grinders and electrical apparatus for treatment of hair and skin); stoves, cookers and similar electrical heating appliances; other electrical heating appliances (including hair dryers, electrical ironing appliances).

Compared to other manufacturing sectors, domestic electrical appliances are of relatively minor importance, as the sector output is about 65 % of that of consumer electronics, measured in terms of value added in 1993. Germany, with 40 % of the total value added in 1993, is the dominating EU producer. Italy follows at 20 %, France at roughly 12 % and the UK at around 9 %.

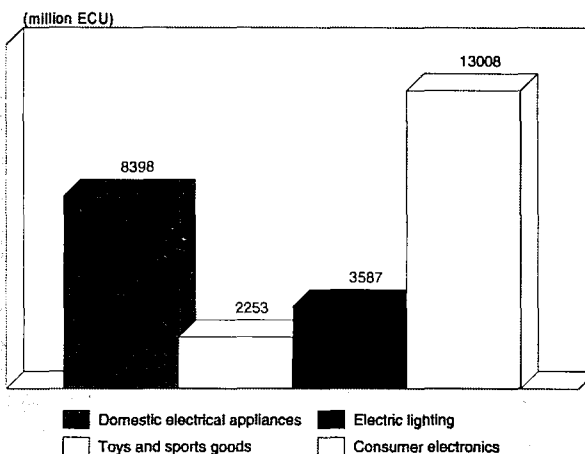
### Recent trends

The sector experienced favourable growth during the last decade, above the average in manufacturing industry as a whole. Whereas production in the manufacturing sector on average increased by 1.9 % per year in constant prices from 1984 to 1993, production of domestic appliances grew by 3.5 % per year over the same period. Production was expected to reach some 25 460 million ECU in 1994 (up 5 % from 1993 but only slightly above the 1992 figure).

Demand for domestic electrical appliances, as measured by apparent consumption, increased by 3.6 % per year in real terms over the period 1984-93. In recent years, however, the EU market has lost some of its momentum. The slowdown in consumption growth in the 1989-93 period (+2.4 % per year) also led to a lower production growth (+2.6 %), despite the substantial rise in exports to countries outside the EU (+5.0 % per year in volume).

In the first half of the 1984-93 period, the industry was faced with rapidly growing imports from outside the EU (+12 % per year in real terms), particularly in small appliances and microwave ovens, causing the trade surplus to fall by 41 % in current prices between 1985 and 1988. From 1989 and

Figure 1: Domestic electrical appliances Value added in comparison with related industries, 1993



Source: DEBA

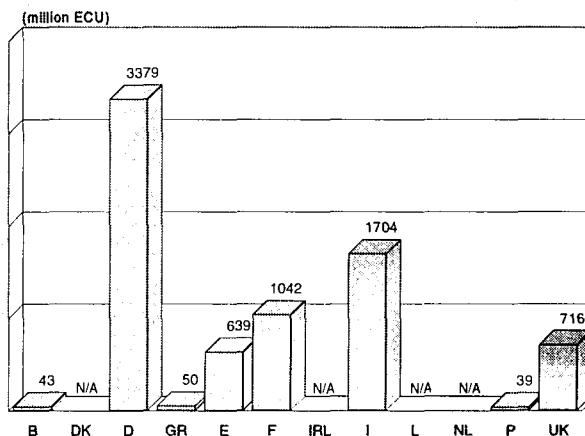
onwards, however, lower demand growth led to a decline in the growth of imports, resulting in an improvement in the EU trade balance, from 3.4 % of production in 1989 to 4.7 % in 1993.

Provisional figures for 1994 indicate that the domestic electrical appliances sector in the EU has witnessed the start of a recovery of consumption.

### International comparison

Japan is the most important producer of domestic electrical appliances within the Triad (i.e. the EU, the USA and Japan). Japanese production was 58 % higher than that of the EU in 1993, and nearly three times as important as that of the USA. In current prices, the order was the same in 1984. From 1984 to 1993, production in the EU on average increased by 3.5 % per year in real terms, whereas that of Japan rose by an annual 2.4 % and that of the USA by 2.3 % per year. In Japan, production increased at a faster rate (at 5.3 % per year) from 1984 to 1992. In 1992 and 1993, however, Japanese production

Figure 2: Domestic electrical appliances Value added by Member State, 1993



Source: DEBA



**Table 1: Domestic electrical appliances**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	15 165	19 550	20 716	21 372	24 480	24 012	23 149	23 643	24 690	26 160	28 030
Production	15 951	20 014	21 436	22 391	25 211	25 259	24 287	25 469	26 600	28 000	29 800
Extra-EU exports	1 858	2 332	2 791	2 939	3 027	3 785	3 704	4 532	4 900	5 300	5 700
Trade balance	786	464	720	1 019	731	1 247	1 139	1 826	1 910	1 840	1 770
Employment (thousands)	243.5	233.7	229.4	234.1	234.1	227.1	218.5	212.0	208.0	208.0	209.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Domestic electrical appliances**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.59	2.43	3.63	-1.07
Production	4.17	2.64	3.49	-1.48
Extra-EU exports	5.57	5.02	5.32	-5.78
Extra-EU imports	11.98	3.90	8.31	-4.02

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Domestic electrical appliances**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 858	1 991	2 095	2 108	2 332	2 791	2 939	3 027	3 785	3 704	4 532
Extra-EU imports	1 072	1 200	1 340	1 574	1 868	2 070	1 920	2 297	2 539	2 565	2 705
Trade balance	786	791	755	533	464	720	1 019	731	1 247	1 139	1 826
Ratio exports / imports	1.73	1.66	1.56	1.34	1.25	1.35	1.53	1.32	1.49	1.44	1.68
Terms of trade index	91.6	90.6	93.0	95.7	96.1	95.6	100.0	99.2	99.5	98.2	N/A

Source: DEBA

**Table 4: Domestic electrical appliances**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	76.6	77.6	83.8	88.5	93.7	99.7	100.0	110.3	113.4	116.1
Unit labour costs index (3)	90.5	94.0	93.5	94.5	93.0	93.1	100.0	98.5	101.5	100.6
Total unit costs index (4)	89.6	91.4	92.1	91.9	93.9	98.3	100.0	100.8	100.5	98.3
Gross operating rate (%) (5)	7.91	7.67	8.53	8.64	9.77	7.83	7.39	8.80	8.49	8.29

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

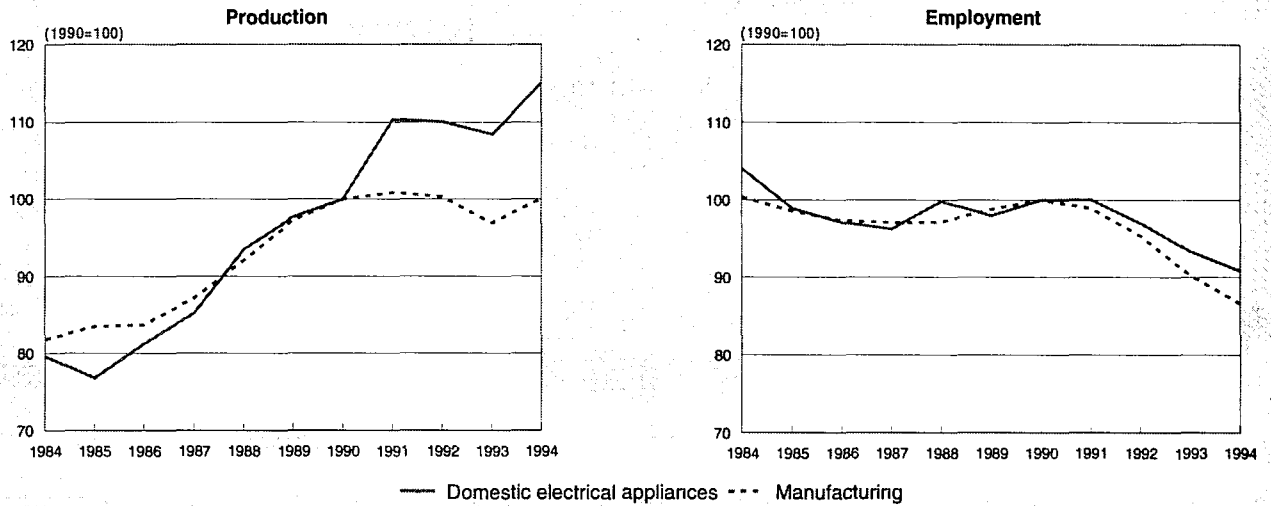
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Domestic electrical appliances**  
**Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
 Source: DEBA

fell steeply (-15 %), mainly due to a significant drop in domestic demand.

**Foreign trade**

The development of trade with countries outside the EU has been dynamic over the last few years. Trade among EU Member States has also increased, at an average annual rate of 12 % from 1984 to 1992, to reach approximately 7.8 billion ECU in 1992.

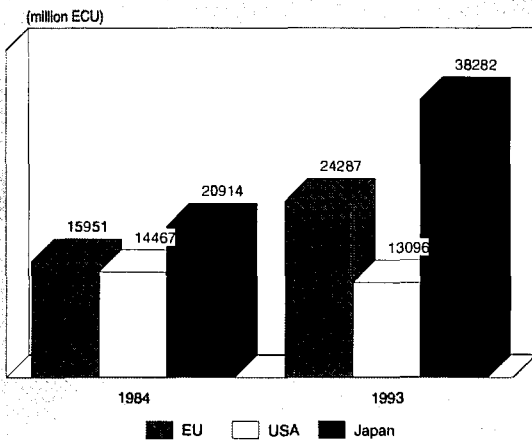
From 1984 to 1993, extra-EU exports increased by nearly 8 % per year in current prices. Important markets for EU producers were the EFTA countries and the "rest of the world" group, including developing countries and the East Asian NICs, with more than 48 % of extra-EU exports. In 1993, the USA and Japan were markets of relatively minor importance for EU producers, with stable 9 % and 4 % shares, respectively. The main characteristic of EU exports over the last few years has been the decline in importance of the traditional EFTA markets. Whereas approximately 48 % of total extra-EU ex-

ports went to these countries in 1988, that share had decreased to 33 % in 1993.

The most important exporting countries within the EU are Italy (32 % of total intra-EU exports), Germany (30 %) and France (14 %). Germany, with 22 % of intra-EU imports, has become the largest importer of white goods, mainly due to German reunification.

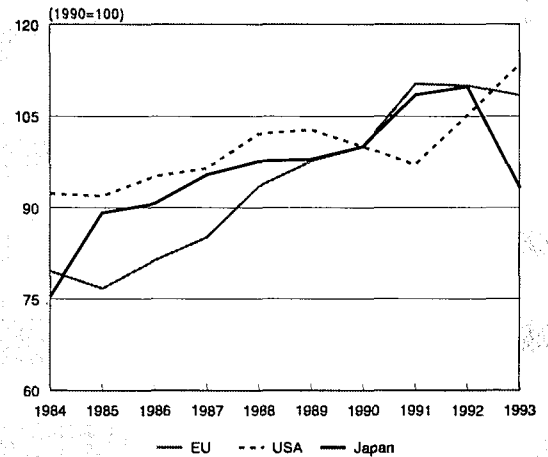
Competition from outside the EU has increased rapidly over the last few years. Extra-EU imports grew on average by more than 10 % per year from 1984 to 1993 in current prices. The EFTA countries are important suppliers to the EU, with a stable share of 29 % of extra-EU imports. Remarkably, Japan's market share has been declining over the last few years: in 1987, nearly 22 % of imports from outside the EU came from Japanese suppliers, whereas in 1993, their share had fallen to around 5 %. A decline in competitiveness vis-à-vis other fast-growing economies, and increasing efforts of Japanese producers to set up production facilities in the EU are

**Figure 4: Domestic electrical appliances**  
**International comparison of production in current prices**



Source: DEBA

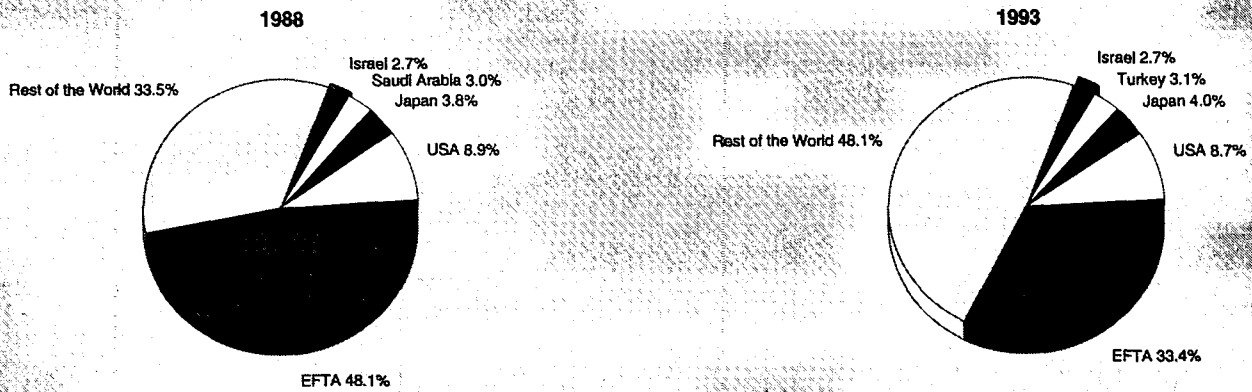
**Figure 5: Domestic electrical appliances**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 6: Domestic electrical appliances  
Destination of EU exports**



Source: Eurostat

the main explanations. South Korea followed the same trend with a market share of 7 % in 1993, down from 13 % in 1988. Conversely, China has made an impressive breakthrough to capture 20 % of extra-EU imports in 1993, up from a mere 2 % in 1988.

During the 1984-93 period, total German imports increased at a rate of 10 % per year in current prices, to reach 2.3 billion ECU. This was to the benefit of other EU Member States (which represent 58 % of German imports) which increased their exports to Germany by 9 % per year over the same period. German imports from countries outside the EU increased more rapidly, at 15 % per year.

As a result of the strong competition from outside the EU, the extra-EU imports share of total apparent consumption increased from 7 % in 1984, to 11 % in 1993.

## MARKET FORCES

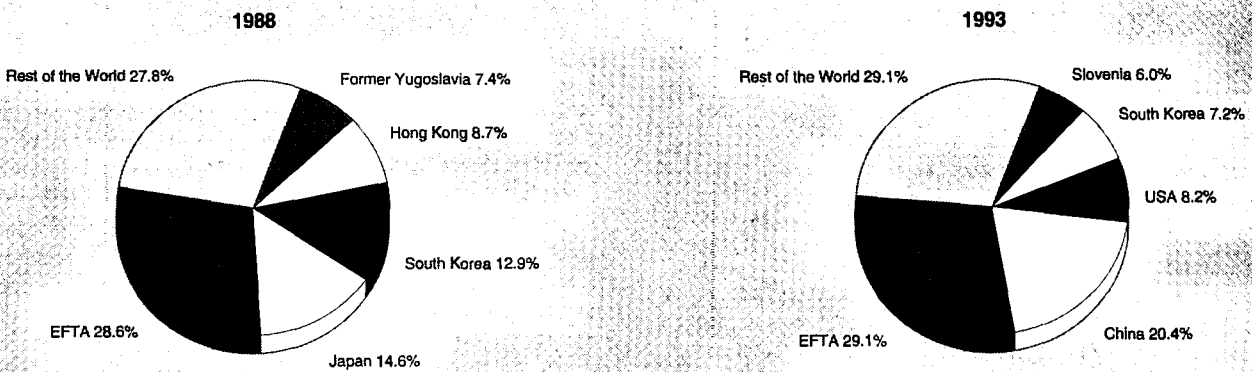
### Demand

Demand for domestic electrical appliances is mainly driven by consumer expenditure levels, residential construction and penetration rates (defined as the percentage of households in possession of a particular appliance). A market segment with

a high penetration rate tends to be more affected by economic cycles as demand will depend essentially on replacement which is likely to be postponed in times of recession. A favourable trend in consumer expenditure and residential construction in the mid-1980s led to an average growth in domestic electrical appliances of 6.4 % per year in current prices from 1984 to 1989. Following the economic slowdown of the late 1980s and the early 1990s, with the exception of 1991 which was positively affected by the German reunification, annual growth in apparent consumption fell between 1990 and 1993, from 3.2 % to -3.6 %. High penetration rates (close to saturation levels in some segments, e.g. refrigerators) have also affected the industry negatively.

Other factors may have positive effects on demand for domestic electrical appliances. One of the most significant is product innovation: the introduction of electronic components in order to improve efficiency and to simplify use may stimulate demand to a certain extent. Changes in the social structure of the population over the last few years, have also stimulated demand. An increase in single person households has led to a rising number of households making first purchases. Another important factor in the recent past has been the German reunification, resulting in a significant increase in demand for German products as well as for those of other EU producers.

**Figure 7: Domestic electrical appliances  
Origin of EU imports**



Source: Eurostat

As a result of the structural problems in the former East Germany, however, demand growth has stagnated and production growth has returned to pre-reunification levels.

### Supply and competition

Competition in domestic electrical appliances is fierce. Smaller manufacturers are finding it increasingly difficult to compete on price and performance with major multinational companies such as Electrolux or Whirlpool. The gap is now widening between the world's largest multinationals and the second tier of national producers. Major players are expanding their production and sales efforts in order to become active on a global scale. Only they are able to fully exploit the economies of scale inherent in a capital intensive industry.

Due to relatively high transportation costs, extra-EU exports and imports represent only a small share of production and consumption. In 1993, the most important source of extra-EU imports were the EFTA countries, representing some 29 % of the total. Competition from Eastern Europe has increased considerably over the last few years. In 1988, Slovenia, Russia and Poland exported goods at a value of 60 million ECU to the EU, whereas in 1992, the export value was eight times higher, representing a market share of nearly 10 %. Slovenia alone reached a market share of 6 % in 1993. In the field of small appliances, competition also comes from developing countries and the South East Asian NICs. In irons, for example, Singapore is a major competitor, providing nearly 50 % of extra-EU imports.

Competition among EU producers has increased over the last few years as well. This development has been stimulated by increasing concentration in the industry, and by the efforts of EU firms to increase market shares in order to compete on the Single Market.

## INDUSTRY STRUCTURE

### Companies

Compared to other sectors of the manufacturing industry, the domestic electrical appliances sector is highly concentrated. The manufacturing process is characterised by mass production, to achieve economies of scale. The world's largest producer of large domestic appliances is the firm Whirlpool (USA). Europe's largest producer is Electrolux (S), with a market share of around 23 % in the EU. However, most of

its production facilities are located within the EU. Other important European producers are Bosch-Siemens Hausgeräte (D) with an estimated EU market share of 17 %, Merloni (I) with 10 %, Brandt Electroménager (F) with 9 % (an important producer of washing-machines and dishwashers). In the field of small appliances, the most important firms are Philips (NL), Moulinex (F), and SEB (F). Other important producers of white goods are Candy (I), Miele (D) and G.E./Hotpoint (UK).

### Strategies

The strategies adopted by the leading white goods companies are similar, and the attention is focused upon manufacturing costs. Low-cost manufacturers may increase their market shares but, more importantly, they will be able to secure long-term profitability. Quality and efficiency are the new watchwords of the industry. Manufacturing efficiency drives down costs, whilst quality helps support price levels and improves a product's value for money.

The existence of substantial economies of scale for the big producers has stimulated a number of mergers and acquisitions in the sector. In 1980, some 810 producers of domestic appliances were active in the EU; by 1989, the figure had declined to 430. Remaining overcapacity is expected to lead to continued consolidation efforts during the 1990s as well. Some important regroupings have taken place over the last few years: Bosch (D) and Siemens (D) merged their appliance divisions and Whirlpool (US) now owns the appliances division of Philips (NL). The merger of Thomson (F) and the Elfi Group (I) was inspired by the need to exploit manufacturing economies of scale. Rosières (F) was taken over by Candy (I) and Scholtes (F) was taken over by Merloni (I). Today, France has no production of washing machines, refrigerators or dishwashers under domestic ownership. The only French-owned producers of white goods are Moulinex and SEB in the field of small domestic appliances. Another important consolidation took place in late 1993 when Electrolux acquired AEG's white goods business and the AEG brands.

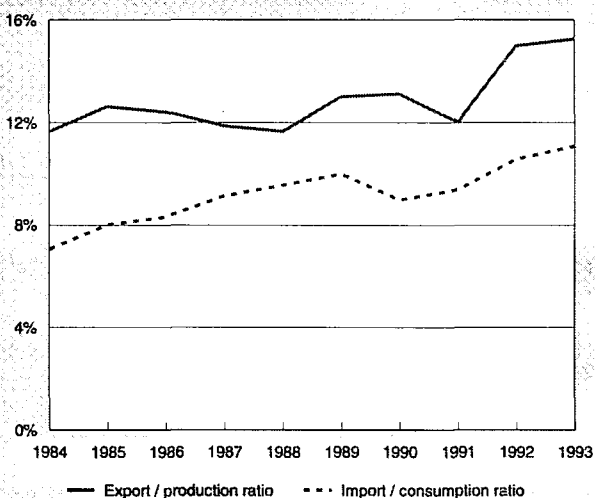
Another strategy aiming at reducing costs is the re-localisation of production facilities to low cost countries, a move made possible by the fact that white goods are, relatively speaking, low-technology products. Production of microwave ovens for instance, has shifted away from Europe (especially Western Europe) and North America towards Asia, particularly Japan and South Korea. Asia's rapidly rising importance in the production of such appliances is almost entirely due to the emergence of China and South Korea as significant bases for manufacturing. Eastern Europe also has strong appeal as a candidate for re-localisation. Merloni, for instance, is considering production in Eastern Europe and Turkey. Even Bosch-Siemens which, just as AEG, is found at the quality end of the market spectrum, is looking very closely at production in Eastern Europe.

Apart from cost reduction measures, new markets have to be found, mainly in the fast growing regions of South East Asia and in potential markets in Eastern Europe. Electrolux, for example, bought Lehel the Hungarian producer of refrigerators, in 1991. This may serve as a springboard for similar activities in other countries in the region.

### Impact of the Single Market

The realisation of the Internal Market has not greatly influenced the domestic electrical appliances sector. Actually, the sector had already shown a relatively high degree of integration, as extended standardisation of products had not allowed technical standards and requirements to become effective barriers to trade. Further, since the EU market has become almost saturated (with demand coming mainly from replacement needs), the producers' main aim has been to increase third country market penetration, especially towards Eastern Europe and East Asia. Internal Market issues are therefore not essential as far as intra-EU trade is concerned. Environmental issues

**Figure 8: Domestic electrical appliances  
Trade intensities**



Source: DEBA

have nevertheless had a sizeable impact on the sector: the Directives on Electromagnetic Compatibility and on Low Voltage are particularly important, together with packaging standards and CFCs.

## ENVIRONMENT

The domestic electrical appliance industry is faced with a number of environmental issues. The most important is the use of CFCs in refrigerators. CFC use must be eliminated by 1995. Some firms have already introduced refrigerators without CFCs. Other environmental impact comes from the use of water and energy in appliances. In order to reduce related environmental stress, the industry's efforts are oriented towards the manufacture of products that use less water and energy.

White goods production that is environmentally friendly necessitates increased investment in the production process, and in research and development especially. This in turn increases the competitive advantage of the largest manufacturers.

In addition, environmentally friendly white goods are also seen by the leading manufacturers as a key to shortening product replacement cycles. The industry is now bringing the message to the market that upgrading to a "green product" saves money for the consumer through lower running costs, saves energy and spares unnecessary damage to the environment. On top of that, modern appliances offer greater value, convenience and performance.

Another problem resides in disposal regulations. German law already states that, as a minimum, 95 % of products must be recyclable and similar legislation may be expected on the EU level by 1997/1998.

## REGULATIONS

There are two Commission Directives that are particularly important for the free movement of domestic electrical appliances within the EU. These are the Low Voltage Directive 73/23/EEC of February 1973 (JO no. L77 of 26 March 1973) and the Electromagnetic Compatibility Directive 89/336/EEC of May 1989 (JO no. L139 of 23 May 1989).

Another relevant piece of legislation is the Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances.

## OUTLOOK

Prospects for the European domestic electrical appliances industry are relatively positive for the near future. Demand was expected to slowly rise again in 1994, following a recovery in both consumer expenditure and residential construction activity. Production forecasts for 1994 anticipated an increase of 4.8 % in industry output.

Environmental concerns are expected to be a driving force behind market growth, in particular for refrigerators and freezers, with the phasing out of CFCs in these products in 1995. High penetration levels should nevertheless dampen the demand for some product categories.

In the medium term, an improvement in consumption and production can be expected, as economic recovery boosts demand for domestic electrical appliances. Product innovations in energy and water saving should stimulate demand for a new generation of appliances. Dishwashers and freezers are expected to raise the growth rate of the industry in the 1990s, as these products to date have much lower penetration rates.

**Table 5: Domestic electrical appliances  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	0.13
Danmark	N/A	N/A
BR Deutschland	0.96	1.13
Hellas	1.17	0.99
España	1.19	1.08
France	0.77	0.65
Irèland	N/A	N/A
Italia	1.68	1.73
Luxembourg	N/A	N/A
Nederlând	N/A	N/A
Portugal	0.50	0.47
United Kingdom	0.73	0.53

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

European white goods manufacturers are looking increasingly at the potential for growth in newly industrialised and developing regions, as the developed markets have reached maturity or are rapidly maturing and offer only limited prospects. The greatest potential lies in South East Asia (with the exception of Japan) Central and South America, the Middle East and the countries in Eastern Europe.

Competition is expected to increase during the 1990s, particularly in the field of small appliances. EU producers will thus have to increase their efforts to reduce production costs. Rationalisation efforts are likely to result in a further decline in employment in the industry during the course of the 1990s.

Written by: LEK

The sector is represented at the EU level by: European Committee of Manufacturers of Electrical Domestic Equipment (CECED). Address: c/o ANIE, Via Alessandro Algardi 2, I-20148 Milano; tel: (39 2) 326 4299; fax: (39 2) 326 4212.

# Electric lighting

## NACE 347

After a period of fast growth in the period 1983-92, the electric lighting industry in the EU experienced a fall in both production and consumption in 1993. This was mainly due to a downturn in business and residential construction cycles, the driving forces within the sector.

Competition from producers in East Asia (NICs and China) has increased in the last few years. The EU market share of these producers has risen accordingly, mainly to the detriment of traditional suppliers from the EFTA countries, Japan and the United States.

In the medium term, EU producers of lamps and lighting equipment should see a recovery, as the expected economic upturn leads to an increase in demand. Product innovation, particularly in the field of energy-saving lamps and lighting equipment, should provide an additional boost to demand over the next few years.

### INDUSTRY PROFILE

#### Description of the sector

The electric lighting industry can be divided into two main subsectors:

- electric lamps, which include incandescent lamps, discharge lamps and dual lamps for lighting purposes;
- electric lighting equipment, which comprises indoor electric lighting equipment, special purpose electric lights, portable lights, outdoor lights, spotlights (excluding lights for motor vehicles) and parts for electric lights.

In the EU, the sector carries minor economic weight within the larger aggregate of electrical engineering. Its value added in 1993 was equivalent to 28 % of consumer electronics. The most important EU producer of electric lamps and lighting equipment is Germany, with some 44 % of the total value added, followed by the UK (14 %), France (13 %), Italy (11 %) and Belgium (6 %).

#### Recent trends

Until recently, the industry in the EU enjoyed a favourable growth climate: whereas production in the manufacturing sector as a whole grew by 1.9 % per year in constant prices from 1984 to 1993, production of electric lighting equipment increased by around 4.7 % per year during the same period. Nevertheless, employment in the lighting equipment sector has fallen steadily since 1989 to reach an anticipated 95 300 in 1994.

The high rates of growth over the period mainly took place in the second half of the 1980s, driven by a healthy economic climate that boosted demand. In the beginning of the 1990s, EU production decreased (by 3.6 % between 1990 and 1993) in real terms.

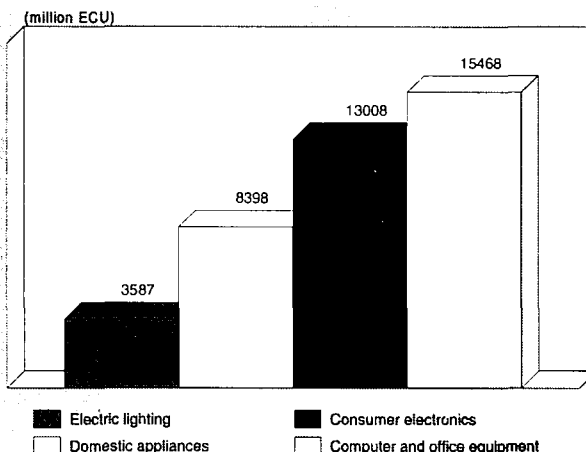
Demand, as measured by apparent consumption, on average grew at a positive real annual growth rate of 5 % from 1984 to 1993. Meanwhile, production grew by 4.6 % per year. During the same period, extra-EU imports grew rapidly: approximately 10 % per year in real terms.

Extra-EU exports increased less rapidly than imports, by 4.7 % per year. The EU trade balance remained positive over the entire period, however.

#### International comparison

The largest producer in the world of electric lamps and lighting equipment is Japan, with a total production that in current

**Figure 1: Electric lighting**  
Value added in comparison with related industries, 1993



Source: DEBA

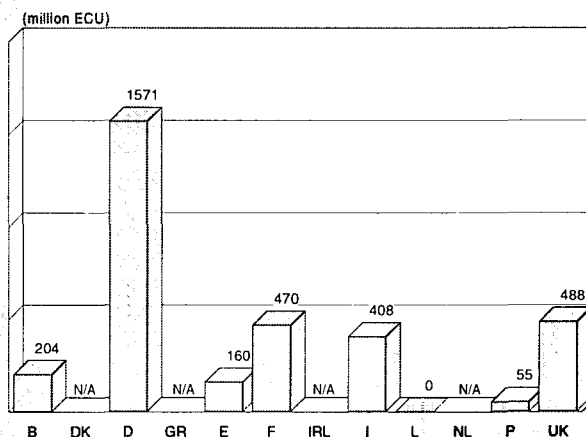
prices was nearly 20 % greater than that of the EU in 1993. The USA ranks third, closely behind the EU. US growth has not been as rapid as that of its competitors. From 1984 to 1993, EU production on average grew by 4.7 % per year in real terms, whilst production in the United States only increased by 1.2 % and that of Japan grew by 6.9 % per year. Consequently, EU and US shares of world production have shifted over the last decade, to the benefit of EU producers.

#### Foreign trade

Extra-EU exports showed strong growth (6.7 % per year on average in current prices in 1984-93), although weaker than that of imports. For EU producers, the USA and Japan are markets of secondary importance, as they account for a mere 14 % of extra-EU exports. More important are the EFTA countries with an export share above 27 %.

Over the last decade, EU imports of lighting equipment have showed substantial growth, at an average of around 12 % per year in nominal terms. As a result, 1993 extra-EU imports

**Figure 2: Electric lighting**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Electric lighting**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	4 267	6 689	7 746	8 259	8 306	8 502	8 178	8 382	8 920	9 570	10 110
Production	4 842	7 129	8 203	8 720	8 647	8 996	8 777	8 987	9 600	10 300	10 900
Extra-EU exports	1 042	1 175	1 323	1 314	1 319	1 587	1 869	2 047	2 300	2 500	2 700
Trade balance	575.2	439.9	457.0	460.5	340.1	494.3	599.2	604.6	680.0	730.0	790.0
Employment (thousands)	97.1	103.4	111.1	109.3	102.2	100.4	97.4	95.0	97.0	98.0	100.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Electric lighting**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	10.24	-0.72	5.23	-3.94
Production	8.39	-0.03	4.56	-1.30
Extra-EU exports	0.39	10.26	4.66	17.18
Extra-EU imports	9.68	10.80	10.17	6.56

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Electric lighting**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 042	1 158	1 107	1 063	1 175	1 323	1 314	1 319	1 587	1 869	2 047
Extra-EU imports	467	510	551	610	735	866	853	979	1 092	1 269	1 443
Trade balance	575	648	557	453	440	457	461	340	494	599	605
Ratio exports / imports	2.23	2.27	2.01	1.74	1.60	1.53	1.54	1.35	1.45	1.47	1.42
Terms of trade index	87.5	88.7	92.2	93.0	97.8	93.3	100.0	97.5	99.4	91.6	N/A

Source: DEBA

**Table 4: Electric lighting**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	72.5	75.8	80.9	84.8	91.1	94.9	100.0	102.0	106.2	108.0
Unit labour costs index (3)	99.4	99.0	98.5	99.2	97.9	97.9	100.0	105.4	107.7	110.0
Total unit costs index (4)	87.4	92.4	92.8	93.4	95.1	98.8	100.0	104.7	107.8	109.4
Gross operating rate (%) (5)	11.1	10.8	10.5	10.7	11.8	10.8	11.5	10.5	9.9	9.0

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

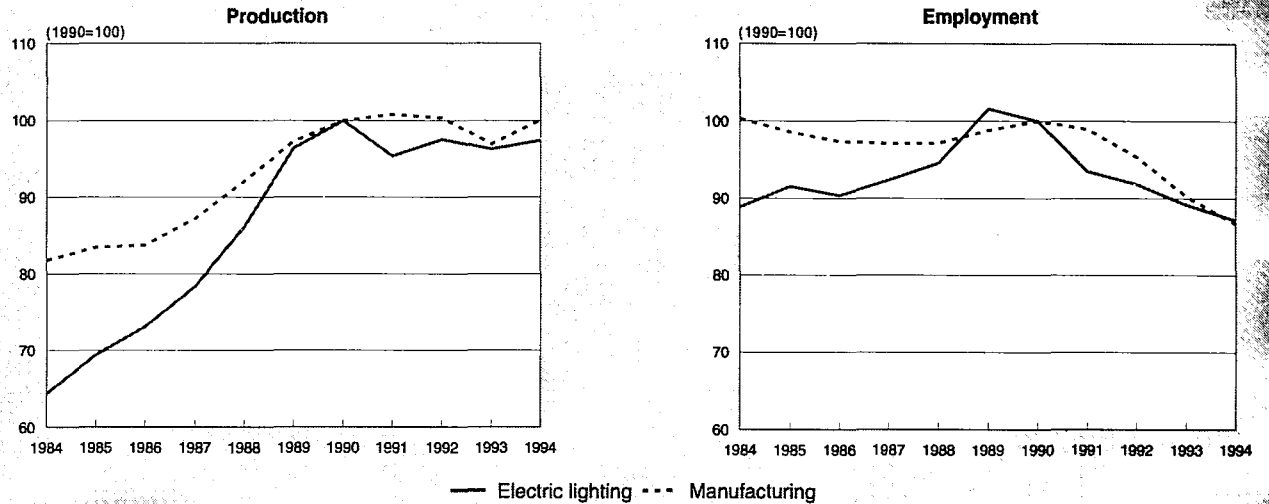
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Electric lighting  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

accounted for nearly 16 % of apparent consumption in the EU, compared to 11 % in 1984. Important competitors are China with approximately 22 % of total extra-EU imports, and the USA with nearly 13 %. More than a third of extra-EU imports, however, come from the aggregate rest of the world, mainly developing countries. In this context it is important to note that traditional suppliers lost market share in the EU to developing countries: Japan's market share dropped from 20 % to 8 % between 1988 and 1993 and the US share also fell, from nearly 16 % to below 13 %.

### MARKET FORCES

#### Demand

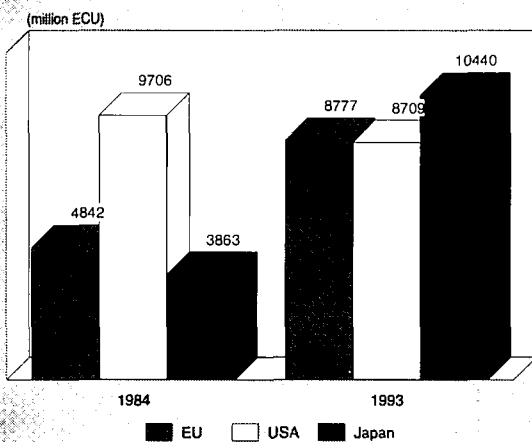
Demand for electric lighting products is driven mainly by the replacement market (for lamps) as well as equipment needs for new buildings, and development projects (for lighting equipment). Much replacement demand is insensitive to cyclical fluctuations, although the growth rate of disposable income, as well as technological innovations and fashion trends, can affect replacement rates. Demand for equipment for new buildings, on the other hand, is highly cyclical, depending as it does on the level of construction activity.

Electric lamps are used mainly in residential buildings, office and industrial buildings and for street lighting. A smaller part of demand for electric lamps comes from the automotive and photographic industries. For electric lighting equipment, private and public construction are the more important sources of demand. Thus, the industry benefited considerably from the boom in EU construction in the second half of the 1980s. The recent downturn in private and public construction activity, as well as the critical situation for the automotive industry, considerably affected demand for the products of the industry.

Product innovation has also been an important driving force behind demand over the last years. New products, such as halogen lamps, discharge lamps and compact fluorescent

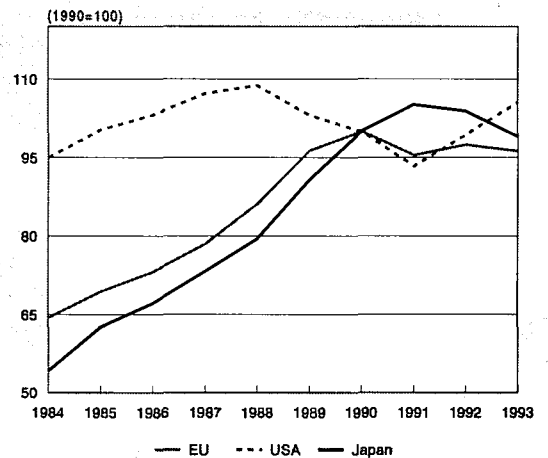
Product innovation has also been an important driving force behind demand over the last years. New products, such as halogen lamps, discharge lamps and compact fluorescent

**Figure 4: Electric lighting  
International comparison of production in current prices**



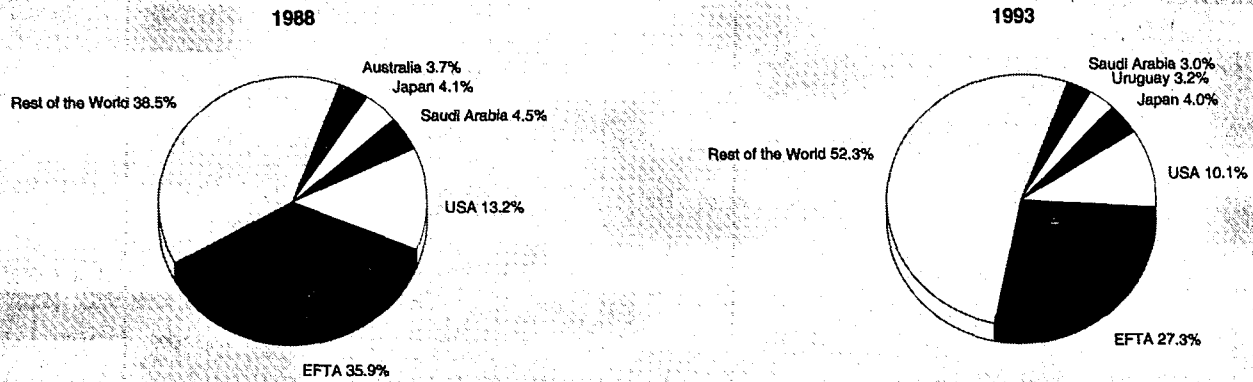
Source: DEBA

**Figure 5: Electric lighting  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Electric lighting  
Destination of EU exports**



Source: Eurostat

lamps, which last longer and use less energy, have increasingly gained acceptance, causing a gradual shift in demand from inexpensive incandescent lamps to high-grade equipment. Finally, one of the most important trends in lamp technology is the development of increasingly compact light sources.

### Supply and competition

In 1984, among the Triad (the USA, Japan and the EU), the USA was the most important producer of electric lighting equipment and lamps, with about 53 % of total production, followed by the EU, at approximately 26 % and Japan in the third position, with roughly 21 %. Competition for EU producers increased considerably in the last few years, as the share of imports from outside the EU rose from some 11 % of consumption in 1984 to 16 % in 1993. In particular, imports from China increased over the same period from a few percent in 1984 to represent 22 % of total extra-EU imports in 1993. Taiwan also increased its market share in the extra-EU imports from 9 % to 12 %. Imports of halogen lamps, particularly from Japan, China and other East Asian countries, developed strongly. Trade among EU member countries grew rapidly during the last decade, at a rate of roughly 10 % per year in value. The increase in international trade in general is partly

the result of the concentration that has taken place in the industry during the last few years.

### Production process

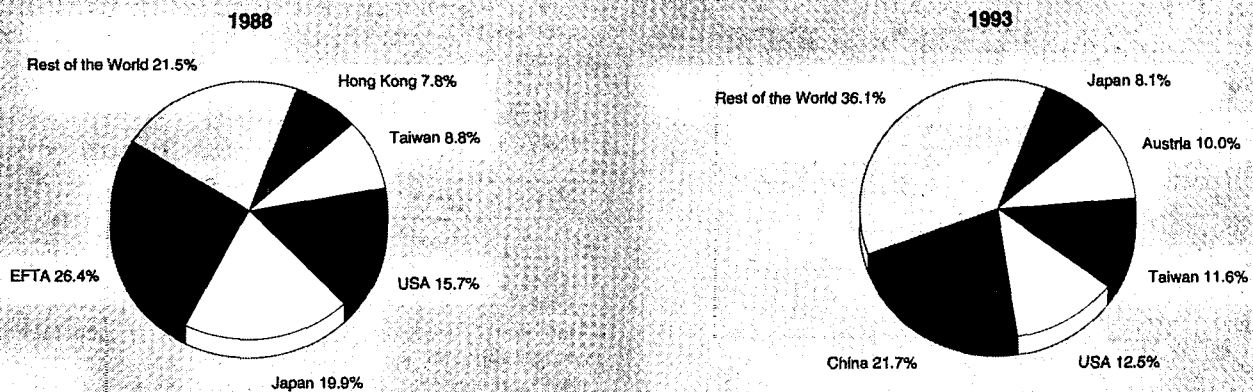
In contrast with the 7 % nominal increase in production per year from 1984 to 1993, there has been a substantial decrease in sector employment figures, from a peak of 110 000 in 1989 to an estimated 95 300 in 1994. The most significant reduction occurred in Spain, which lost 66 % of its sector workforce between 1983 and 1992. As a result of these changes, EU productivity increased by 4.5 % per year on average between 1984 and 1993.

## INDUSTRY STRUCTURE

### Companies

In electric lamps, over 80 % of the market is in the hands of only four companies. The tendency in this subsector is to concentrate activity to a few large firms in order to profit from economies of scale, and to make it possible to muster the huge resources necessary for mass production and intensive R&D activities. All of these firms are operating internationally, in most cases world-wide. The largest manufacturer in the

**Figure 7: Electric lighting  
Origin of EU imports**



Source: Eurostat

**Table 5: Electric lighting  
Production specialisation (1)**

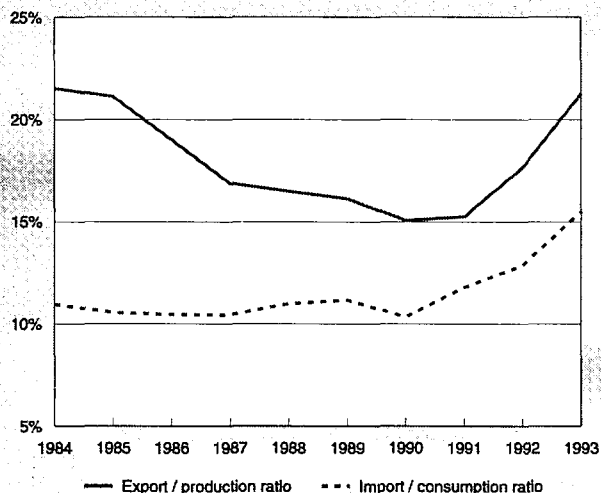
(ratio)	1984	1993
Belgique/België	N/A	1.60
Danmark	N/A	N/A
BR Deutschland	1.17	1.24
Hellas	N/A	N/A
España	1.48	0.62
France	0.64	0.76
Irland	N/A	N/A
Italia	0.64	0.96
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	1.49	1.07
United Kingdom	1.10	0.90

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

EU is Philips (NL), the multinational producer of electrical goods, which plays a central role in assuring the dominant position of the Netherlands as Europe's number one in electric lamps. The market share of Philips is about 40 % in Europe and 20 % in the United States. Another prominent firm is German Osram (a division of Siemens since 1990), which bought the US part of Sylvania from GTE. Osram is now one of the world's three largest producers of lamps, along with Philips and General Electric (US). The latter acquired Tungsram (Hungary), the producer of lamps, in 1990 and the lamp division of the European firm Thorn EMI (UK) in 1991.

In the electrical lighting equipment subsector, production is much more fragmented, with no large initial investment acting as a barrier to entry. Many of the firms are niche players and operate only regionally, or even locally. The most important firms are Siemens (D), Trilux (D), AEG (D), Philips (NL) and Thorn Lighting (UK). Large groups in other countries are Zumtobel in Austria, and Lithonia, Cooper and GTE in the United States.

**Figure 8: Electric lighting  
Trade Intensities**



Source: DEBA

## Strategies

There has been a great deal of restructuring and transferring of activities among the major lighting multinationals. Some of the larger suppliers are investing in production facilities where they can manufacture at lower cost, for example in Eastern Europe or in East Asia. This is the case of GE Lighting which is concentrating its production of incandescent and compact fluorescent lamps to Hungary.

In the field of technologically advanced products, EU firms in the electrical lighting industry are faced with stiff competition from traditional competitors from the United States, Japan and the EFTA countries. In the field of technologically less advanced products, the main competitors are the East Asian NICs and China, benefiting from lower costs of labour, raw materials and energy.

As a result, EU producers have to increase their efforts to improve productivity in order to compensate for unit cost advantages in lower value added products, presumably through increased substitution of capital for labour, i.e. increasing automation. For technologically advanced products, on the other hand, EU firms have to increase R&D expenditure, in order to maintain competitiveness vis-à-vis other industrialised countries. This also means that the trend towards concentration is likely to continue in the next few years and be accompanied by further labour force reductions.

Licenses for intellectual property rights are often assigned, at a price, from one manufacturer to another. Philips e.g. holds patents on the compact fluorescent lamp but the other three leading lamp suppliers have been licensed to manufacture the same product.

## Impact of the Single Market

The completion of the Internal Market is bound to have a positive impact on the electric lighting industry. Even though the free movement of goods has been enhanced by technical harmonisation and cross border facilities, the industry nevertheless pledges for further simplification of procedures and regulations. The achievement of a truly integrated EU market for electric lighting is in fact likely to reduce the difference in consumer market size between Europe and the US. Also, the industry feels that the realisation of the program will entail streamlining of production and diversification, alongside with considerable developments in products energy saving. The move towards a Single European currency and the elimination of double standards and regulations are considered key issues for future progress in this area.

## ENVIRONMENT

Compared to other industries, environmental issues are of minor importance in the electric lighting industry. Gas-discharge lamps contain some toxic elements and materials, such as mercury, antimony and lead. Another problem in this context is the use of packaging materials, given the fragile nature of the products. Industry efforts are dedicated towards the reduction of toxic materials and the reduction of packaging materials through the development of reusable or recyclable materials.

## REGULATIONS

Important directives for the sector are the Low Voltage Directive (73/23/EEC), the Electromagnetic Compatibility Directive (EMC; 89/339/EEC) and, to a lesser extent, the Machinery Directive 89/392. Manufacturers whose products comply with the relevant provisions of these Directives and who have demonstrated this conformity by following the applicable procedures set out in the Directives may affix the CE-mark. This allows free movement of the products throughout the European Economic Area.



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## OUTLOOK

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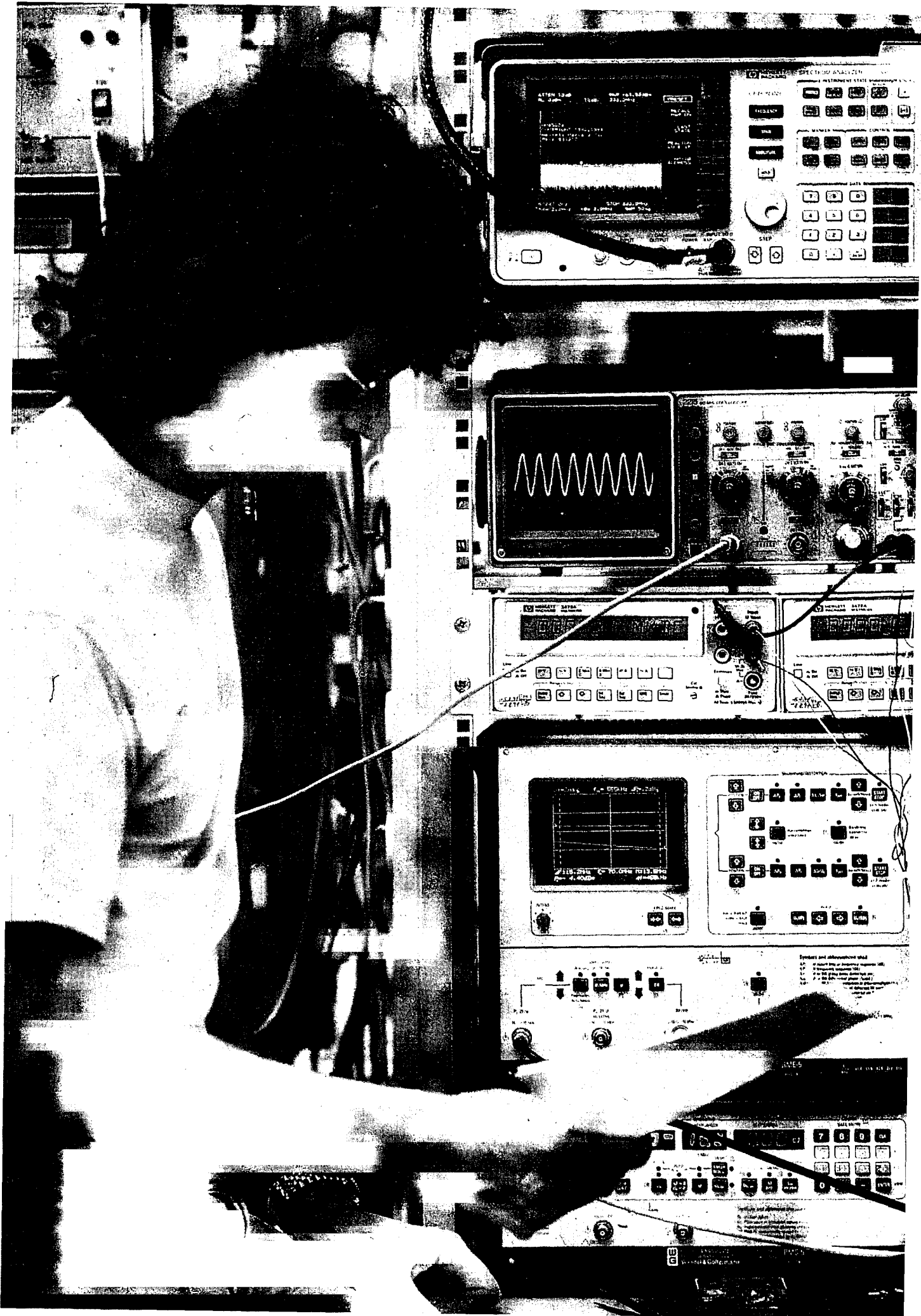
Prospects for the EU electric lighting industry are relatively optimistic in the short term with the construction industry beginning to show a recovery in most parts of Europe.

Ongoing replacement demand, little affected by cyclical fluctuations, will support this upward trend. In the medium term, consumption and production are expected to regain momentum, stimulated by the expected general economic upswing. A compound annual growth rate of just over 3 % is forecast for the market between 1993 and 2000.

Product innovation is likely to continue to boost demand, as recent R&D efforts of EU firms are oriented towards electronically regulated lighting devices, improvements in light emitting efficiency and in colour, and further reduction in the size of electric lamps. These developments will presumably lead to a decline in EU production of incandescent lamps, which will be displaced by growth in high-grade products. Lamp prices in general are expected to fall, whilst prices of light fittings are forecast to rise over the coming years. Extra-EU competition, particularly in the field of low-end technology, can be expected to increase throughout the 1990s.

Written by: LEK

The sector is represented at the EU level by: The European Lighting Council (ELC). Address: Rue Montoyer 31, B-1040 Brussels; tel: (32 2) 513 6085; fax: (32 2) 514 3386.



## Overview

### NACE 33, 344, 345

The development of a strong electronics sector (including sub-sectors such as computers and office equipment, telecommunications equipment, electronic components, and consumer electronics) is strategically important for the development of the overall EU economy. According to the Bangemann report, the electronics sector is at the centre stage of EU attention, in order to ensure that it remain competitive in the new knowledge intensive global economy. 1992-93 were difficult years for the EU electronics industry as the total market declined, as well as production, due to increasing competition and a dramatic drop in prices. In 1994, the electronics industry benefited from the overall recovery of the EU economy. The EU trade deficit in electronics has more than doubled over ten years and in 1993 it approached 22.5 million ECU. The only subsector with a positive trade balance is telecommunications equipment, although the surplus is declining. Due to increasing automation, employment has continued to fall and in 1994 reached 1.3 million.

In general, US and Japanese companies are more internationalised than EU electronics companies and benefit from higher economies of scale. However, the EU has points of strength on the electronics market. This is reflected by the fact that there are at least three EU companies among the world's top fifteen in each subsector and all of them are well diversified into complementary electronics sectors. Moreover, EU telecommunications equipment manufacturers rank among the top performers in the world. Most EU electronics companies recovered in 1994, in particular those in the micro-electronics and consumer electronics sectors. Computer companies try to establish new partnerships and to focus on their core business in order to overcome their difficulties. The role of the EU is indispensable in supporting co-operative R&D, ensuring fair competition and promoting the integrated European market.

### INDUSTRY PROFILE

#### Description of the sector

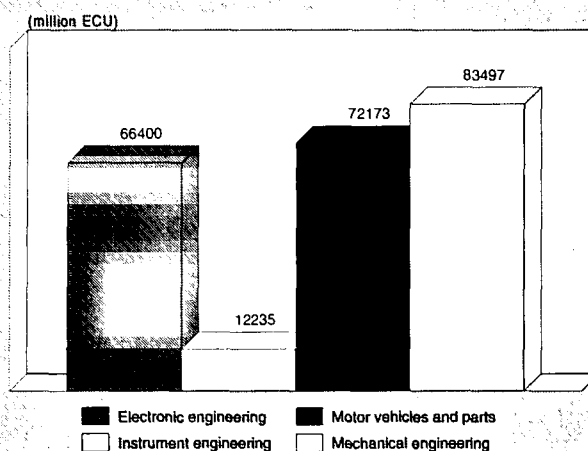
The electronics industry includes: computer and office equipment (NACE 33), telecommunications equipment (NACE 344), electronic components (NACE 345), and consumer electronics (NACE 345.1 and 345.2).

The products manufactured by the computer and office equipment sector are:

- hardware: portables, notebooks, microcomputers, minicomputers, workstations, mainframes, network equipment;
- peripherals: printers, disks, monitors, keyboards, CD-ROM players;
- office equipment: electronic typewriters, electronic calculating machines, electronic cash registers, electronic accounting machines, dictation equipment.

Telecommunications equipment's main product categories are: public switching, transmission, terminals, private switching, data communications and mobile communications. Consumer electronics comprises audio-visual products for domestic use and its accessories, such as colour and monochrome television sets, video recorders, video cameras and camcorders, audio equipment in general, wireless telephones and videogames.

Figure 1: Electronic engineering Value added in comparison with related industries, 1993

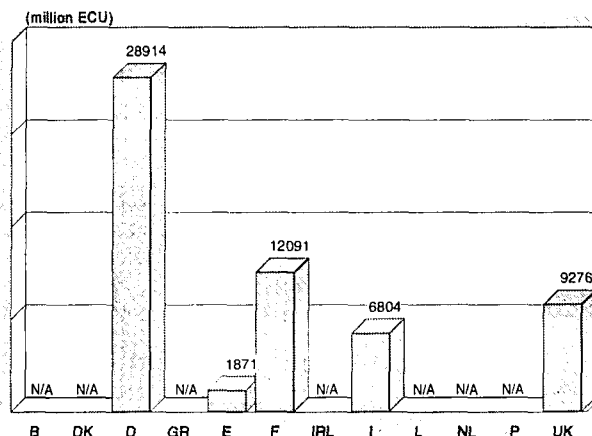


Source: DEBA

The electronic components sector includes active, passive and electromechanical components.

The electronics sector is a very important part of EU industry: in 1993 the value added equalled 92 % of the motor vehicles and parts industry, and nearly 80 % of the mechanical engineering sector whereas it was more than five times larger than that of the instrument engineering sector. In 1993, telecommunications equipment represented 38 % of the total EU electronics market, computer and office equipment accounted for 27 %, consumer electronics 25 % and electronic components 10 %. Germany is the largest EU producer followed by France, the UK, Italy and Spain. These five countries generate approximately 90 % of the total value of the electronics sector. Because of the prominent part it plays in information economies, the electronics sector has strategic importance for

Figure 2: Electronic engineering Value added by Member State, 1993



Source: DEBA



**Table 1: Electronic engineering  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	117 317	167 077	182 603	192 108	201 655	198 217	190 588	202 539	218 968	239 230	261 442
Production	107 614	147 383	159 780	168 727	175 063	173 243	168 129	178 754	192 868	209 730	228 242
Extra-EU exports	20 934	24 908	27 789	28 334	30 615	32 242	36 692	43 697	48 900	54 500	60 700
Trade balance	-9 703	-19 694	-22 823	-23 381	-26 593	-24 974	-22 459	-23 785	-26 100	-29 500	-33 200
Employment (thousands)	1 509	1 557	1 580	1 566	1 550	1 467	1 370	1 286	1 307	1 339	1 368

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Electronic engineering  
Breakdown by sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Electronic components	22 039	13 173	6 137
Computer and office equipment	58 222	44 909	12 013
Telecommunications equipment	80 706	83 236	13 889
Consumer electronics and music recording	51 660	39 984	10 789

Source: EECA, DEBA

**Table 3: Electronic engineering  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.93	1.54	4.50	-2.16
Production	6.90	2.28	4.82	-0.45
Extra-EU exports	2.20	5.05	3.46	4.91
Extra-EU imports	4.25	1.09	2.84	-3.73

(1) Some country data for apparent consumption and production have been estimated.

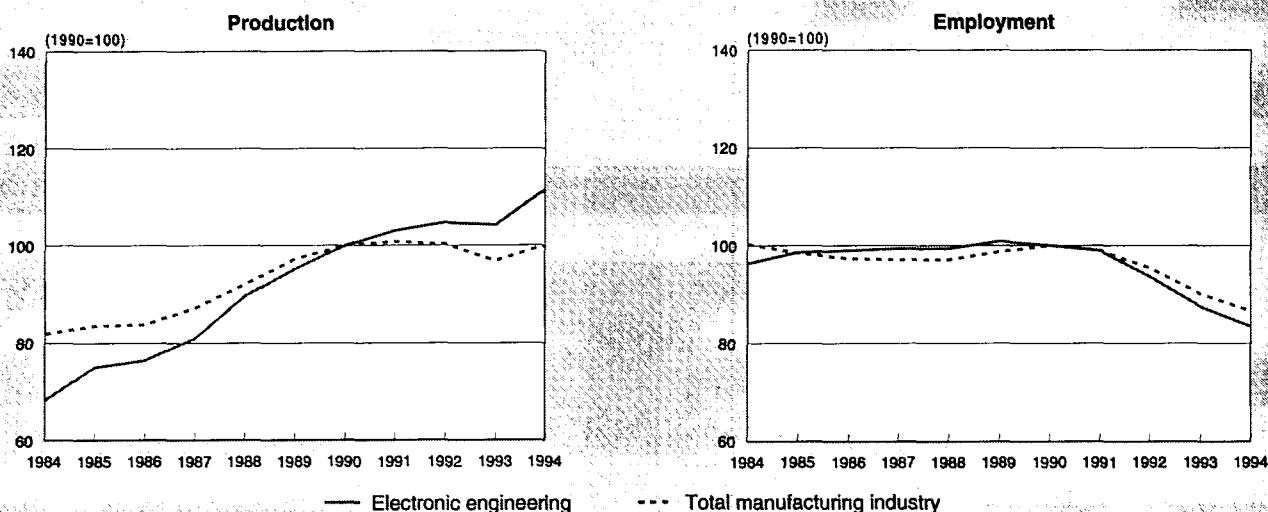
Source: DEBA

**Table 4: Electronic engineering  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	20 934	25 062	23 037	23 682	24 908	27 789	28 334	30 615	32 242	36 692	43 697
Extra-EU imports	30 637	34 008	32 493	36 278	44 602	50 612	51 715	57 208	57 216	59 150	67 482
Trade balance	-9 703	-8 946	-9 456	-12 597	-19 694	-22 823	-23 381	-26 593	-24 974	-22 459	-23 785
Ratio exports / imports	0.68	0.74	0.71	0.65	0.56	0.55	0.55	0.54	0.56	0.62	0.65
Terms of trade index	106.6	108.2	112.6	109.7	102.2	99.2	100.0	96.8	95.6	97.4	N/A

Source: DEBA

**Figure 3: Electronic engineering  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

the development of the overall EU economy. Moreover, the industry is expected to grow more than any other major sector of economic, such as the automotive industry and transports.

**Recent trends**

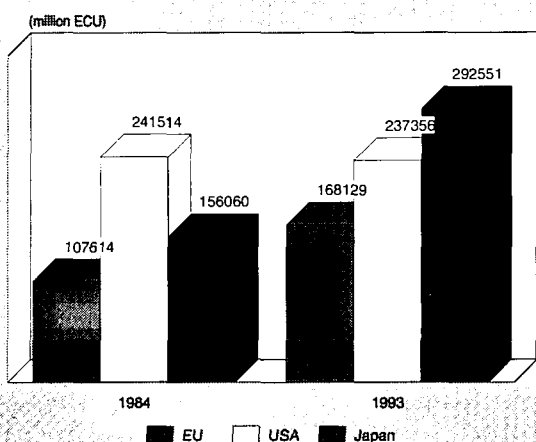
Apparent consumption in current prices in the EU increased at a compound annual growth rate of 5.5 % in 1984-93, whereas production increased by 5.1 % per year on average and extra-EU exports at a rate of 6.4 % per year. In spite of increasing exports, the trade deficit increased to reach a peak in 1991. It then fell slightly, to reach 22.5 million ECU in 1993, which is more than twice the size of the deficit of 1984. In 1994, employment reached 1.3 million, 40 000 less than in 1984. From 1991 to 1993, both apparent consumption and production of electronics decreased, due to the recession and the continued fall in prices. 1994 saw some signals of recovery, mainly thanks to the recovery of the overall EU economy.

**International comparison**

In 1993, EU production of electronic goods amounted to 168 billion ECU, US production equalled 237 billion ECU, whereas the value of Japanese production was 168 billion ECU. Since 1984, Japanese production in current prices has almost doubled, EU production has grown by 57 %, whereas US production has remained more or less at the same level. The international comparison of production in constant prices reveals that, in the period 1990-93, EU production grew by only 4 %, whilst Japanese production declined by roughly 4 %. Meanwhile, the USA increased its production by nearly 15 %.

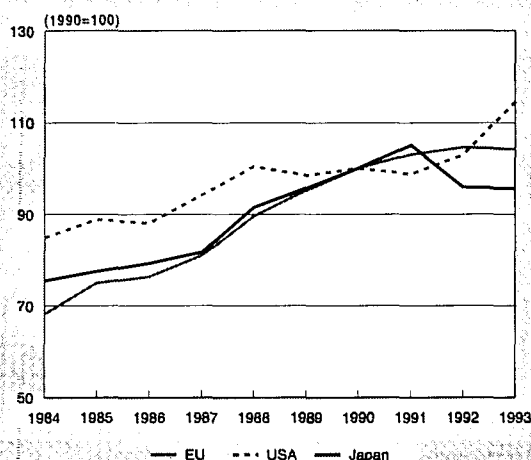
In general, EU companies compete on a world-wide basis, in all market segments. However, the consumer market is dominated by Japan and, to less extent, by newly industrialising countries (NICs), such as Korea, Malaysia and Singapore, in the low value added consumer products. EU companies are strong in the TV segment and in innovative products, such

**Figure 4: Electronic engineering  
International comparison of production in current prices**



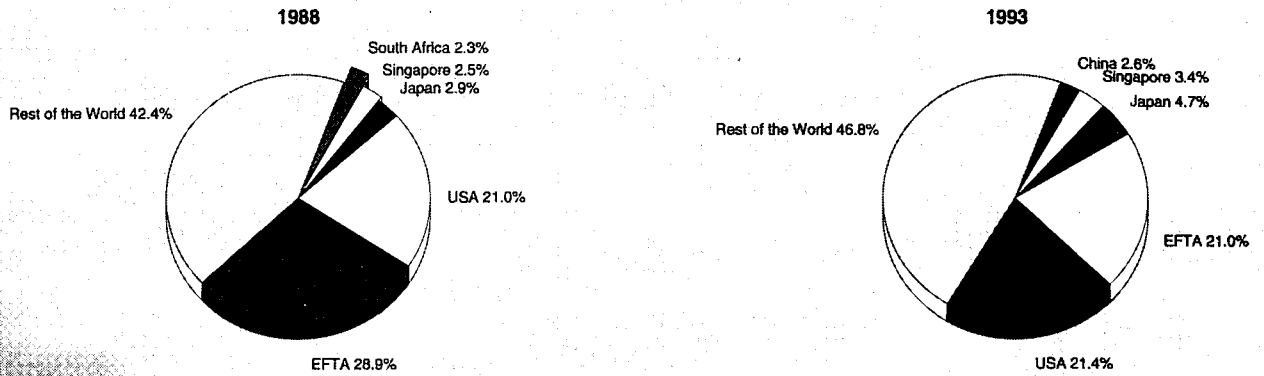
Source: DEBA

**Figure 5: Electronic engineering  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Electronic engineering  
Destination of EU exports**



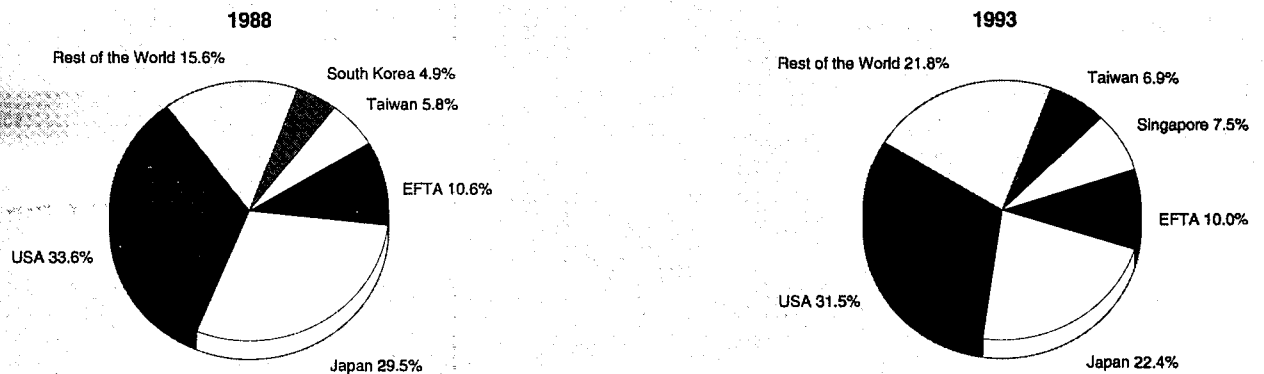
Source: Eurostat

as optical and digital products, e.g. Compact Disc, CD-I (Compact Disc Interactive) and digital television. American and, to less extent, Japanese companies dominate the computer and office equipment market. American companies established the world-wide standards in this sector, and thereby set the guidelines for information technology developments. American and Japanese companies dominate the microelectronics market as well. In the microprocessor segment, US companies, such as Intel, Motorola and IBM, establish world-wide standards, whilst Japanese companies are strong especially in the DRAM (Dynamic Random Memory) market. EU companies compete in many high value added segments of the market, e.g. ASIC (Application Specific Integrated Circuit) products. EU companies are highly competitive in telecommunications equipment, where American companies (e.g. AT&T, Northern Telecommunications and Motorola) and Japanese companies (such as Fujitsu and NEC) are also very strong. In general, US and Japanese companies enjoy vast domestic markets and rely on highly sophisticated users in order to offer innovative products that afterwards may be launched on the EU market. Conversely, many EU manufacturers are at a disadvantage as they cannot offer their products to a fully integrated market at the European level.

### Foreign trade

On average, extra-EU imports grew faster than extra-EU exports in the period 1984-91 (compound annual growth rates of 3.5 % and 2.8 %, respectively). However, between 1991 and 1993 the trend was reversed, and the EU trade deficit declined to 22.4 billion ECU in 1993, although it was still roughly 2.5 times the 1984 level. The only sector where the trade balance is positive is telecommunications equipment, although the surplus is shrinking. Computer and office equipment and consumer electronics have the largest trade deficits in the sector. From 1988 to 1993, the percentage of exports to the USA (21 % of total exports in 1993) and Singapore (3 %) remained more or less stable, while export to the EFTA countries decreased from nearly 29 % to 21 %. In the same period, exports to Japan increased from 2.9 % to 4.7 %. China's share rose to 3 % and the rest of the world (mainly NICs) increased its share to 47 % of the 1993 total, in comparison with 42 % in 1988. From 1988 to 1993, the percentage of imports from the USA, EFTA and Taiwan remained more or less stable, whilst imports from Japan decreased (from 29.5 % to 22.4 %) Imports from Singapore and other NICs increased consistently.

**Figure 7: Electronic engineering  
Origin of EU Imports**



Source: Eurostat

**Table 5: Electronic engineering**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	66.2	73.1	74.7	78.5	87.9	93.8	100.0	104.8	109.6	113.9
Unit labour costs index (3)	106.3	103.1	105.7	108.3	102.2	101.0	100.0	103.8	105.5	104.0
Total unit costs index (4)	63.2	71.0	72.9	77.0	86.1	93.9	100.0	105.2	106.8	102.7
Gross operating rate (%) (5)	13.6	13.2	12.7	12.4	12.9	12.2	11.5	10.4	7.8	8.1

(1) Some country data have not been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

## MARKET FORCES

### Demand

Business customers is the main market for electronic goods, as information and communications technology is of strategic importance in increasing efficiency and reaping competitive advantages. The manufacturers of computer and office equipment, telecommunications equipment (especially voice networks and private data) and electronic components (which constitute basic components in every manufactured electronic product or system) all target business customers. The public sector is an important market due to the fact that national public operators constitute the main customers in telecommunications equipment. The consumer market is targeted not only by the consumer electronics manufacturers but also increasingly by producers of telecommunications terminals (e.g. wireless telephones) and personal computers. Cellular phones and computers for the SOHO (Small Office, Home Office) are two of the fastest growing segments of the market.

Demand for electronic goods depends heavily on the economic cycle, in part since investments in information and communications technology represent a consistent share of overall industrial investment. The recovery of the EU economy in 1994, following the recession in 1992 and 1993, is the key factor behind the recovery in business demand for electronic goods. However, budget restraints in Member States also have an impact on telecommunications expenditure, despite the fact

that network operators in the Member States are implementing significant modernisation plans for their networks. The electronics market has expanded in volume due to large price decreases, despite the recession. Demand is also becoming more differentiated and sophisticated and competition is spreading also to the most protected (and more profitable) public sector markets.

All electronic goods, whether directed to consumers or to business, are based on microelectronics and the dynamics of the electronics sector are directly determined by technological developments in the microelectronics field. Increasing intelligence and functionality, down-sizing and down-pricing characterise the production in each subsector.

### Supply and competition

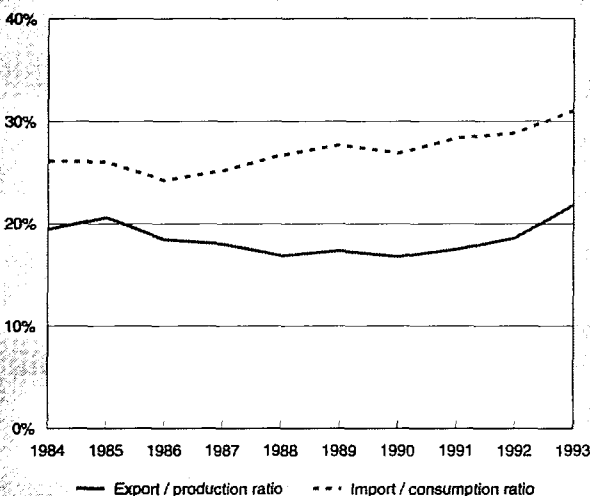
The market for electronic products is global, but new products require higher and higher investment in R&D. This means that large production volumes are needed to meet rising R&D costs. Because competition in the electronics sector is global, it is projected that no important producer will survive until the year 2000 if it does not attain world leadership in at least one, albeit small, niche of the world market.

Many American and Japanese electronic companies have R&D and production units in Europe, especially in the UK, Ireland, Germany and France, although the number of new sites is falling due to recession and overproduction. These plants account for a significant proportion of overall employment in the electronics field. Other competitors have preferred to acquire European firms (e.g. the Fujitsu (J) acquisition of ICL (UK)) or to set up joint ventures (e.g. IBM and NEC acquiring minority shares in Bull (F)). The need for technological and commercial partnerships including EU and, above all, non-EU companies will surely grow because of the technological strengths of the latter. However, non-EU manufacturers are generally less widely present on the European telecommunications equipment market than they are in other electronics sectors. Many European companies are also active globally, especially in the telecommunications equipment and consumer electronics sectors. However, in the computer and office equipment sector, EU companies are at a disadvantage since they are not as internationalised as their American and Japanese counterparts. It is acknowledged that EU companies have a high degree of scientific and technological expertise, but they also have the disadvantage of high labour costs (especially in comparison with the South East Asian countries) and a high cost of capital (in comparison with the USA and Japan). Productivity increased by 21 % from 1990 to 1994, although labour costs increased as well (by 17 %).

### Production process

The supply of electronic goods is characterised by very high levels of R&D expenditures. R&D costs may amount to 15-20 % of the revenues of electronic component suppliers. In microelectronics and in the telecommunications equipment

**Figure 8: Electronic engineering**  
**Trade intensities**



Source: DEBA

**Table 6: Electronic engineering  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	58 948	82.7	9.0	7.6
20-99 employees	9 121	12.8	12.5	12.7
100 or more employees	3 210	4.5	78.5	79.7

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

sectors, R&D is often more costly than production. Moreover, supply is affected by a dramatic reduction in product life cycles, due to the high pace of innovation in microelectronics. Therefore, large economies of scale and rapid returns on investment are necessary. In the latter respect, it is becoming increasingly important for large manufacturers to be vertically integrated or to have strong links with component suppliers, as well as to be appropriately diversified in order to share high R&D costs and to quickly reap returns on investment.

Innovation, combined with establishing world-wide standards, creates new business opportunities that allow early market entry and the reaping of high profits before prices fall as a consequence of increasing competition. Major innovations in the electronics field will be pocket computers, the PDA (Personal Digital Assistant), digital TV, broadband networks to transmit voices, data and images, and cellular digital networks for mobile telecommunication.

## INDUSTRY STRUCTURE

### Companies

In each subsector there are at least three European companies among the top fifteen world-wide. These are: Philips (NL), SGS-Thomson (F) and Siemens (D) in the components industry; Siemens, Olivetti (I) and Bull (F) in the computer industry; Alcatel (F), Siemens, Ericsson (S), Nokia (SF) and Bosch (D) in the telecommunications equipment industry; and Philips, Thomson and Nokia in consumer electronics. All of them are diversified into complementary sectors. Apart from the globally active manufacturers, there are approximately 70 000 small and medium sized companies that target the EU market, supplying components and electronic equipment, or focusing on certain market niches.

Although many of the largest EU companies suffered losses in 1992 and 1993, with the exception of the telecommunications equipment suppliers (which still had to face lower profit margins), most of the companies recovered in 1994, in particular in the microelectronics and consumer electronics sectors. To overcome their difficulties, EU computer companies try to establish new partnership and focus either on their core business or on the fastest growing segments of the market.

### Strategies

EU electronics companies are engaged in efforts to restructure and to cut costs, to become leaner, and to reduce marketing time for new, innovative products. Technological and commercial partnership agreements have become commonplace in the industry. Joint ventures, alliances and take-overs between EU and non-EU companies frequently take place, in order to reach the size necessary required in order to compete on the global market and to share technological know-how and market power. In the near future, the trend towards the setting up of networks of alliances for specific products and/or markets will intensify. In fact, the convergence of the telecommunications, computer, software and media industry, is limiting the ability of companies to face the new and increasingly complex market on their own.

## Impact of the Single Market

All sectors of the electronics industry are dominated by multinational companies selling standardized product throughout the EU. The industry benefits from the free movement of goods, people and capital within the EU, and relies on the provision of trans-European services such as banking and telecommunications. Common standards such as those drawn up by ETSI on GSM and digital broadcasting are essential. The abolition of telecommunications monopolies and the liberalization of public procurement have had a major impact on this sector, as have had certain decisions of the EU competition authorities (e.g. the privatization of Bull in France and Alcatel SE in Spain). Common external tariffs and anti-dumping measures (or the threat thereof) have encouraged foreign companies to set up production facilities within the EU. As a result, non-EU manufacturers account for a significant and growing share of EU electronics production.

## ENVIRONMENT

In relative terms, the EU electronics industry does not have a very substantial impact on the environment. Waste or emissions are relatively insignificant in most of the production processes, at least in comparison with most of other industries. Moreover, the electronics industry is highly innovative and frequently modifies its production processes with the partial aim of reducing polluting emissions. CFC (chloro-fluorocarbon) emissions have been reduced before the legislation that will completely ban CFC use has entered into force. Important goals are to minimise the residual waste and to re-cycle hardware. Some of the main problems to be solved concern the re-cycling of cathode ray tubes, which contain toxic materials, and plastic components.

Environmentally sensitive policy is often a successful strategy for electronics companies to pursue. Consumers are becoming more and more sensitive to environmental problems and prefer to purchase products that are not harmful to the environment.

## REGULATIONS

The EU plays a central part in the industry's development by promoting European market integration and fair competition among EU and non-EU companies and other actors (e.g. through anti-trust legislation and Directives concerning e.g. public procurement). One of the main goals of the EU is to open the EU market, on the assumption that it will generate a mutual response from non-EU countries, thereby enabling a reduction of the trade deficit.

The EU is also funding strategic and co-operative research programs (e.g. JESSI in microelectronics and ACTS and ESPRIT in telecommunications) and is promoting new advanced applications (such as Trans-European digital Networks) that benefit the EU electronics industry. According to the Bange-mann report, the electronics sector is at the centre stage of EU attention in order to ensure that it remain competitive in the new knowledge intensive global economy. The EU also



**Table 7: Electronic engineering  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	N/A	N/A
BR Deutschland	1.12	1.16
Hellas	N/A	N/A
España	0.39	0.39
France	1.17	1.02
Ireland	N/A	N/A
Italia	0.77	0.79
Luxembourg	0.00	N/A
Nederland	N/A	N/A
Portugal	N/A	N/A
United Kingdom	1.11	1.18

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

## OUTLOOK

Although in real terms the EU electronics market is not likely to grow fast in the next few years, and despite a projected further reduction of employment, there are few doubts that in the medium and long term, it will grow at a higher rate than any other mature industry in the EU. However, it is also very likely that the EU trade deficit in electronic goods will increase over the next years. Competition from American and Japanese companies will increase and the EU companies will have to maintain large R&D and other industrial investments to meet the competitive challenge on the global scale.

East Asian countries, and in particular China, represent highly attractive market opportunities because of the untapped potential of their large and fast growing economies. Innovative markets and products, created by the convergence of consumer electronics, telecommunications, computer and media technologies, are projected to create significant opportunities in the next years. Multimedia systems and networks constitute the major opportunity for the future.

allocates financial support to less developed and disadvantaged EU regions, with the aim of upgrading the technological content of their capital stock.

Written by: Databank Group - Teknibank

# Electronic components

## NACE 345

After years of moderate or even declining growth, the European electronic components industry has experienced an increase of production and consumption in 1994: it is the beginning of a typical growing cycle for this industry. Most of the increase is due to expansion and innovation in the PC's and mobile communications markets and to the recovery of automotive demand. For the first time in history, all European semiconductor producers were profitable in 1994.

In 1995 the European market is expected to grow by 4 %, while the European production will probably still lose market share on both the internal and international markets, because of its historical weakness in the semiconductors, the fastest growing segment.

The structural decline of employment in the electronic component sector - mainly due to engineering and manufacturing processes innovation - is expected to decelerate. Employment might even start to increase.

A general trend is the rapid convergence of computing, communications, video and audio technologies in a single Information and Communication Technologies market that will lead the components demand for many years.

The USA are gaining market share with respect to Europe and Japan, Intel (USA) has the largest market share in the EU. Only three European manufacturers of semiconductors (Philips, SGS-Thomson and Siemens) are present in the top 20 list of worldwide manufactures, and there is a very limited number of small and medium manufacturers able to feed the European market requirements with advanced niche products. But the European components industry is likely to react to past difficulties, by taking advantage of the new opening opportunities, both developing a stronger integration between suppliers and vertical industries and reinforcing the alliances with USA and Japanese suppliers.

### INDUSTRY PROFILE

#### Description of the sector

The electronic components sector includes three main categories of products:

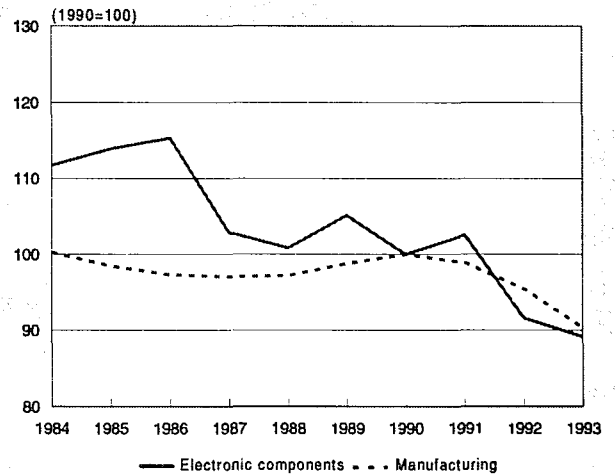
Active components: integrated circuits, discrete semiconductors, electronic tubes, optoelectronic components and flat panel displays;

Passive components: capacitors, resistors, wound and ceramic components;

Electro-mechanical components: connectors, relays, switches, keyboards, printed circuit boards, hybrid circuits/MCMs and other functional devices.

Electronic components is the smallest of the electronic engineering sectors - computers and office equipment, telecommunications equipment and consumer products - analysed in Panorama. These three sectors are the main markets of the electronic components sector. Other outlets, while smaller individually, all together make up about a quarter of the total electronic market and employment and absorb a significant portion of electronic components production (about 20 % of active components and 30-35 % of passive and electro-mechanical components). These sectors are: automotive (electronic parts, accessories), civil and military avionics and defence, medical equipment, industrial controls and instruments, measuring and analytical instruments, clocks and watches, photographic and optical equipment, transportation.

**Figure 1: Electronic components**  
Employment compared to total EU manufacturing industry



Source: EECA, DEBA

Production of components is driven by market demand from the electronic equipment manufacturing sector: innovation in components in turn drives those markets.

Electronic components are used exclusively by original equipment manufacturers (OEMs) or as spares for maintenance and repair markets. Components are increasingly specific to each OEM application, although dependent on common underlying design and production technologies.

#### Recent trends

The long term trend of this industry is positive, especially for the most innovative sectors of the industry and relevant products.

According to many sources, the worldwide market for semiconductor components will grow up to 160 billion ECU by 2000, i.e. the double of that expected for 1995: that means that the average annual growth rate (13.5 %) will be just lower than that of the last thirty years (15 %), but very far from justifying any "mature market" perspective.

In the same period, the European market will grow less than the average and particularly less than the fastest growing area (Asia and Pacific), but it will still account for 14 % of total (22 billion ECU), out of which 2-3 billion ECU are due to East European markets.

From mid-1993 onwards, the electronic components apparent consumption has recovered, after a three year period of stability due to economy recession: it is the beginning of a typical growing cycle for this industry, similar to those happened in 1973-75, 1983-85 and 1987-90. The increase of production allowed the trade deficit to shrink, from 9.1 billion ECU in 1992 to 8.9 billion ECU in 1993.

In 1994 and 1995 the European market is expected to grow by 5 % and 4 % respectively. The European production will still lose market share on both the internal and international markets, because of its small size in semiconductors, the fastest growing segment.

Most of the increase is due to continuous growth and innovation in the PC's and mobile communications markets and to the recovery of automotive demand.

In 1993 and in the first half of 1994, the computer business has been threatened by a tightening in the availability of spe-

**Table 1: Electronic components**  
**Main indicators in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	15 682	16 491	17 436	16 686	18 732	20 984	21 679	22 318	21 373	22 039
Production	9 721	10 535	11 934	10 205	11 591	12 264	13 345	12 845	12 300	13 173
Extra-EU exports	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 237	4 564	6 137
Trade balance	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-9 473	-9 073	-8 866
Employment (thousands) (1)	253.9	258.9	262.0	233.8	229.1	238.9	227.2	233.1	208.1	202.6

(1) 1984 and 1985, excluding Spain; 1988, excluding Belgium.  
Source: EECA

**Table 2: Electronic components**  
**Breakdown by sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports	Extra-EU imports
Printed circuit boards	2 679	2 438	212	453
Integrated circuits	8 465	2 708	2 896	8 653
Connectors	1 911	1 858	326	379
TV and monitor tubes	1 443	1 268	248	423
Discrete semi-conductors	1 669	1 112	884	1 441
Capacitors	1 350	880	317	787
Film circuits	903	490	257	670
Inductors	1 035	700	247	582
Switches and relays	686	602	293	377
Others	1 898	1 117	457	1 238

Source: EECA

**Table 3: Electronic components**  
**Average real annual growth rates**

(%)	1984-89	1989-93	1984-93
Apparent consumption	6.0	1.0	3.5
Production	4.8	1.4	3.1
Extra-EU exports	7.8	4.7	6.2
Extra-EU imports	7.9	2.0	4.9

Source: EECA

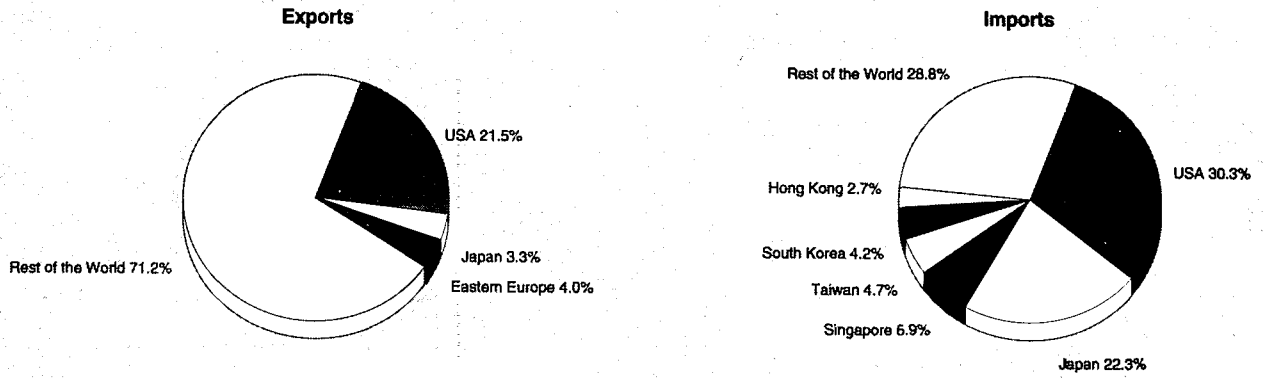
**Table 4: Electronic components**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 237	4 564	6 137
Extra-EU imports	9 309	10 151	9 096	9 545	11 846	13 599	13 527	14 710	13 637	15 003
Trade balance	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-9 473	-9 073	-8 866
Ratio exports/imports	0.36	0.41	0.40	0.32	0.40	0.36	0.38	0.36	0.33	0.41
Terms of trade index (1)	99.9	100.0	106.6	106.1	106.4	99.8	105.0	98.7	93.5	93.5

(1) NACE 345.  
Source: EECA, Eurostat



**Figure 2: Electronic components**  
**Destination of EU exports and origin of EU imports, 1993**



Source: EECA

cific components (dynamic RAMs). This was a consequence of fast innovation in PC's (memory requirements doubled in 2 years, new microprocessors, changes of operating systems, etc.) and because producers were slow to add new capacity as memory prices were believed to be too low to return a decent profit.

A better integration between producers and OEM's, also including market forecast and capacity planning, would have positive effects on the flexibility of suppliers to react to the changing market requirements.

Total employment fell from 208 000 in 1992 to 203 000 in 1994. The structural decline of employment in the electronic component sector - mainly due to engineering and manufacturing processes innovation - is expected to decelerate. Employment might even start to increase.

With regard to employment, the importance of the electronic components sector depends more on the size and prosperity of the electronic equipment markets and relevant applications and services, than on the size of the sector itself; however this industry has still the opportunity to contribute to employ high quality European engineers and technicians.

It is very important to note that the electro-mechanical component subsector includes a large number of small and medium enterprises focused on the European market and that nearly 50 % of employment in the component sector belongs to the electro-mechanical sub-sector.

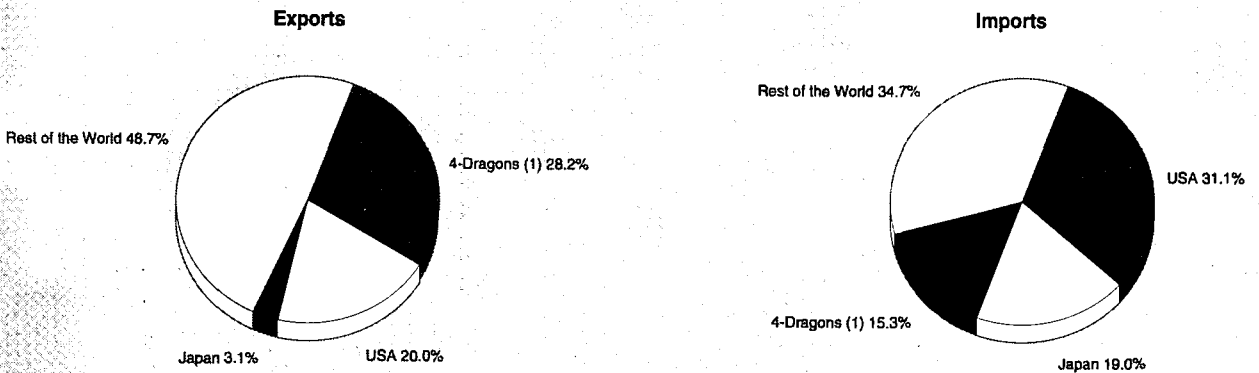
A key success factor for these sectors is R&D activity in order to identify the future application niches, also through the collaboration and vertical integration with OEM's, and the globalisation and innovation of marketing and distribution strategies.

Following the R&D investment through programmes such as Esprit, the European semiconductor industry has reduced a two-year gap to a six-months lag behind the state-of-the-art CMOS, and is now even leading the world in areas such as BICMOS, fast CMOS and power technologies.

**International comparison**

Japanese equipment manufacturers are highly integrated but, on average, they still produce in-house only 50 % by value of their component requirements. From a trading block point of view, however, Japanese companies are largely self sufficient. This is not the case in Europe.

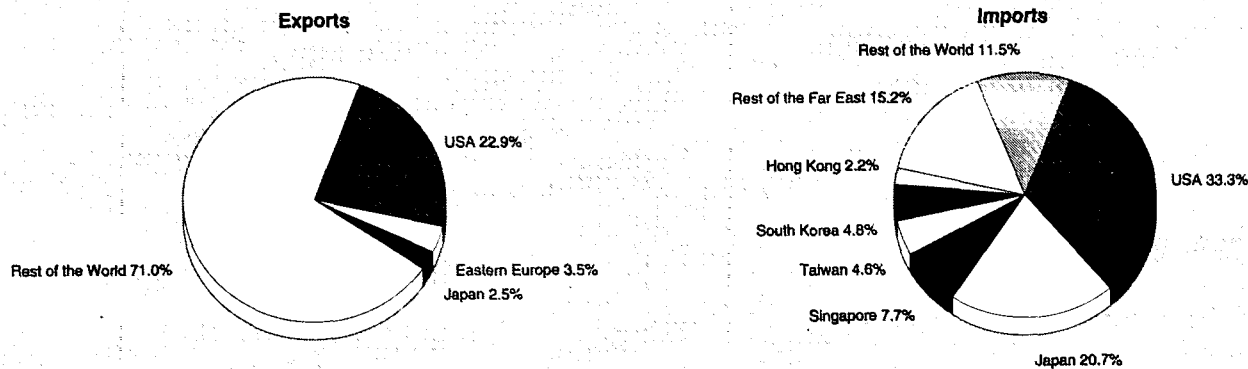
**Figure 3: Semiconductors**  
**Destination of EU exports and origin of EU imports, 1993**



(1) Hong Kong, Singapore, South-Korea and Taiwan.  
 Source: Eurostat



**Figure 4: Active components (1)**  
**Destination of EU exports and origin of EU imports, 1993**



(1) TV & monitor tubes, other tubes, integrated circuits and discrete semiconductors.  
 Source: EECA

From a market point of view, Asia & Pacific (including China and the Four Dragons) and the USA are gaining market share with respect to Europe and Japan, but the most interesting fact is the consolidation of the market leadership by USA based semiconductor manufacturers, after a period of strong competition pressure from the Japanese.

USA companies have turned around their fortunes by reducing their engineering and production costs, by investing in world-class performance systems and plants, by partnering with major customers, by revising their marketing media and distribution channels and investing heavily in R&D.

The largest manufacturer of high technology electronic components is Intel, an American company. Intel produces most of the microprocessors used in personal computers.

**Foreign trade**

Total extra-EU exports of electronic components recorded a remarkable growth in 1993 (+34 %); although the extra-EU imports increased from 13.7 billion ECU to 15 billion ECU (+10 %), the trade balance reduced its negative spread, with the exports/imports ratio up to 0.41 in 1993 in comparison with 0.33 in 1992. The destination of EU exports is quite fragmented, the most important market being the USA (22 %).

Europe has a very weak position in Japan, which represents only 3 % of exports.

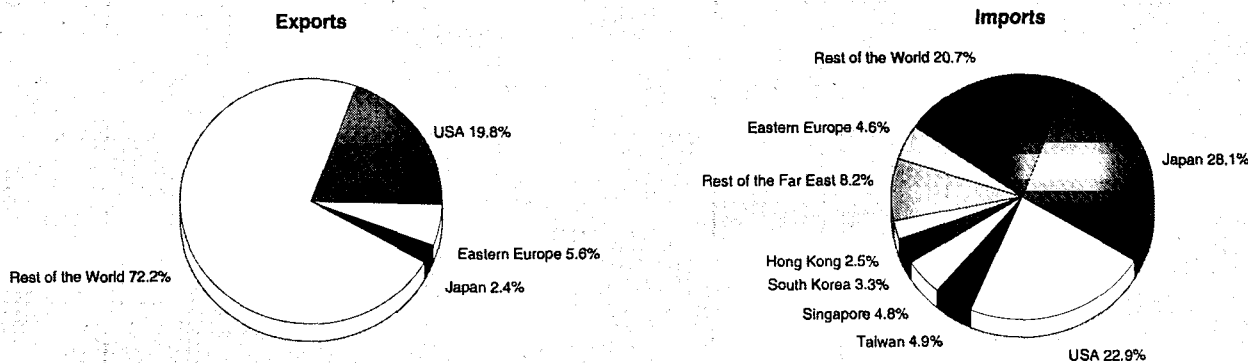
Most of the EU imports comes from USA (30 %), followed by Japan (22 %). The south-east Asian countries represent about 19 % of total imports.

As for active components, extra-EU exports increased from 4.4 billion ECU in 1992 to 5.8 billion ECU in 1993. Extra-EU imports grew at a smaller rate: the exports/imports ratio passed from 0.61 in 1992 to 0.63 in 1993. The USA are the main supplier, while most European exports are absorbed by developing countries (the "Rest of the World" category).

The export of passive components also increase in 1993, passing from 1.2 billion ECU to 1.8 billion ECU. The exports/imports ratio is stable. The breakdown of imports origin and exports destination shows an important cross trade with the USA (20 % of export destination and 23 % of import origin). Japan is the most important supplier but it absorbs only 2 % of European exports.

In the electromechanical components market, the exports/imports ratio was at 1.61 in 1993.

**Figure 5: Passive components (1)**  
**Destination of EU exports and origin of EU imports, 1993**



(1) Capacitors, resistors, inductors, soft ferrites and film circuits.  
 Source: EECA

**Table 5: Electronic components  
Breakdown of EU trade by component type, 1991-93**

(million ECU)	1991	1992	1993
<b>Active components</b>			
Extra-EU exports	4 767	4 369	5 814
Extra-EU imports	7 362	7 161	9 227
Ratio exports/imports	0.65	0.61	0.63
<b>Passive components</b>			
Extra-EU exports	1 170	1 157	1 326
Extra-EU imports	1 590	1 559	1 811
Ratio exports/imports	0.74	0.74	0.73
<b>Electro-mechanical components</b>			
Extra-EU exports	5 534	5 532	6 286
Extra-EU imports	3 790	3 594	3 911
Ratio exports/imports	1.46	1.54	1.61

Source: Eurostat

## MARKET FORCES

### Demand

An important general trend is the rapid convergence of computing, communications, video and audio technologies in a single Information and Communication Technologies market that will lead the electronic components demand for many years.

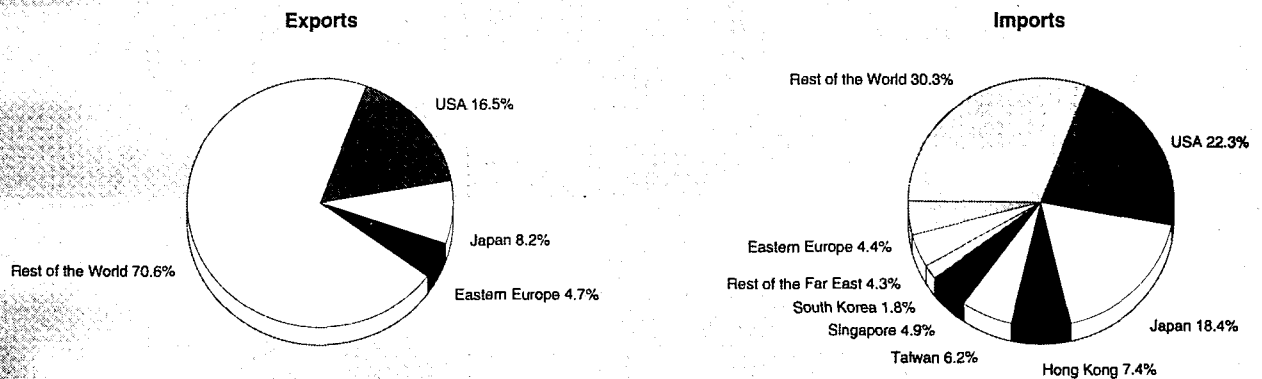
In the 1980s, the birth of the PC opened a huge new market for semiconductor vendors. Today many of the same vendors are trying to penetrate the emerging video-based markets, such as multimedia and cable TV, which will probably rival the PC business in size and importance. Other new businesses and consumer applications based on television, such as digital television, VCRs, video conferencing and CD ROM will also take off over the next few years. Moreover, PC might be equipped to send and receive video through satellites, fibre optics networks and even telephone lines. There is also a new generation of dedicated video processors and chips which, thanks to wide programmability and general purpose nature, can serve a wide range of applications beyond video (video conferencing equipment, multimedia workstations, fingerprint recognition products and integrated image processing systems combining printing, copying, faxing and document scanning).

The displacement effect will continue to increase the proportion of value added attributable to active components at the expense of passive and electro-mechanical components.

On the other hand, new functionalities made possible by advances in microelectronics create new end user products which, in turn, increase demand for the other components: mobile communications and automotive electronics are two examples of this.

In 1994, the market drivers for the semiconductor segment have been the increasing demand for communication chips, the falling prices of 486-based PC, the stiffening competition and the impact of PowerPC-based computers. In the passive components market, the Surface Mount Technology (where some components are encapsulated in plastic casings) for capacitors, resistors and connectors is growing at 30-40 % per year. Passive components demand in 1993 has been fuelled primarily by PC's and communication, although a few suppliers report an upsurge in demand from the automotive industry. Other issues characterising the market are the increasing miniaturisation, the demand for customer-specific and high performance (faster speed, higher reliability, higher volumetric efficiencies, etc.) components and the development of fibre optics and opto-electronics.

**Figure 6: Electro-mechanical components (1)  
Destination of EU exports and origin of EU imports, 1993**



(1) Printed circuit boards, connectors, switches and relays.  
Source: EECA

**Table 6: Electronic components**  
**EU trade balance in semiconductors, 1990-93**

(million ECU)	1990	1991	1992	1993
Discrete semiconductors	-237	-209	-109	-37
Integrated circuits	-1 617	-2 049	-2 413	-3 099
Opto-electronics	-59	-107	-113	-117
Total	-1 913	-2 365	-2 635	-3 254

Source: Eurostat

### Supply and competition

The electronic components industry is almost completely globalised in the semiconductors segment. The other components segments are also moving steadily towards globalisation for both commodity products, and for application-specific niches, that are becoming transnational markets too.

Nearly all the large electronics OEM's were vertically integrated and producing many of their own strategic components. Many of them are now either abandoning their internal components operations (as for Printed Circuit Boards (PCB), for instance) or forming new divisions supplying components to other OEM's. More than half the PCB's are made by independents and their share will grow in the next years.

Competition from large manufacturing companies increases, threatening the small and medium manufacturers which currently represent most of the offer. A common trend is towards diversification and innovation of distribution channels (distributors, dealers, retailers...), also including direct marketing and telemarketing media.

### Production process

The approach to design and manufacturing of semiconductors has been changing recently for 2 main reasons: Japanese companies, utilising techniques such as Kaizen (continuous improvement), have forced European and USA companies to abandon design for performance and replace it with application-specific design. Moreover, the product development is

becoming market based not technology based, different variants of a product are intended for specific applications.

As more and more system functions are integrated on silicon, chip makers have evolved from being suppliers of building blocks to the role of system designers. The relationship between semiconductor suppliers and OEMs has been transformed into much more a partnership, changing the way integrated circuits are developed. Customers guidance is vital as a system can be designed in a few months and have a life cycle of less than one year. However, silicon production is not the only relevant factor: the added value of test, interconnect and assembly technologies are also important and are areas of relative strength in Europe. Another example of strength of the industry in Europe is given by the collaboration between silicon suppliers and the systems industry (e.g. telecommunications), where more complex and technically challenging chips and systems (e.g. mixed analog and digital) are produced.

As all the system design is being done at chip level, and there is very little differentiation at the board level, most of the financial risk and technology is now at the semiconductor companies.

For electro-mechanical components suppliers the challenge is to focus on custom-design products for specific applications rather than for commodity products. For instance, connectors suppliers are stepping up efforts to move closer to key customers, as interconnected systems become more critical.

**Table 7: Electronic components**  
**The top 20 firms in the West European semiconductors market**

Firm	Rank 1993	Rank 1992	Sales (million ECU)	European market share 1993, (%)
Intel	1	2	1 755.8	13.3
Motorola	2	3	1 076.0	8.1
Philips	3	1	942.8	7.1
Siemens	4	4	887.3	6.7
SGS-Thomson Microelectronics	5	5	858.2	6.5
Texas Instruments	6	6	743.8	5.6
NEU	7	7	516.7	3.9
Toshiba	8	8	493.6	3.7
Samsung	9	12	435.5	3.3
National	10	9	387.7	2.9
AMD	11	10	386.0	2.9
Hitachi	12	11	362.9	2.7
IBM	13	N/A	349.3	2.6
TEMIC	14	N/A	290.4	2.2
Mitsubishi	15	16	230.6	1.7
Fujitsu	16	14	228.0	1.7
AT&T	17	22	175.1	1.3
Analog Devices	18	17	155.4	1.2
GEC Plessey semiconductors	19	13	134.9	1.0
LSI Logic	20	20	124.7	0.9

Source: Dataquest



**Table 8: Electronic components**  
**European semiconductor sales by vendor base region**

(million ECU)	Sales 1991	Sales 1992	Sales 1993	Market share (%)	Annual growth 1992-93 (%)
European firms	3 346	3 202	3 728	28.2	5.0
North American firms	3 857	4 260	6 581	49.8	39.3
Japanese firms	1 417	1 547	2 227	16.8	29.9
Rest of the world firms	268	403	689	5.2	54.3
Total market	8 888	9 412	13 225	100.0	26.7

Source: Dataquest

The issues affecting the semiconductor industry, and particularly the microprocessors and memory chips industry, are quite peculiar. The world-wide average R&D investment intensity in this industry is between 12 % and 15 % of revenues. Capital investments are ranging between 10 % and 13 % of revenues. In the 1992-93 period Japan had the highest R&D investment rate, followed by Europe and the USA. In the same period, Europe presented the lowest capital investments rate.

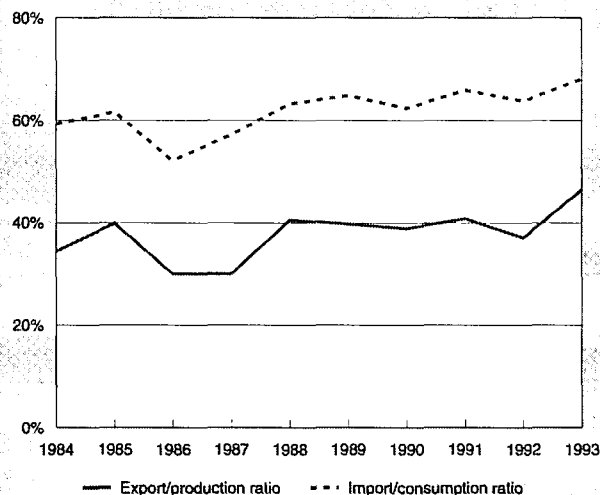
Between 1984 and 1992, worldwide capital investments in this industry have grown up to a cumulative value of about 87 billion USD. Of this total, Europe accounts for 10 % only, Asia and Pacific for 12 %, the USA for 33 % and Japan for 43 %.

The cost of developing a new "top end" semiconductor component (e.g. the next 256Mbit microprocessors or the future 1Gbit chip memories) can already reach 10 billion USD per project and will grow further.

At this level there is a need for long term capacity planning and the risk has to be spread between consortia of companies, as it happened for example with Concorde and Airbus in the aerospace industry.

These consortia are forming now, most of them aiming to combine American design know-how with Japanese or Asian manufacturing expertise, but they can involve European manufacturers as the agreement between IBM, Siemens (D) and Toshiba (JPN) can demonstrate.

**Figure 7: Electronic components**  
**Trade intensities**



Source: EECA

## INDUSTRY STRUCTURE

### Companies

In the semiconductor industry, there is a strong European presence of USA and Japanese companies.

In 1993 Intel (USA) gained the largest market share in the EU, overtaking Philips (NL) which had been ranking first for years. The increase of Intel sales comes from the huge demand for 486 microprocessors for PCs. The introduction of the Pentium (the "586") and of the clock tripled 486 will consolidate Intel's leadership.

Motorola has the second largest market share, thanks to the increasing sales of mobile communications components. The introduction of the PowerPC microprocessor will favour its growth.

Philips is losing market shares. The decrease of the consumer market is the main reason explaining this result. Siemens keeps the fourth position thanks to the telecommunication and the discrete components, as well as its DRAM business.

SGS-Thomson (F) is aiming at the USA and Asian markets, concentrating its efforts on the EPROM, FLASH and ASIC technologies. In this context, it is worth to notice the SGS-Thomson - Mitsubishi alliance in the field of flash memories.

For years, system companies such as IBM, AT&T (USA), DEC (USA) have developed sophisticated technologies and manufacturing processes only for their proprietary systems, but this is no longer true. The high cost of developing and manufacturing the new generations of components, is forcing these companies to find ways to share the costs.

Initially they looked for strategic alliances to reduce costs and risks: AT&T teamed up with NEC, IBM with Siemens and then with both Toshiba (JPN) and Siemens.

The deteriorating finances have also forced them into the merchant business. The main problem affecting the systems manufacturers is not the technology, it is marketing and distribution. None of them has distribution channels to compete with companies such as Intel, AMD (USA), Texas Instruments (USA), National Semiconductor (USA). Moreover they have to face two major competitive problems which need new strategies: to become reliable suppliers to their long-standing competitors and to compete with their own current suppliers

### Strategies

Only three European manufacturers of semiconductors (Philips, SGS-Thomson and Siemens) are present in the world largest 20 manufacturers, and there is a very limited number of small and medium manufacturers able to feed the European market requirements with advanced niche products.

But the European components industry is likely to react to past difficulties, by taking advantage of the new opening opportunities. For the first time after many years, the Japanese semiconductor suppliers were forced to reduce their R&D investments in 1993, because of their profitability decline.



This is giving to EU producers a unique opportunity to reduce the gap, by developing a stronger integration between suppliers and users, such as automotive and telecommunications, and to develop application oriented and market oriented components.

Another strategic direction is to reinforce the alliances with US or Japanese suppliers: the joint venture between Siemens and IBM, extended later to Toshiba, is seen as a paradigm to imitate. Interestingly, America's SEMATECH - the government supported R&D consortium - has opened discussion on collaboration with JESSI, which can be considered its counterpart in the EU (although the scope of JESSI is broader).

### Impact of the Single Market

In the words of EECA, the industry trade association, the Single Market is "not a real issue". The electronic components industry operates on a world-wide basis with little concern for national boundaries. Of course the free movement of goods is essential. The industry is very capital intensive and requires highly trained personnel. Therefore, the free movement of capital and people is also important. The recent GATT agreement has sanctioned the EU's external tariffs which are designed to protect the indigenous industry. These are criticized for placing EU client industries at a competitive disadvantage. They have also encouraged foreign component manufacturers to open plants in Europe, thereby increasing competition for local producers.

Successful companies must operate world-wide. A major, but difficult, objective of European semiconductor manufacturers is to reduce their dependence on the European market. In doing so, they face various "non-tariff barriers" such as the vertical integration of the Japanese and South Korean electronic industries.

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### REGIONAL DISTRIBUTION

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Electronics manufacturing is now for the most part a global business: the globally coordinated production of globally standard products by multinational enterprises.

The location of manufacture is determined solely by the size of regional markets, the economics of production (including regional incentives) and the availability of skills.

To compensate for the attraction of the newly industrialised and newly developing countries of the Far East, offering low wage costs together with a well educated work force and rapidly growing local markets, some European regions have very good chances to attract future investments thanks to financial support (structural funds).

The growing investments of Texas Instruments in the Centre of Italy (Avezzano) is a good example of this, as it is the decision of the Siemens Group to create a new production plant for integrated circuits in Dresden.

Production is kept close to home when the product or process is at a technological leading edge, while they are still in development or where volumes are low

So far, the availability of high quality designers, engineers and technicians, as well as of high quality machinery and product/process services suppliers are key factors in persuading multinationals to invest in Europe.

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### ENVIRONMENT

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Environmental regulations, such as the Montreal Protocol to avoid CFC (chlorofluorocarbons) releases in the atmosphere, will have a strong impact on the electronic components industry.

Tightening environmental legislation has reduced profit margins to the extent that many companies are relocating to regions where the environmental control is less strict: it was the case of the Printed Circuit Boards industry in Germany, whose expenditures to comply with protection regulations have risen to between 6 % and 8 % of sales.

Many of the indigenous producers in Germany have closed down their mass production plants and are instead importing from the Far East or from nations with less strict environmental controls.

To meet both the industry economics requirements and the environment requirements, some markets or marketing advantages should be considered for "green" electronic manufacturers.

For instance, after the USA Environmental Protection Agency (EPA) launched the Energy Star programme, aimed to promote the production of "green PC's" (i.e. Energy Saving Personal Computers, made by fully recyclable materials) the Federal Government decided that, starting October 1993, only PC's respecting the new EPA programme would be introduced in the Federal Administrations.

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### OUTLOOK

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In the coming years, market developments will be driven by the user industries. The continuous growth and innovation of the PC and the emerging video based markets are expected to support the demand for more sophisticated and specific components.

Future "top end" active component technology will require international consortia to share the risk, allowing European participants the opportunity of entering the product and equipment markets at the same time as the competition.

Accordingly, national or regional responses as manifested in projects as JESSI or SEMATECH will need to be replaced by global initiatives. Similarly, trade quotas and competition policies based purely on regional markets will be outmoded.

In the active components sub-sector, Japanese and America transplants will be among the largest creators of new employment. Policy towards transplants should aim at encouraging high value added manufactures to be located in Europe.

In conclusion the European market is expected to grow less than average in the period 1994-1998, particularly less than the fastest growing area of Asia and Pacific.

Written by: Databank Group - Teknibank

The industry is represented at the EU level by: European Electronic Component Manufacturers Association (EECA). Address: rue d'Arion 69-71 Bte 8, B-1040 Brussels; tel: (32 2) 230 9630#39; fax: (32 2) 280 1041.

# Computer and office equipment

## NACE 33

The computer and office equipment sector has experienced poor market growth since 1991. The main cause has been the overall economic recession in Europe and the substantial restructuring of the sector due to technological innovation, changing customer requirements and the shift of the computer and telecommunications markets in particular. In 1994, the market has re-entered its growth path although double digit growth rates are not likely to re-occur in the years to come, due to the present price/performance levels. The information technology (I.T.) sector is expected to have a strong potential for growth in the coming years thanks to technology transfer, new applications, and increasing supply and demand against the background of multimedia, local and wide-area information and communication user requirements and the development of a pan-European information infrastructure to meet these needs.

### INDUSTRY PROFILE

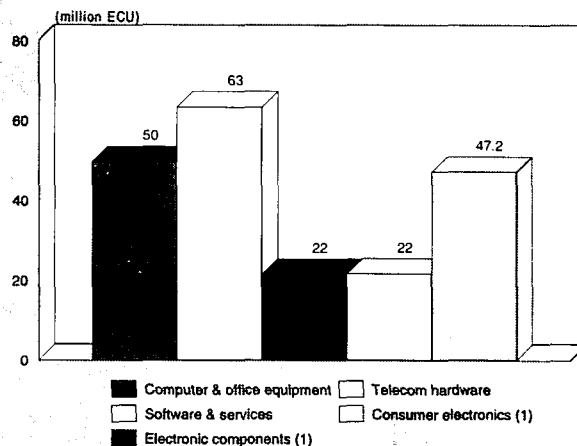
#### Description of the sector

The computer and office equipment sector comprises the following product categories:

- large, medium and small Electronic Data Processing (EDP) systems, workstations and personal computers;
- EDP-peripherals such as printers, monitors, keyboards and disk drives;
- data communication equipment;
- office equipment such as typewriters, calculators, cash registers, mail and money handling equipment.

The sector is steadily merging with the software and computer services sector and has become related to the electronic components and the consumer electronics sectors. In the new product generations of today, information, telecommunication and

**Figure 1: Computer and office equipment Market value in comparison with related industries, 1994**



(1) 1993 data.  
Source: EITO, Eurostat

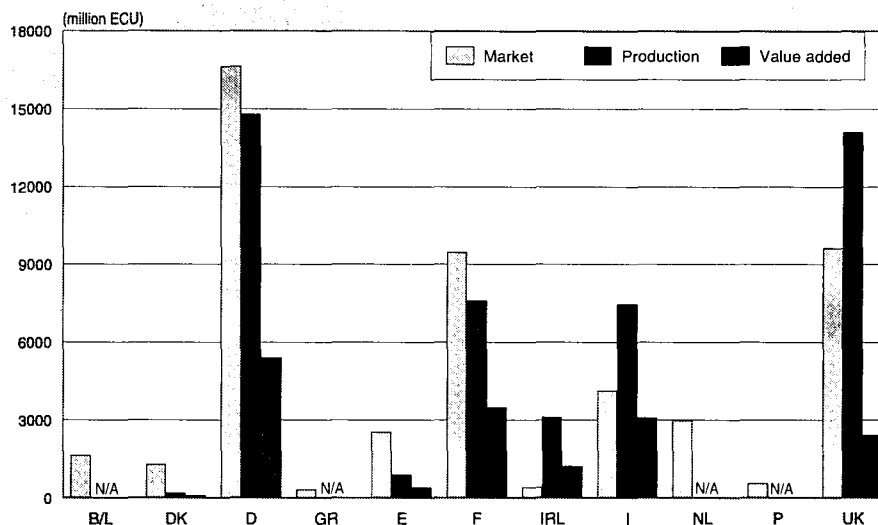
software functions are an integral part of the product solution. The traditional division into office, computer and telecommunication products is therefore growing obsolete.

In 1994, the computer and office equipment sector reached a market and production volume of 50 billion ECU of which office equipment represented 15%. The sector's market volume is twice the size of the market of the electronic components and telecommunications hardware sector, with 22 billion ECU each, and is comparable to the market volume of the consumer electronics sector with 47 billion ECU. Production (1994) is concentrated to Germany (29.7%), the UK (28.3%), France (15.2%) and Italy (15.0%).

#### Recent trends

In the 1980s, the use of office automation increased rapidly in industry and administration; as a consequence the I.T. market boomed, and outperformed overall economic growth, with yearly double digit growth rates. Between 1984 and 1990, production grew by 8% per year, and demand was satisfied

**Figure 2: Computer and office equipment Market, production and value added, 1994**



Source: DEBA, EITO

**Table 1: Computer and office equipment  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Market value	N/A	N/A	N/A	N/A	N/A	48815	48399	49609	51900	54812	N/A
Production	30 115	42 623	45 142	46 985	50 275	48 995	44 909	51 892	56 200	62 100	68 500
Extra-EU exports	6 525	8 211	9 327	9 190	9 939	9 984	12 013	14 206	15 990	18 130	20 470
Trade balance	-6 349	-10 756	-12 117	-12 505	-13 920	-14 500	-13 313	-14 575	-16 260	-18 210	-20 370
Employment (thousands)	231.3	265.6	266.8	259.2	293.4	270.0	230.2	217.0	220.0	230.0	240.0

(1) Some country data for production and employment have been estimated.

(2) DEBA estimates, except for market value.

(3) Rounded EITO forecasts.

Source: EITO, DEBA

**Table 2: Computer and office equipment  
EU computer and office products market by segments**

(million ECU)	1992	1993	1994	1995	1996	1992/93 (%)	1993/94 (%)	1994/95 (%)	1995/96 (%)
Large Systems	6 735	5 700	5 181	4 832	4 703	-15.4	-9.1	-6.7	-2.7
Medium Systems	5 205	5 044	4 994	5 083	5 208	-3.1	-1.0	1.8	2.5
Small Systems	4 900	4 852	5 012	5 311	5 676	-1.0	3.3	6.0	6.9
Workstations	2 471	2 666	3 020	3 524	4 175	7.9	13.3	16.7	18.5
Personal Computers	14 298	14 503	15 133	16 008	16 988	1.4	4.3	5.8	6.1
PC Printers	4 065	4 087	4 229	4 390	4 622	0.5	3.5	3.8	5.3
Data Communication Equipment	3 275	4 017	4 537	4 988	5 311	22.7	12.9	9.9	6.5
Computer Products	40 949	40 869	42 106	44 136	46 683	-0.2	3.0	4.8	5.8
Typewriters	676	583	495	444	415	-13.8	-15.1	-10.3	-6.5
Calculators	690	644	614	596	582	-6.7	-4.7	-2.9	-2.3
Copiers	4 057	4 023	4 077	4 253	4 472	-0.8	1.3	4.3	5.1
Other Office Equipment	2 443	2 280	2 317	2 470	2 661	-6.7	1.6	6.6	7.7
Office Products	7 866	7 530	7 503	7 763	8 130	-4.3	-0.4	3.5	4.7
Computer & Office Products	48 815	48 399	49 609	51 899	54 813	-0.9	2.5	4.6	5.6

Source: EITO

to a growing extent by imports which grew by 9 % per year in the same period. Meanwhile, extra-EU exports grew by only 6 % per year and the EU trade deficit rapidly increased to reach 13 billion ECU in 1990.

In the 1990s, substantial changes in the market environment, in part influenced by the overall decline in economic activity, have necessitated a strategic re-focus and restructuring of the computer and office equipment sector. Because of this, the market declined by 1 % between 1990 and 1992, and grew by a mere 1 % between 1992 and 1994 to reach 49.6 billion ECU. This stagnation was also influenced by further increasing price/performance ratios whereby unit shipments in specific segments grew substantially. Production experienced a similar trend with a compound growth of 2 % between 1990 and 1992 and 1 % between 1992 and 1994 to reach 49.9 billion ECU. Despite an annual growth rate of 2 % between 1990 and 1992, employment decreased by 10 % annually between 1992 and 1994 to reach a total of 218 000 employed in the sector, due to industry restructuring.

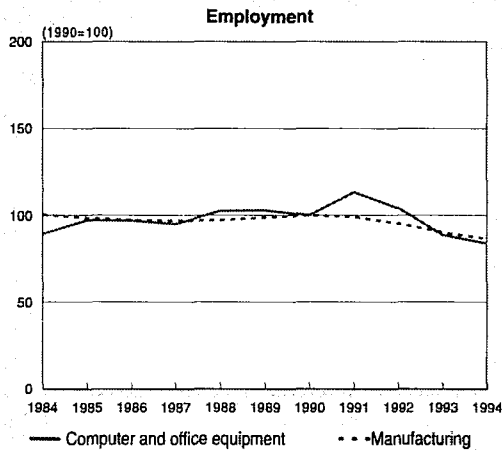
Whereas in the 1980s the I.T. market outperformed overall economic growth, the economic slowdown at the beginning of the 1990s demonstrated that the I.T. market had reached a mature stage and had entered into a cyclical trend where market growth approached the main GDP and investment trends. Therefore, for the I.T. market a nominal growth of 5 % in 1995 is expected, in line with GDP growth.

### International comparison

At 30.1 billion ECU, EU production in 1984 equalled 44 % of the US production of 68.4 billion ECU and was roughly on a level with the Japanese production of 32.1 billion ECU. Whereas EU and US production between 1984 and 1994 on average grew by 5 % and 4 % per year, respectively, the Japanese production increased at a compound growth rate of 10 % per year. In 1994, the Japanese production of 80.0 billion ECU amounted to 81 % of the US production of 99.1 billion ECU. EU production in 1994 had reached 49.9 billion ECU. Due to cost developments in Japan and relocations from the US and the EU, several Pacific rim countries such as Singapore, Taiwan, HongKong and Malaysia have substantially increased their contributions to world production. Meanwhile, China is emerging as a new important host country for production.

In 1994, the value of the world market for computer and office equipment reached 202 billion ECU. At 81 billion ECU, the US is the largest market followed by Western Europe with 57 billion ECU (40 % and 28 % world market shares, respectively). Whereas production and consumption lie within the same range in the EU and the US, the Japanese market of 38 billion ECU, equalling a market share of 19 %, only represents 47 % of the value of the country's production in the sector. This indicates Japan's global orientation. Eastern Europe today represents 1 % of the world market. Apart from Japan, Eastern Europe and the Pacific Rim countries will be the fastest growing markets until 1996, with overall growth

**Figure 3: Computer and office equipment  
Employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

rates of 20-30 %. For Western Europe and the US, growth rates of 11 % and 8 %, respectively, are anticipated.

### Foreign trade

The main characteristic of EU foreign trade in computer and office equipment is a growing trade deficit. Between 1988 and 1993, the trade deficit increased by 4.4 % per year, from 10.8 billion to 13.3 billion ECU. In recent years, the trade deficit growth has slowed down to an average of 2.1 % between 1990 and 1993. Extra-EU exports have grown by 8 % per year from 1988 to reach 12.0 billion ECU in 1993. They are still highly focused on the European market but have begun to penetrate foreign markets. Whereas in 1988 Europe represented 46 % of extra-EU exports, its share decreased to

**Table 3: Computer and office equipment  
Computers: Market share by major product category in  
Europe, 1993**

(%)

Personal computers (1)	
IBM	14.7
Compaq	13.7
Apple	8.9
Olivetti	4.4
Commodore	2.2
Market value (billion ECU)	23.7
Workstations (2)	
Sun	30.0
Hewlett Packard	29.0
IBM	13.0
Digital	13.0
Market value (billion ECU)	4.0
Computers (3)	
IBM	37.0
Siemens Nixdorf	10.0
PC Compatibles	9.0
Bull	6.0
Market value (billion ECU)	20.7

(1) General-purpose single-user computer.  
(2) Unix and integrated networking capability systems.  
(3) Computers used in commercial environments only, from corporate resource computers down to small-scale work group computers.  
Source: Dataquest

38 % (4.6 billion ECU) in 1993. With a compound growth of 27 % from 1988 to 1993 and a share of 7.5 %, Eastern Europe is the fastest growing European market. The US represents the largest non-European destination with a share of 29.4 % (3.5 billion ECU) of total EU exports in 1993. It is followed by Japan with 849.5 million ECU (7.1 %) and the Four Tigers (HongKong, Singapore, South Korea and Taiwan) with 595.1 million ECU (5.0 %). The latter two reached compound annual growth rates of 34.2 % and 17.2 %, respectively, between 1988 and 1993.

With a share of 54.9 % in 1993 (13.9 billion ECU) and a compound annual growth rate of 11.3 % since 1988, East Asia is the dominating source of extra-EU imports. In 1993, Japan's share was 21.5 % (5.5 billion ECU), whilst imports from the US accounted for 38 % (9.6 billion ECU). European imports represented only 5.2 % (1.3 billion ECU) of total EU-imports. China has emerged as the sixth largest exporter to the EU.

## MARKET FORCES

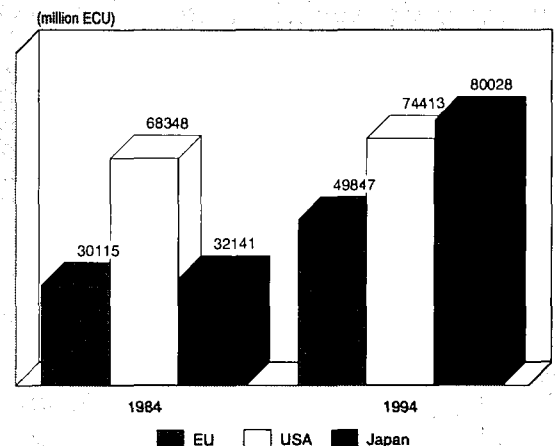
### Demand

Over the last few years, market patterns for the computer and office equipment sector have changed substantially. I.T. customers have become increasingly sophisticated which has made more advanced definitions of user requirements necessary.

As the Internal Market develops, the EU industry is becoming increasingly pan-European and is globalising its business with substantial impact on I.T. strategies and requirements as a result. The sector industry is undergoing a process of business re-engineering towards decentralised and customer-oriented structures and processes, where new information and communication requirements must be met. The accelerated merging of office, computer and telecommunications technology and applications has created many potential market opportunities. These factors have greatly influenced the market development of the different I.T. product categories.

For multi-user systems, down-sizing and decentralisation have had a substantial negative impact on the market for large systems. Between 1992 and 1994, this market segment declined by 12.3 % per year. Further price cuts and the holding back of investment decisions, due to anticipated new product announcements, will result in a further decline in the large systems market by 4.7 % per year until 1996. Whereas

**Figure 4: Computer and office equipment  
International comparison of production in current prices**



Source: DEBA

**Table 4: Computer and office equipment  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	6 525	8 316	7 753	7 752	8 211	9 327	9 190	9 939	9 984	12 013	14 206
Extra-EU imports	12 875	14 448	13 663	15 229	18 966	21 444	21 695	23 859	24 484	25 326	28 781
Trade balance	-6 349	-6 133	-5 910	-7 477	-10 756	-12 117	-12 505	-13 920	-14 500	-13 313	-14 575
Ratio exports / imports	0.51	0.58	0.57	0.51	0.43	0.43	0.42	0.42	0.41	0.47	0.49
Terms of trade index	121.1	140.0	137.7	123.0	104.4	105.0	100.0	98.4	96.4	110.6	N/A

Source: DEBA

**Table 5: Computer and office equipment  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	6 799	88.8	7.5	5.3
20-99 employees	608	7.9	7.5	4.7
100 or more employees	246	3.2	85.0	90.1

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

**Table 6: Computer and office equipment  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	74.6	80.3	79.4	84.6	91.5	93.4	100.0	95.6	109.7	124.9
Unit labour costs index (3)	94.9	94.6	101.1	101.5	95.6	99.8	100.0	110.0	103.4	89.2
Total unit costs index (4)	93.5	95.7	95.6	92.3	94.0	97.6	100.0	101.0	99.6	91.2
Gross operating rate (%) (5)	19.3	18.5	18.8	18.7	18.6	16.4	15.4	13.3	8.2	9.5

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 7: Computer and office equipment  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.14	0.07
Danmark	0.17	0.23
BR Deutschland	1.04	0.92
Hellas	N/A	N/A
España	0.34	0.32
France	1.22	0.91
Ireland	7.72	6.54
Italia	1.13	1.03
Luxembourg	0.00	N/A
Nederland	0.91	N/A
Portugal	N/A	N/A
United Kingdom	0.88	1.71

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

down-sizing from larger systems to smaller, distributed computing solutions has had a positive effect on the midrange market, the continued shift towards smaller systems and PC-based solutions has had a negative impact. Hence, the market declined by 2 % per year between 1992 and 1994. Between 1994 and 1996, a growth of 2 % is anticipated. As the price gap between PC solutions and small systems is narrowing and open systems solutions are gaining further importance, this market segment is experiencing a recovery, and a compound growth of 6.4 % is projected for the period 1994 to 1996. The multi-user systems together accounted for 36 % (15.2 billion ECU) of the total computer products market in 1994.

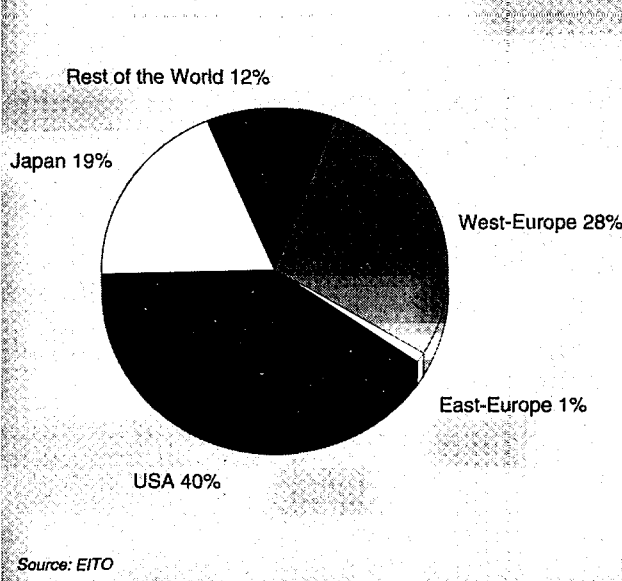
Personal computers and PC-peripherals have been the most important driving forces behind the computer market for the last few years and will remain in this position. PCs and PC printers in 1994 represented 46 % of the computer market. Although double digit unit shipment growth struck a blow to the ongoing spread of PC solutions on the market, due to further increasing price/performance ratios and absolute price cuts, the PC market grew by a compound average of 2.9 % between 1992 and 1994 to reach 15 billion ECU. It is projected to grow by 6 % between 1994 and 1996. PC printers, with

**Table 8: Computer and office equipment  
Share of top ten vendors in Member State markets**

(%)	1991	1992	1993
Belgique/België, Luxembourg	76.5	58.3	60.5
Danmark	82.2	62.9	62.0
BR Deutschland	74.2	56.2	56.6
Hellas	N/A	N/A	N/A
España	68.0	59.6	53.9
France	76.6	62.8	60.3
Ireland	N/A	N/A	N/A
Italia	78.9	69.0	62.6
Nederland	74.7	61.1	57.1
Portugal	N/A	N/A	N/A
United Kingdom	72.4	52.5	51.1

Source: EITO

**Figure 5: Computer and office equipment  
International comparison of market value, 1994**



Source: EITO

a market of 4.2 billion ECU, grew by 2 % in 1994 and a 4.5 % growth between 1994 and 1996 is expected for this market segment. The shift from impact to non-impact, and from monochrome to colour solutions constitute important developments in the printer market. In the professional business environment, PC market growth is driven by network solutions to meet the information and communication requirements in a decentralised environment. This fuelled the data communication equipment segment to grow by 18 % between 1992 and 1994, thereby achieving the highest average growth of the computer market segments. The segment will grow by another 8 % until 1996.

A second prominent driving force is the emergence and growing importance of the small office and home office market (SOHO). The declining prices of PCs, and new private consumer-oriented applications in the multimedia environment, have made the PC more and more attractive for home use. It is estimated that 22 % of the European households now own a PC. In 1994, 6 million PCs were sold on the home market. As I.T. product solutions have increasingly penetrated the larger professional business environment, I.T. manufacturers are now focusing their interest on the SOHO market. It is estimated that less than 30 % of small businesses in Europe have purchased I.T. equipment and solutions. This explains why growth in this market segment remains above 10 % per year. 25 % of the PCs sold in Europe in 1994 went into the SOHO market.

**Table 9: Computer and office equipment  
Revenues of European IT Companies by product range, 1993**

(million ECU)	1993 revenue	Large systems revenue	Mid range revenue	PC revenue	Work stations revenue	Peripherals revenue	Software revenue	Data communications revenue	Services revenue	Maintenance revenue	1992/93 revenue change (%) in total revenue)
Siemens Nixdorf	6 170	699	802	466	155	1331	854	0	621	1242	-13
Olivetti	4 330	65	350	1038	0	655	542	123	0	828	-12
Groupe Bull	4 270	598	213	726	0	640	384	0	299	1025	-13
ICL	3 344	299	285	607	227	0	523	0	371	651	-10
Cap Gemini	1 663	0	0	0	0	0	266	0	1397	0	-14
Finsiel	877	0	0	0	0	0	262	0	615	0	-14
Sema Group	640	0	0	0	0	0	512	0	128	0	2
Comparex	629	312	0	0	0	283	0	0	0	119	1
British Telecom	625	0	0	0	0	0	0	293	331	0	-15
Getronics	601	0	0	72	60	117	24	87	174	66	21

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**Table 10: Computer and office equipment  
The ten largest European IT vendors, 1993**

(billion ECU)	Revenues (1)
IBM	18.8
Siemens-Nixdorf	5.4
Digital Equipment	4.9
Fujitsu & ICL	3.8
Hewlett-Packard	3.8
Groupe Bull	2.9
Olivetti	2.6
Compaq	2.3
Apple	1.7
Unisys	1.6

(1) Including software and services.  
Source: Eurobit

Office products represented 15 % (7.5 billion ECU) of the I.T. hardware market in 1994. The market declined by 2.3 % between 1992 and 1994 but is expected to grow by 4.1 % between 1994 and 1996. Whereas traditional office product categories such as typewriters (which went down by 14.4 % between 1992 and 1994) will further decline, there are growth opportunities, especially in the field of copiers which represent 54 % of the office products market. Major driving forces in this market segment are the transition from analogue to digital technology, the merging of traditionally separate applications such as telefaxing, printing and copying in multifunctional equipment, and electronic imaging.

#### Supply and competition

The computer and office equipment sector is a global industry with a high degree of international work-sharing and extensive international exchange and flow of goods and components. I.T. suppliers therefore have to be competitive not only in a given market area but on a global scale. Hence, regional economic factor conditions play a key role in decisions regarding manufacture localisation and sourcing. As Europe is the second largest world market for I.T. products all international suppliers are active on this market. European manufacturers of computer and office equipment have to supply their customers with price-competitive products. International cost differences therefore play a decisive role in sourcing and manufacturing decisions.

In addition, the market success of personal computers has changed the market environment substantially on the supply side. A high innovation rate, a price/performance ratio that continues to increase, short product life cycles of less than one year and the development of the PC to a high-technology

mass-market product, have brought about a need for modularisation of the PC design and economies of scale in manufacturing. It has also spurred a high degree of specialisation in specific PC components with fierce cost management. Together with European factor conditions in the 1980s, this development spurred out-sourcing and the transfer of manufacturing steps to countries such as Taiwan. Conversely, the shortening of the product life cycles and the increasingly consumer-driven market environment makes it necessary for I.T. suppliers to be close to the end markets in order to be able to quickly react to changing customer requirements and to ensure short delivery times. Hence, in the last years new manufacturing plants have been opened or have been expanded in the EU by international as well as domestic manufacturers. To some extent this development can be seen in the official statistics. Value added on production in constant prices fell from 43 % in 1984 to 32 % in 1994 in the EU. Meanwhile, this ratio remained more or less stable in the US (49 % in 1984 and 47 % in 1994), whilst in Japan it declined from 36 % to 31 %. Purchases of goods and services between 1984 and 1994 grew by 7 % per year in the EU compared to 4 % in the US and 10 % in Japan.

Not only have I.T. supply side conditions changed, but the customers' market environment has undergone substantial changes as well. In the multi-user systems market, direct sales dominate, whereas in the field of PC, peripherals and office products area a wide range of distribution channels have been created. In 1994, for instance, 25 % of the PCs for use in private homes were sold by PC dealers, 21 % by large-scale merchandisers, 18 % by advertiser resellers and 17 % by direct mail in 1994. Department stores and direct retail are additional channels. It is estimated that by 1996 large-scale merchandisers will be the largest channel for home-PC purchases.

#### Production process

The most notable development in the area of products and production recently is the increasing convergence of the office, computer, telecommunications and consumer electronics sectors with regard to technology, media and applications. Whereas in the 1980s a move from mechanical to digitalized solutions for office applications occurred (typewriters/word processing, cash registers), in the 1990s we are witnessing the shift from analogue/optical to digital technologies. More and more copiers, scanners, telefaxes and printers already incorporate the same technology and offer multifunctional applications and use. New PC generations now incorporate as integral parts communication, video and sound product features in order to fulfil the requirements for multimedia applications. CD-ROM's are used in the consumer electronics field as well as in the I.T. environment. Requirements in speed and memory capacity due to software needs, are increasing further, as are information and communication data flows,

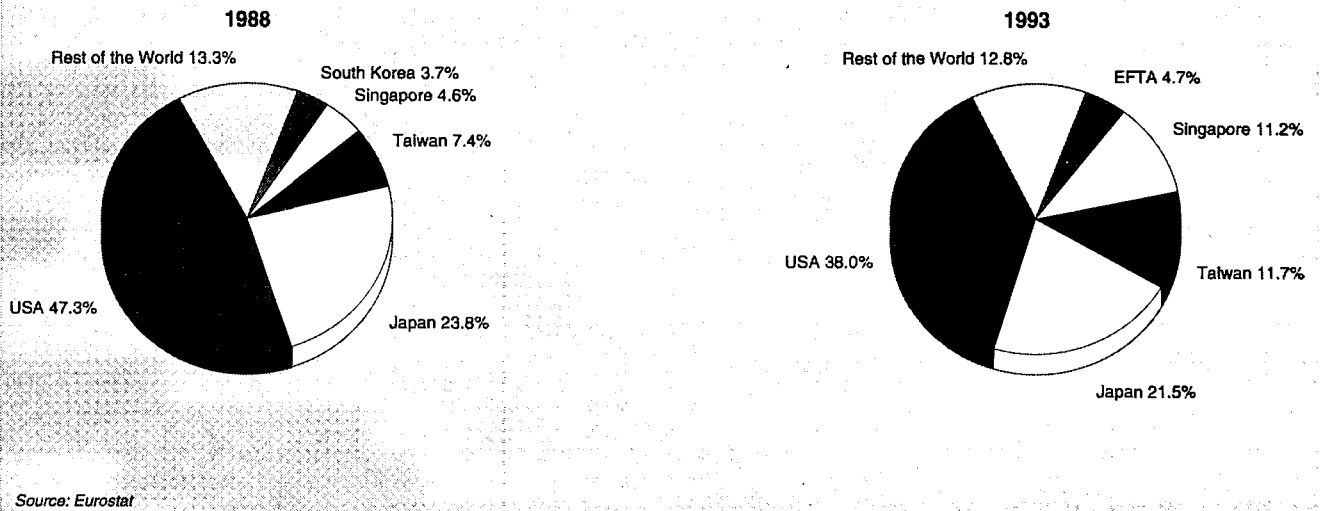
**Table 11: Computer and office equipment  
The ten largest companies worldwide, 1993**

(million ECU)	Country	Sales	Profit	Employment (thousands)
IBM	USA	53 558	-6 918	267
Toshiba	JPN	36 650	96	175
Fujitsu	JPN	24 845	-298	164
Hewlett-Packard	USA	17 350	1 005	96
Canon	JPN	14 096	162	65
Digital Equipment	USA	12 272	-214	94
Ricoh	JPN	7 664	75	52
Apple Computers	USA	6 812	74	15
Unisys	USA	6 612	482	49
Compaq Computer	USA	6 141	395	11

Source: Fortune 500



**Figure 6: Computer and office equipment  
Destination of EU exports**



especially with regard to image processing. Moreover, portable computers are creating new requirements for wireless data transmission.

### INDUSTRY STRUCTURE

#### Companies

In 1990, there were 7 600 computer and office equipment manufacturers in the EU. 89 % of these enterprises had less than 20 employees and contributed 5 % of the turnover and 8 % of the employment in the sector. Enterprises with 100 or more employees accounted for 90 % of the turnover and 85 % of the employment. The top ten manufacturers in each EU member state in represented a total market share of 68-82 % in 1991. In 1993, these market shares had fallen to 51-63 %, due to the fact that new domestic and international manufacturers entered the market whilst others re-focused their business.

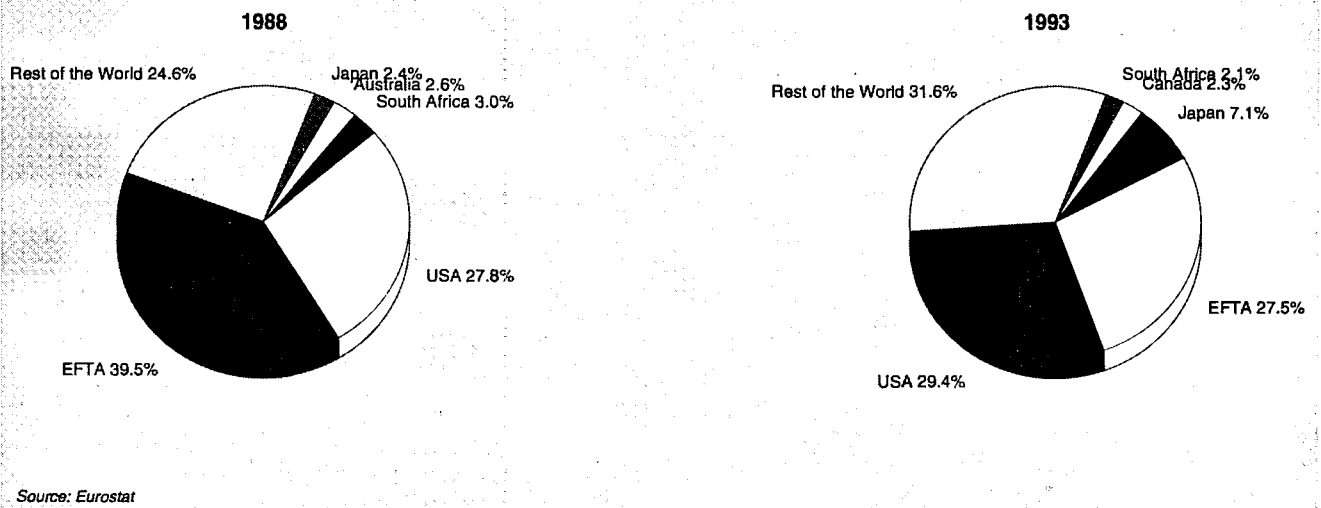
With revenues of 22 billion US dollars, IBM was the largest I.T. manufacturer in Europe (including Software and Services)

in 1993, followed by Siemens-Nixdorf at 6.3 billion US dollars and Digital Equipment at 5.7 billion US dollars. Groupe Bull was the sixth largest with revenues of 3.4 billion US dollars followed by Olivetti with revenues of 3.1 billion US dollars. Compaq and Apple as PC manufacturers followed with 2.0 and 1.9 billion US dollars, respectively.

#### Strategies

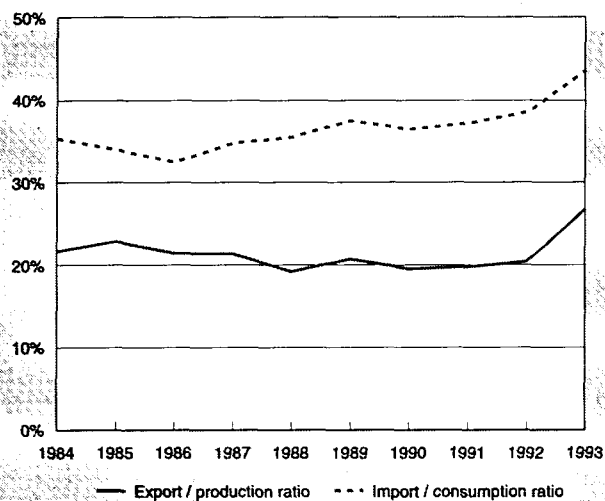
The recent market developments show that company strategies are not homogeneous. Companies are re-focusing on their core business or are placing strategic emphasis on specific market segments or links of the market chain. Manufacturers have thus focused on providing complete hardware and software solutions for the banking and finance sectors, or begun to provide PCs for the home market. The merging of computers and telecommunications, and the increasing customer demands with regard to information and communication, has resulted in the integration of computer and telecommunications hardware, software and services solutions in areas such as multimedia and portable computers. Large and globally oriented customers furthermore require appropriate solutions to meet

**Figure 7: Computer and office equipment  
Origin of EU imports**





**Figure 8: Computer and office equipment  
Trade intensities**



Source: DEBA

their computer and communication requirements. Due to changing customer preferences and the growing SOHO market, the choice and mix of distribution channels has become an increasingly strategic issue. Whereas technological and strategic alliances and joint ventures within the sector dominated until recently, alliances with related industries, such as media and information manufacturers and distributors, are gaining increased significance.

### Impact of the Single Market

The European computer and office equipment industry is dominated by non-European multinational companies mainly, American in the case of computers and Japanese in the case of other office machines, many of which have production facilities in Europe.

The free movement of goods within the single market has therefore been of at least as much benefit to American and Japanese companies as to European ones, especially as Japanese and American companies operate Europe-wide whereas European companies have until recently tended to concentrate more on their national markets.

The opening up of public procurement has also been of benefit to non-European companies. Public administrations are major clients for computers and office equipment. However, although "national champions" can no longer be favored as in the past, they do have local knowledge and contacts which makes them attractive to foreign partners (ICL-Fujitsu, Bull-NEC, Olivetti-DEC).

The computers and office equipment industry is a global industry. Standards are established world-wide, often de facto by a dominant supplier (IBM, Microsoft). Therefore Single Market measures have had little impact in this respect.

A feature of the internal market which has a negative effect on the industry in Europe is the imposition of external tariffs on electronic components. These are blamed for the fact that prices of equipment such as PC's are higher in Europe than in the US.

### ENVIRONMENT

I.T. is making an essential contribution to breaking the link between economic development and the consumption of natural resources through the integration of 'raw material information' into products and processes. It thereby helps to reduce the amount of raw material and energy used in industry pro-

duction and administration as well as to reduce the pollution caused by these activities.

The I.T. industry itself has developed recycling concepts which take account of the complete life cycle of a product, beginning with the design and development of the hardware, through environmentally friendly production, to the recycling of used equipment. In addition, methods of integrated environmental protection, such as environmental auditing and efficient resource management, are increasingly being applied.

In 1994, the European commission initiated a Priority Waste Streams project on waste from electrical and electronic equipment. Among other tasks the project addresses the relevant technical, logistical and financial issues in order to fully analyse the waste stream and to identify the areas which may have significant repercussions on end of life issues. European I.T. Industry supports this initiative in view of its lead waste experience in recent years.

### REGULATIONS

Regulation of I.T. products is based on Directives that mainly deal with technological parameters on safety, compatibility and access in the field of telecommunications. By now, all relevant technological regulations are based on EU Directives such as the Low Voltage (73/23/EEC), the Electromagnetic Compatibility Directive (89/336/EEC) and the Telecommunications Terminal Equipment Directives. For technical requirements, there are European harmonised standards such as the EN 60950 for low voltage and the EN 50022 for EMC. By 1996, at the latest, I.T. products will have to be marked with the CE sign to prove their legal and technical conformity.

### OUTLOOK

It is expected that the computer and office equipment hardware market will grow by 5 % per year between 1994 and 1996. Moderate growth in production is anticipated as well. However, these growth rates do not give a true picture of the further growing importance and development of the sector. Whereas until recently I.T. mainly penetrated the professional business environment, I.T. solutions have entered private homes and thereby begun to influence the whole social environment. The industry has introduced the technological and application solutions for the growing needs of the professional and private customer for mobile computing, multimedia information and communication purposes, which has created significant potential for growth in the coming years. The setting-up of a pan-European information infrastructure as a requirement for speedy communication and massive data flows will further support this development.

Written by: Eurobit

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# Telecommunications equipment

## NACE 344

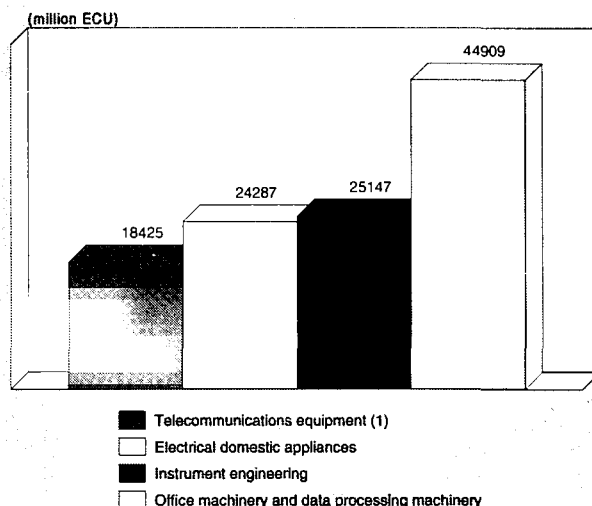
In 1993, the value of EU production was 18 425 million ECU, which was 16 % more than in the USA and 53 % above that of Japan. Telecommunications equipment is one of the few high-technology sectors where the EU trade balance is positive and European vendors have a sound position in the world market.

European telecommunications technology is in a strong position with respect to other competitors in the world market. This is reflected by significant developments of standards, such as ISDN (Integrated Services Digital Network), GSM (Global System for Mobile Communication) and DECT (Digital European Cordless Telecommunication), all of which originated in Europe. The European telecommunications industry is thus competitive in international terms and is holding its ground world-wide.

The large national telecommunications markets in the EU (but also the USA and Japan) have historically developed as closed markets run by public operators, usually with strong links to domestic manufacturers. Thanks to EU legislation and the process of products standardisation, national markets are now opening up. The other two segments of the market, business and consumers, are already open and highly competitive, and, although smaller than the former, are growing faster. Demand is stimulated by the development of two main categories of services, data and voice network services and mobile communications.

In the next few years, the trend towards globalisation, rising competition, increasing supplier concentration and, eventually, lower employment in the sector will be accentuated. The European public telecommunication operators (most of which will be privatised) will increasingly act like private customers vis-à-vis manufacturers. The telecommunications equipment industry is likely to continue to grow in the next few years. Advanced telecommunication services will acquire strategic importance for the economic development of nations and will drive demand for telecommunication systems, such as ATM (Asynchronous Transfer Mode), capable of transmitting high-speed multimedia services.

Figure 1: Telecommunications equipment Production in comparison with related industries, 1993



(1) Excluding Portugal, Greece and Luxembourg.

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995, DEBA

## INDUSTRY PROFILE

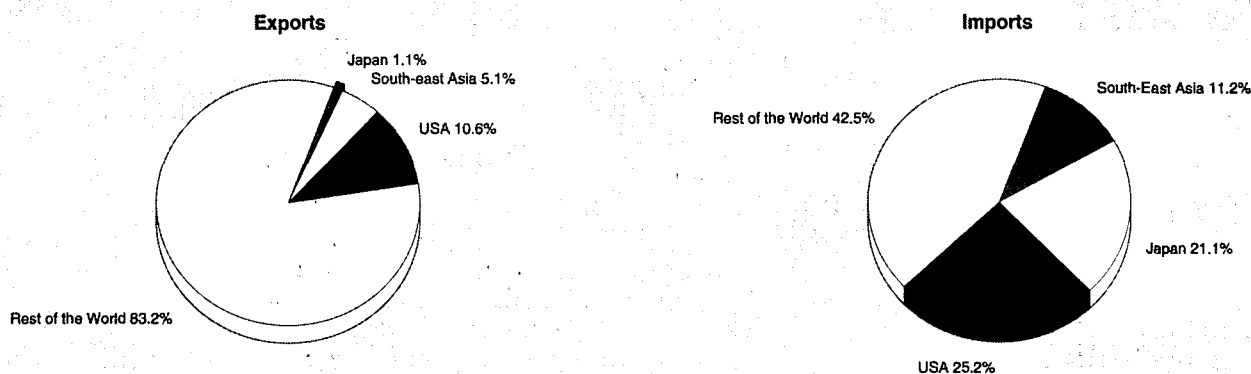
### Description of the sector

The main product categories manufactured by this industry are: public and private switching equipment, radio communication and public broadcasting equipment, user terminals, such as fax and telex machines, telephones, equipment for data and mobile communication; and transmission equipment for cable, fibre, microwave, satellite, etc.

The production of telecommunications equipment is a strategically important industry as it is becoming more and more interconnected with other technologies and industries, such as electronic components, computers, aerospace (satellites), software, consumer electronics and, more recently, television, media and publishing industries.

In previous years, telecommunications equipment was mostly sold to domestic public operators and the range of equipment and terminals offered to the private sector was very limited. Since then, telecommunications equipment manufacturing has

Figure 2: Telecommunications equipment Destination of EU exports and origin of EU imports, 1993



Source: DG III

**Table 1: Telecommunications equipment  
Main indicators in current prices**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Market size (1)	13 777	13 735	14 165	16 266	18 171	18 939	19 878	18 598	16884
Production (1)	14 913	14 678	14 776	15 928	18 010	18 808	19 947	19 007	18425
Extra-EU exports	4 770	4 304	4 615	3 787	4 663	4 558	5 215	5 850	6930
Trade balance	1 570	1 241	1 029	91	111	297	384	718	1409
Employment (thousands) (2)	889.6	905.2	912.3	901.3	926.2	924.2	881.0	843.8	808.9

(1) Excluding Portugal, Greece and Luxembourg.

(2) NACE 344: includes measuring, recording and electro-medical equipment.

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995, DG III, DEBA

become a multi-product, multi-market industry, with the scope of equipment ranging from large public switching installations to small PABX (Private Automatic Branch Exchange) for private offices, and from mobile networks - used by both public and private operators - to video conference equipment for business customers and video telephone for individual customers. The importance of business and consumer markets is growing and the market as a whole is becoming global and highly competitive. Also, there is a trend towards greater functionality at network periphery, i.e. terminals and private networks. Because of the rapid changes in digital technology, with microcomputer technology in the lead, the life cycle of telecommunications products is dramatically being reduced.

In 1993, the total value of the telecommunications equipment market was 24.6 billion ECU (source: EITO). Extra-EU exports amounted to 6 930 million ECU, contributing to a trade balance surplus of 1 409 million ECU.

Production in the telecommunications equipment industry is very high also in comparison with other sectors of the industry. In 1993, production in the EU telecommunications industry amounted to 18 425 million ECU, which equalled approximately 75 % of electrical domestic appliances production, 73 % of instrument engineering and 41 % of office and data processing machinery. Germany is the largest EU market (5 406 million ECU in 1993) and the largest EU supplier (6 166 million ECU), followed by France, Italy, the UK, Spain and Belgium.

Due to the strong growth of both the public and private telecommunication services markets, the EU telecommunications

equipment market will expand quickly in the next few years. It is projected that it would grow at an average rate of 8.6 % in 1994 and in 1995, and by 8.8 % in 1995 and 1996, in current prices.

#### Recent trends

Between 1984 and 1989, the EU telecommunications equipment market expanded rapidly, with an average annual growth rate of 8.9 % in current prices. However, the growth rate fell markedly from 1989 to 1993, to 2.4 %, due to the increase in competition and the fall in prices linked to the full introduction of microelectronics technology in every telecommunications segment.

Due to increasing automation, EU employment has been declining since 1988 and in 1993 reached a total of 808 900 employed, which was approximately 4 % less than the previous year.

#### International comparison

In 1993 EU production amounted to 18 425 million ECU, which was 16 % more than in the USA and 53 % above that of Japan. The ex-EFTA countries, Canada, South Korea, Taiwan and Brazil are the other large producers.

European manufacturers maintain prominent positions on the world market. Four European companies (Alcatel (F), Ericsson (S), Siemens (D) and Bosch (D)) rank among the top ten in the world along with four North American (AT&T, Motorola, Northern Telecom and IBM) and two Japanese companies (NEC and Fujitsu).

**Table 2: Telecommunications equipment  
European production, breakdown by sector, 1993**

(million ECU)	France (1)		BR Deutschland		Italia (1)		United Kingdom	
	Production	Market	Production	Market (1)	Production	Market	Production (2)	Market
Radio communications	2 265	2 242	N/A	1 761	943	1 023	2 039	1 811
Public broadcasting	N/A	N/A	N/A	N/A	N/A	N/A	166	172
Mobile radio telephones	N/A	N/A	695	N/A	N/A	N/A	254	N/A
Switching equipment	1 594	1 450	2 139	1 412	1 465	1 462	777	763
Facsimile machines	137	65	86	372	35	84	44	120
Other data and text terminal equipment	275	272	41	92	N/A	N/A	85	107
Transmission equipment	688	575	1 547	1 434	N/A	N/A	306	324
Telephone sets	535	501	N/A	N/A	284	344	267	336
Other telecom equipment including telephone answering machines	282	169	396	496	810	698	64	102
Accessories and parts	470	182	882	293	249	273	32	181
Total telecommunications	3 980	3 214	6 166	5 406	2 844	2 862	1 576	1 931

(1) Data for radio communications include mobile radio telephones and public broadcasting.

(2) Mobile radio telephones, 1992.

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995



**Table 3: Telecommunications equipment  
Telecommunications production by Member State**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België	683	755	692	615	787	891	976	879	1091
Danmark	114	129	110	94	113	103	98	97	112
BR Deutschland	4 331	4 082	4 208	4 271	4 411	4 733	5 931	6 151	6166
España	710	756	926	1 405	2 093	2 388	2 138	1 509	1404
France	3 491	3 549	3 462	3 385	3 544	3 653	3 752	3 937	3980
Ireland	199	203	203	223	248	214	244	216	277
Italia	2 141	2 212	2 353	2 716	3 448	3 859	3 997	3 773	2844
Nederland	569	576	651	654	733	820	815	832	978
United Kingdom	2 673	2 416	2 171	2 566	2 634	2 147	1 997	1 612	1576

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995

European telecommunications technology is highly competitive on the world market. This is reflected by major developments such as ISDN, GSM, DECT, all of which originated in Europe. Hence, European telecommunications industry is competitive in international terms and is holding its ground world-wide.

In broad terms, the USA is the world leader when it comes to new products and technologies targeted at sophisticated business users, such as high-speed data transmission systems, whilst Japanese suppliers are ahead as far as consumer products (e.g. fax machines and telephones) are concerned. The US telecommunications market claims to be very open to foreign competition. Northern Telecom, the Canadian telecommunications company, is challenging AT&T to become the major supplier of both services and equipment. European companies, such as Siemens and Ericsson, compete in this sector as well. Moreover, Alcatel, Ericsson and Nokia (SF) compete with Motorola for supplying US mobile services operators with cellular networks for mobile communications. The Japanese market, where NEC and Fujitsu are the main suppliers, is almost closed to foreign competition, although imports from the USA (in particular) and the EU are growing as a result of moves towards liberalisation of Japanese telecommunications services.

#### Foreign trade

Since 1984, the EU trade balance in telecommunications equipment has been positive, which is quite an exception compared to other high technology sectors. Moreover, the surplus almost doubled from 1992 to 1993. However, the surplus was much higher in the early 1980s: in 1984 the export/import ratio was 1.66 compared to 1.26 in 1993.

The USA (at 11 % of the total EU exports) is the single most important destination of EU exports. Japan and South East

Asia account for only 1 % and 5 %, respectively. The rest of the world (i.e. the ex-EFTA countries, China, India and other developing countries) represents the biggest share of exports (83 %). The USA (25 %), Japan (21 %), and South East Asia (11 %) are the main exporters to the EU. A weakness in the external trade structure of the EU is that exports are directed mainly towards less developed countries, whilst imports mainly come from the most industrially advanced nations (Japan and USA). The EU countries mainly export large network systems (i.e. switching, transmission and radio communication related equipment), whereas imports are dominated by fax machines and other terminals, mainly from Japan and South East Asia.

#### MARKET FORCES

##### Demand

The market for telecommunications equipment may be divided into three overlapping categories. The first, and by far the largest, is public switching and transmission systems for traditional telephone networks. The other two, the business and the consumer markets, are smaller but are growing faster. The major national telecommunications markets in the EU (but also in the USA and Japan) have historically developed as closed markets dominated by public operators, usually with strong links to domestic manufacturers. Thanks to EU legislation and the process of product standardisation, national markets are now opening up.

The business and consumers market segments, are already very open and highly competitive. Demand is supported by the development of two main categories of services: data and voice network services and mobile communication. Demand for mobile services stimulates the markets for infrastructure and services. Demand for business data and voice communi-

**Table 4: Telecommunications equipment  
Production of major producers in the World market (1)**

(million ECU)	1985	1990	1993
EU (2)	14 913	18 808	18 425
USA	22 229	12 544	15 757
Japan	7 956	11 478	12 022
EFTA	2 786	3 132	2 898
Canada	1 770	1 892	1 782
South Korea	1 008	1 379	1 505
Taiwan	675	1 030	1 109
Brazil	974	1 037	1 056

(1) The contents of this table has been strongly influenced by exchange rate fluctuations

(2) Excluding Greece, Luxembourg and Portugal.

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995

cation networks is also very dynamic because of the increasing need of EU companies to co-ordinate their activities, either at the national or international level. Whereas some segments of the telecommunications equipment markets have already reached, or are in the process of reaching, saturation (e.g. modems, fax machines, electro-mechanical multiplexer and private exchanges), new markets are emerging, such as frame relay systems (for remote connections between local area computer networks), digital PABX for connecting both computers and telephones, wireless PABX and digital or multifrequency telephones, as well as ATM switching equipment for private and public multimedia networks.

### Supply and competition

Over the last decade, labour productivity has risen significantly, due to the rapid increase in automation. Between 1990 and 1993, labour productivity increased by 19 %, whereas unit labour costs index grew by only 2.2 %, despite rising wages.

Equipment prices are falling very fast, similar to price developments in computer products, because of rapid innovation in basic fields, such as microelectronics and optics. Price declines are pronounced both in the consumer market and in the business market. Because of global competition, it is the opinion of the author that there would be no more than five or six full-range suppliers of public and private telecommunications systems by the year 2000, but telecommunication markets are expanding so quickly and are becoming so segmented that it is now becoming apparent that it would be inconceivable for a handful of suppliers to control the whole market.

Generally speaking, domestic manufacturers traditionally have strong links with the national telephone operators, i.e. the main buyer of telecommunication systems and products. In the EU, as in the USA and Japan, public operators supplying basic telecommunication services have long-standing relations with their suppliers. Market accessibility is associated with the share of the national telecommunication market held by the largest domestic supplier. Market accessibility is e.g. around 50 % in France and Sweden, and roughly 40 % in Italy.

Due to recent EU legislation, and the projected privatisation of nearly all EU telecommunication operators in the next few years, the link between domestic operators and manufacturers will become weaker. Newly privatised operators will demand faster returns on investment and higher profits, also in the short term, and will push for increasing competition between manufacturers. Hence, barriers to domestic competition will fall in the next years, and competition will spread also to suppliers of telecommunications equipment to national operators.

In the business and consumer arena there is already stiff, global competition. In the dynamic field of data communications equipment for business customers, the highly inno-

vative US networking companies, originating in the computer sector, are threatening to marginalise the European equipment suppliers. It is interesting to note that the success of the innovative US companies has been supported by the more favourable US regulatory market regime. Systems are increasingly based on sophisticated computer software, and networking companies, such as Novell, Cisco Systems and Synoptics (all USA) are bringing products to the market faster than the largest European companies with a background in telecommunications. For this reason, the leading equipment manufacturers are hoping that telephone operators will commit themselves to broadband networks, which require high-capacity systems, such as ATM, that can switch and transmit large quantities of voice, data and image information. These systems are increasingly requested for delivering interactive services both to the business and consumer markets, e.g. video conference and video-on-demand services.

In the consumer market, the competition from Japanese and South East Asian companies is becoming stiffening. Many low value added products, e.g. telephone hand sets, are manufactured in East Asia at low prices. However, with regard to high value added products, such as cellular telephones, Ericsson, Motorola and Nokia are the leading suppliers in the world. Nevertheless, as consumer electronics companies (e.g. Sony) diversify into mobile telephones, competition with telecommunications companies will increase.

### Production process

Product costs are increasingly being dictated by high R&D costs for hardware and software. In telecommunications systems, the R&D costs (depending on the volumes produced) already notably exceed the value added generated by manufacturing. It is estimated that investments in R&D to develop the latest generation of digital public switching were around 700 million ECU. R&D subsidies, agreements on pre-competitive research between EU telecommunications manufacturers, or free technology transfer from network operators, will therefore continue to influence competition substantially.

Demand for intelligent services (e.g. credit card calling), provided by the public networks both to businesses and private consumers, is becoming stronger. Manufacturers therefore must increasingly provide sophisticated software integrated into hardware systems (e.g. in switching) and into networks. Software development has become one of the most distinctive and important feature of telecommunications equipment and suppliers.

The most innovative and sophisticated telecommunication technologies currently under development are SDH (Synchronous Digital Hierarchy) and ATM, which is a switching technology for broadband multimedia communications, such as video-on-demand or cable TV. SDH is a high-speed transmission technology that is increasingly being employed by public operators in order to replace or supplement existing transmission systems. Moreover, in the next few years, public operators will adopt ATM. Companies have already begun to

**Table 5: Telecommunications equipment  
External trade in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	4 404	4 770	4 304	4 615	3 787	4 663	4 558	5 215	5 850	6 930
Extra-EU imports	2 659	3 200	3 063	3 586	3 696	4 552	4 261	4 831	5 132	5 520
Trade balance	1 745	1 570	1 241	1 029	91	111	297	384	718	1 409
Ratio exports / imports	1.66	1.49	1.41	1.29	1.02	1.02	1.07	1.08	1.14	1.26
Terms of trade index (2)	95.1	90.3	97.1	101.4	97.9	95.8	100.0	99.4	101.6	100.8

(1) A change in trade nomenclature in 1988 makes a comparison of pre-88 and post-88 figures hazardous.

(2) NACE 344: Includes measuring, recording and electro-medical equipment.

Source: DG III, Eurostat

**Table 6: Telecommunications equipment  
Trade, breakdown by sector, 1993**

(million ECU)	Extra-EU exports	Extra-EU imports	Trade balance	Ratio exports / imports
Switching equipment	1 650	576	1 074	2.87
Transmission equipment	1 361	906	455	1.50
Radio-related equipment	274	167	107	1.64
Components for telecom equipment	374	427	-53	0.88
Telecom terminals	3 271	3 444	-173	0.95
Facsimile terminals including parts	457	1 120	-664	0.41
Other telecommunications terminals	2 815	2 324	491	1.21
<b>Total telecommunications equipment</b>	<b>6 930</b>	<b>5 520</b>	<b>1 409</b>	<b>1.26</b>

Source: DG III

install ATM systems to increase the speed and widen the range of services of their private networks.

## INDUSTRY STRUCTURE

### Companies

European companies are very well positioned on the global market of telecommunications equipment and, generally speaking, all of them have seen solid growth in revenues and, to less extent, in profits in the last years.

As precise rankings can quickly become outdated, the largest manufacturers are better defined in broad groupings: In the first group we find Alcatel, Siemens, the German group diversified into energy, industrial equipment, computers, and semiconductors, and AT&T.

In the second group we find Motorola, NEC, Ericsson and Nortel. Ericsson depends on its domestic Swedish market for less than 20 % of its total revenues and has operations in 100 countries all over the world. In the past few years, the company has increased its revenues mainly thanks to the growth of its radio communication operations. Ericsson and Motorola are firmly established as the leading suppliers on the world market for cellular telephone networks.

In the third group we find Fujitsu, Nokia and Bosch. Nokia showed big increases in its telecommunication revenues in 1993 and 1994, thanks to its strength in the mobile communications segment, and is the largest supplier of cellular telephones in the world, along with Motorola.

In 1994, the Italian company Italtel set up a joint venture with Siemens with the aim to increase technological strength and to expand on foreign markets. In order to expand, EU companies will have to take advantage of the opportunities

on the markets in Asia and in Eastern Europe. Alcatel, Siemens and Ericsson are already well positioned in China, India and in the Eastern European countries. Siemens is using its position in East Germany for leverage to get the biggest share of orders for Deutsche Bundespost Telekom's massive upgrading of the public network in that region.

### Strategies

The largest European companies have to balance the goals of expanding into new business and consumer markets, such as mobile communications and data services, and continuing to look after existing customers, the national telephone operators. Rapid technology innovation and the creation of international commercial operations and production units are, and increasingly will be, the most important challenges for telecommunications companies. India, China and other Asian markets may represent great opportunities as they grow at annual double-digit rates. Telecommunications companies can thereby escape the risks linked to the saturation of the public sectors of the markets (telephony) in the more industrialised countries. Newly Industrialising Countries will develop their fixed and mobile digital networks with the technological and financial help of the large EU players, such as Siemens, Alcatel, Ericsson and Nokia.

The trend towards further market concentration continues through mergers and acquisitions, mainly directed towards the acquisition of new technology and penetration of foreign markets, which have traditionally been dominated by domestic companies. In general terms, to win orders in foreign markets, a supplier has to form a joint venture or buy a stake in one of the established suppliers. In 1994, Siemens and Italtel set up a new fifty-fifty joint venture after the failure of the previous one, in order to get a major share of the Italian Market, whilst strengthening their exports from Italy to foreign markets. Many

**Table 7: Telecommunications equipment  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992
Labour productivity index (2)	72.4	77.0	77.9	82.6	90.6	94.7	100.0	105.4	112.0
Unit labour costs index (3)	96.8	96.8	99.7	102.1	99.1	100.2	100.0	103.5	103.5
Total unit costs index (4)	89.5	91.8	93.1	95.1	96.5	98.8	100.0	102.5	103.4
Gross operating rate (%) (5)	13.3	12.8	12.0	11.5	11.8	11.2	11.0	10.3	8.9

(1) Some country data have been estimated. NACE 3440: includes measuring, recording and electro-medical equipment.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 8: Telecommunications equipment Production specialisation (1)**

(ratio)	1985	1993
Belgique/België	1.34	1.66
Danmark	0.48	0.37
BR Deutschland	0.98	1.02
Hellas	N/A	N/A
España	0.69	1.07
France	1.19	1.12
Ireland	1.42	1.32
Italia	0.95	1.07
Luxembourg	N/A	N/A
Nederland	0.76	1.10
Portugal	N/A	N/A
United Kingdom	1.02	0.55

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU.

Source: Elsevier Advanced Technology, Oxford, UK - Yearbook of World Electronics Data 1995, DEBA

joint ventures, mergers and acquisitions have taken place in the last few years for the same reasons (e.g. between Siemens and GPT of the UK, Northern Telecom and STC of the UK), and supplier rationalisation is far from over as well. Another factor behind the increasing concentration in the industry is the need to find a partner to share the burdens of high R&D expenses with. Alcatel and Sprint (USA) set up a joint venture to develop a new ATM switching system. Many telecommunications companies try to set up technological partnership networks with computer companies in order to share the costs of R&D in new products and systems (e.g. ATM) and for entering new markets, such as video-on-demand, and home and office automation.

### Impact of the Single Market

Traditionally each national state had its own telecommunications equipment industry supplying its own, usually state-owned, monopoly telecoms operator with everything from subscriber equipment to cables and public exchanges and on an exclusive basis. This traditional structure is in the process of totally disappearing under the pressure of technical developments, telecoms deregulation and the advent of the Single Market. A European-wide, and even a global, industry is taking its place.

The most spectacular and influential technical development was the advent of the digital exchange in the 1970's. Only three or four groups in Europe had the financial and technological strength to develop these systems. To recuperate their investment they have been obliged to become multinational and sell world-wide. The pressure of increasing R&D expenditure continues to affect the structure of the industry.

The deregulation of the telecommunications market is destroying the monopolies of the state controlled operators in the provision of subscriber equipment, private networks, data transmission, mobile communications and, by 1998 at the latest, the basic fixed voice network. This means equipment suppliers now have a larger but much more competitive potential market with many more network operator clients and the possibility of selling subscriber equipment direct to the final user. Moreover, the range of services being offered (e.g. Video conferencing, video on demand) by operators is growing and therefore so is the demand for equipment.

Finally, specific Single Market measures are having widespread repercussions. Public procurement regulations now call for open tenders rather than the private deals previously negotiated between operators and equipment suppliers. Technical

harmonization is in the process of creating Europe-wide, indeed world-wide, markets for equipment such as GSM terminals.

### REGULATIONS

The Single European market should be increasingly favourable for the telecommunications companies since it will help them to achieve economies of scale through standardisation of network systems and terminal interfaces. ETSI (European Telecommunications Standard Institute) is putting great effort into establishing common European standards, although full European standardisation will be possible only when new systems, such as narrow band ISDN, broadband ISDN and GSM have been introduced and widely diffused in all EU countries. The importance of supporting common European standardisation is displayed by the success of the GSM digital mobile radio system: in addition to 22 European countries, 32 non-European countries have opted for, or are considering to introduce, the European standard (as well as European equipment).

Previous opinions of the EU Commission against vertical integration between network operators and domestic equipment manufacturers are currently being re-examined due to the trend towards global competition with integrated companies outside the EU, and the ongoing privatisation of EU telecommunication operators. Other important EU Regulations concern the opening of public procurement contracts for bidding by EU and non-EU companies. Generally speaking, the basic principle of the mutual opening of markets and non-discrimination must apply not only within the EU, but also in other markets of the world. National markets must be accessible under fair and non-discriminatory conditions. It is generally acknowledged that until now it has not been possible to create all the conditions for an effective open market in the public sector within the EU. Until 1995, the EU will continue to support the Race programme for advanced communication aimed at sharing the expenses for pre-competitive R&D. It is also promoting the new ACTS (Advanced Communication Technologies and Services) programme with the objective of speeding up the process of introducing harmonised advanced networks and services across Europe, and helping new commercial pilot projects in the new high-speed and multimedia technologies. Finally, also the programme ESPRIT is contributing to the creation of an effective open market.

### OUTLOOK

In the next few years, the major trends towards globalisation, rising competition, increasing concentration of suppliers and, eventually, lower employment in the sector will be accentuated. The European public telecommunication operators (nearly all of which will be privatised) will act more and more like private customers vis-à-vis manufacturers. However, the telecommunications equipment industry should grow in the next few years. As the Bangemann Report (issued by the European Commission) clarified, advanced telecommunication services will acquire strategic importance for the economic development of nations and will drive demand for telecommunication products and systems. Massive investment projects in new digital networks, such as ISDN, GSM and broadband multimedia networks for video-on-demand and cable TV services will be essential to the development of the equipment sector. However, it is likely that US and Asian companies will increase their market share in some of the fast growing EU markets, i.e. data communication and consumer products.

A promising product for the next few years, a result of the convergence of computers, consumer electronics and telecommunications technologies, is the PDA (Personal Digital Assistant), a pocket personal computer that will also be able to communicate data and voice. Although the commercial launch of certain PDAs that do not yet match the user requirements

has met with some failure, there are few doubts that PDA will become the next generation of advanced mobile telephones. For the rapid growth of the sector, the promotion of new applications by the EU and the execution of pan-European pilot projects will be very important as well. Two prime examples are TEN (Trans-European Network) and EPAN (European Pilot ATM Network). The former will connect integrated broadband communication "islands", the latter will be used to test innovative technologies, such as ATM.

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# Consumer electronics

## NACE 345.1, 345.2

In 1992 and 1993, the EU market (and EU production) experienced difficult times because of over capacity, demand saturation, price erosion and economic recession in Europe. In 1994, the market saw some recovery and EU production grew by 8 % in comparison with 1993. Japanese companies dominate the audio-visual sector world-wide, especially in products such as VCRs and camcorders, whilst US companies play a marginal role. The top ten companies, out of which six are Japanese, two European and two South Korean account for three quarters of world production. Above all, EU companies are strong in the colour television segment. Apart from Italy, where there are still some medium-sized TV manufacturers, small and medium-sized European consumer electronics companies have almost disappeared because of the globalisation of the market. In 1994, thanks to their diversification in different segments of the market, cost rationalisation and the recovery of the EU economy, the most important EU companies indicated revenue and profit growth after having experienced decreasing profitability in the last few years. Because automation is increasingly dominating the production process, employment in the consumer electronic sector has decreased more than in the manufacturing industry as a whole since 1990. Employment is expected to maintain its downward trend over the next years. Product innovation, economies of scale, user friendliness, promotion and distribution are the key factors for success in the consumer markets. In the short term, the recovery of the EU consumer electronics companies hinges upon the successful completion of the vigorous restructuring programs undertaken by the leading companies in order to return to structural profitability. Companies are likely to concentrate on their core competence, but increasingly need to set up new joint ventures with companies that originate even from other sectors such as media, satellite and cable broadcasters, computer and telecommunications as well. In the long term, awaiting the new era of multimedia, success will depend on the ability of EU companies to increase their global market share, to establish common and world-wide standards in satellite and cable digital TV and to market innovative products (such as the Digital Compact Cassette, the Compact Disc Interactive, widescreen receivers, Digital Audio Broadcasting and the Personal Digital Assistant).

### INDUSTRY PROFILE

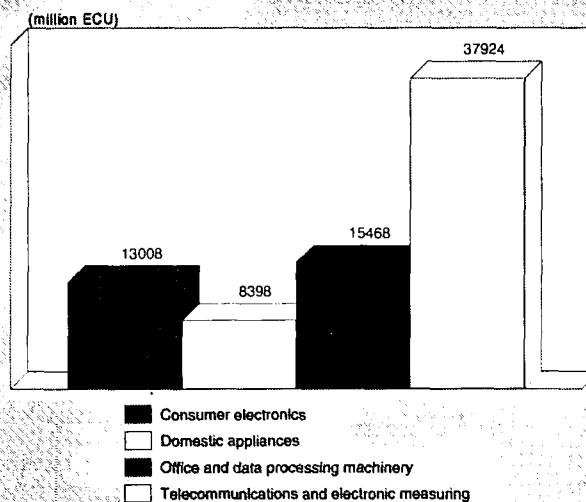
#### Description of the sector

The consumer electronics sector includes all audio-visual products for domestic use and their accessories, such as colour and monochrome televisions, video recorders, video cameras and camcorders, CD readers and audio equipment in general (NACE 345.1). Other 'brown goods' are classified in this sector (NACE 345.2), including cable terminals and pay-TV decoders. Other products are: antennas and satellite dishes, in-car entertainment and traffic guidance systems, mobile phones, home computers and telecommunications terminals. Video games is another category of increasing importance that may be included in the consumer electronics sector.

However, with the migration from analogue to digital technologies and the convergence of telecommunications, computing and consumer electronics technologies and applications, the traditional definition of consumer electronics as "brown goods" becomes less and less relevant.

Some products, such as TV sets and VCRs, are experiencing increasing market saturation and have entered the phase of maturity of their life cycle. After the launch of VCRs, walk-

Figure 1: Consumer electronics  
Value added in comparison with related industries, 1993



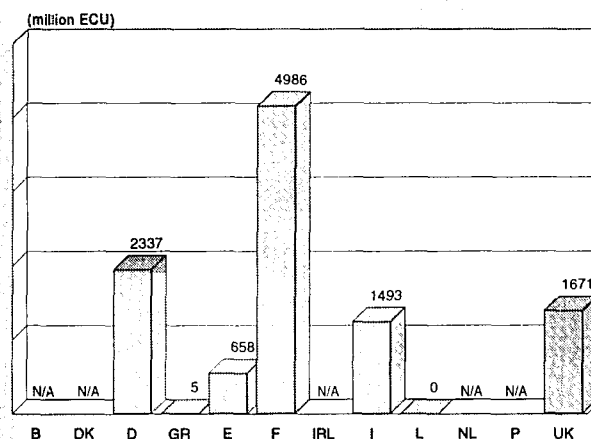
Source: DEBA

mans, compact discs, satellite dishes and camcorders in the 1980s, in the early 1990s innovations have been mostly incremental. Innovative products released in Europe in 1993, such as the Digital Compact Cassette (DCC) by Philips and the MiniDisc by Sony, are based on optical technology and will be the next generation of products for playing and recording music (though they are still far from the market success of the Compact Disc). The CD-I (Compact Disc Interactive), a new interactive multimedia system connectable to TV sets, is also based on optical technology but is still in the initial stage of market penetration. Widescreen (16:9 format) and improved definition television receivers have recently entered the market: in 1994, total European sales of 16:9 widescreen TV sets reached 150 000 units (100 000 in France only, as 16:9 broadcasting started there first).

#### Recent trends

Compared to the years of expansion in the period 1984-91, with growth at a compound annual rate of 9.7 %, EU consumption and production have experienced difficult times in

Figure 2: Consumer electronics  
Value added by Member State, 1993



Source: DEBA

**Table 1: Consumer electronics**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	32 873	47 098	51 855	54 440	57 314	53 726	51 660	56 349	59 900	64 700	70 300
Production	28 922	36 973	40 664	42 997	44 158	41 958	39 984	43 693	46 200	49 400	53 200
Extra-EU exports	3 705	6 577	7 399	7 959	8 409	8 888	10 789	13 176	14 900	16 700	18 800
Trade balance	-3 951	-10 125	-11 191	-11 442	-13 156	-11 769	-11 675	-12 656	-13 700	-15 300	-17 100
Employment (thousands)	406.1	389.8	387.4	382.7	375.8	352.8	331.1	315.5	311.0	312.0	314.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Consumer electronics (excluding music recording)**  
**Total market (sales to distribution channels) in volume**

(thousand units)	1990	1991	1992	1993	1994 (1)	1995 (2)
Colour televisions	20 558	20 462	20 785	20 395	20 246	20 805
Car radios (3)	16 147	16 708	15 785	13 732	13 726	13 925
CD players	10 661	14 066	16 571	17 319	17 926	N/A
Video tape recorders	11 581	11 069	11 199	10 821	10 768	11 049
Camcorders	2 475	3 320	3 319	2 711	2 327	2 401

(1) EACEM provisional results.

(2) EACEM estimates.

(3) Excluding sales to the German automobile industry as from 1992.

Source: EACEM

**Table 3: Consumer electronics**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	8.40	-0.69	4.26	-5.94
Production	6.31	0.53	3.70	-1.77
Extra-EU exports	12.49	11.70	12.14	18.77
Extra-EU imports	16.96	2.41	10.25	-3.18

(1) Some country data for apparent consumption and production have been estimated.

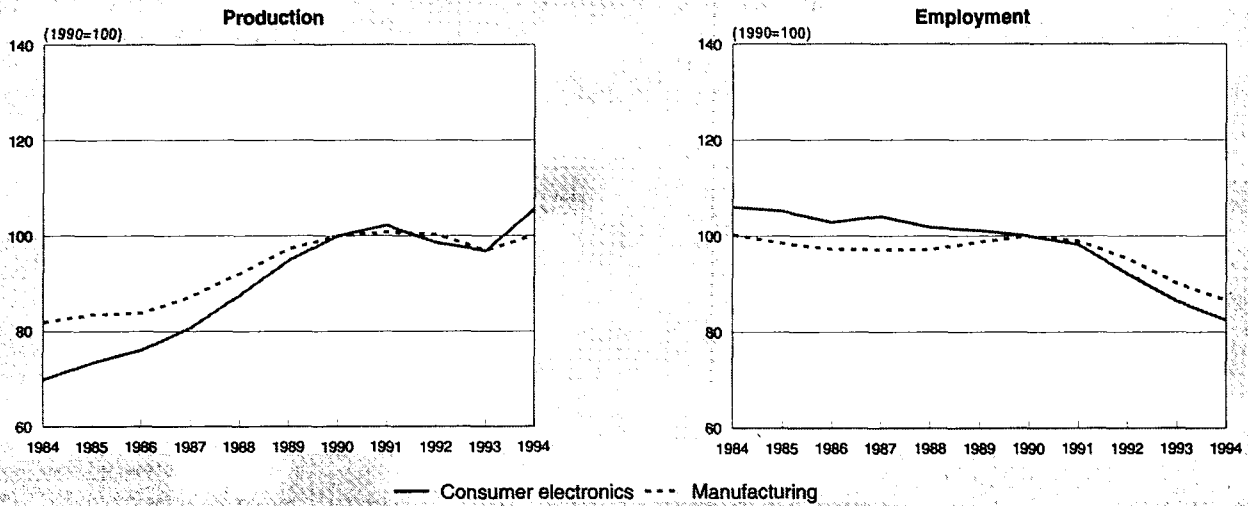
Source: DEBA

**Table 4: Consumer electronics**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 705	4 460	5 623	5 936	6 577	7 399	7 959	8 409	8 888	10 789	13 176
Extra-EU imports	7 656	8 193	12 073	13 696	16 702	18 590	19 401	21 565	20 657	22 464	25 832
Trade balance	-3 951	-3 733	-6 450	-7 761	-10 125	-11 191	-11 442	-13 156	-11 769	-11 675	-12 656
Ratio exports / imports	0.48	0.54	0.47	0.43	0.39	0.40	0.41	0.39	0.43	0.48	0.51
Terms of trade index	95.1	95.3	101.7	101.0	101.4	95.1	100.0	94.0	89.1	81.0	N/A

Source: DEBA

**Figure 3: Consumer electronics  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

1992 and 1993. By 1993, apparent consumption had dropped to 90 % of the consumption in 1991. In 1994, the sector began to recover, coming out of the general European industrial and economic recession. Production in 1994 grew by 8 % in comparison with the previous year. In 1993, the consumer electronics sector generated a value added of 13 008 million ECU, which was more than the domestic appliances sector but less than the office and data processing machinery sector and less than the telecommunications equipment sector as well. France contributed most of the value added (4 986 million ECU in 1993), followed by Germany (2 337 million ECU), UK (1 671 million ECU), Italy (1 493 million ECU) and Spain (658 million ECU).

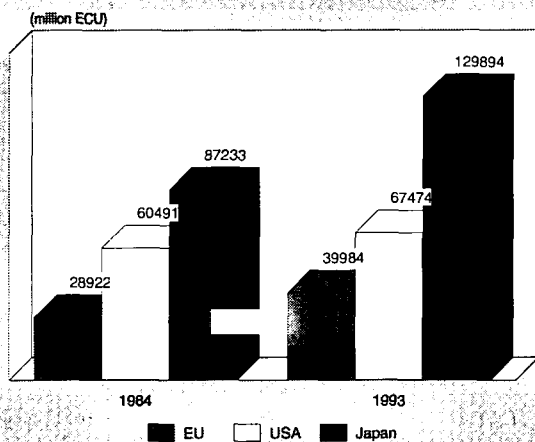
Employment maintained its negative trend. Since 1984, employment has declined every year except for 1987, and since 1990 it has been falling more than in the manufacturing industry as a whole. In 1994, EU employment in consumer electronics was 315 600, which was around 15 000 less than in 1993. Employment is expected to continue to fall in the

next few years. In spite of increasing extra-EU trade exports (in 1993 they amounted to 10 789 million ECU), the trade balance deteriorated every year between 1984 and 1991. In 1992 and 1993, the trade deficit (11 769 million and 11 675 million ECU, respectively) decreased in comparison with 1991.

**International comparison**

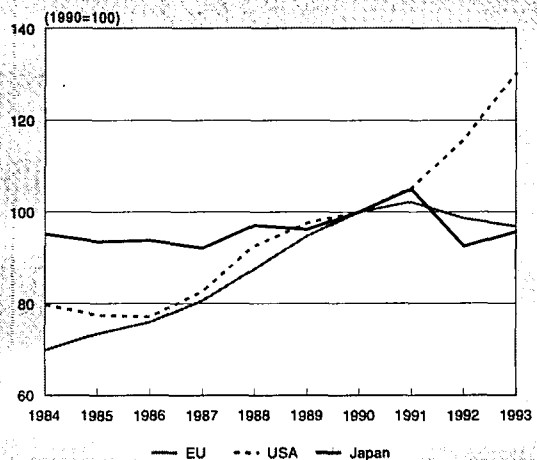
Japanese companies dominate as producers of consumer electronics goods for the world market. In 1993 the Japanese production value was nearly twice as high as that of the USA and more than three times as high as in the EU. In the audio-visual sector, Japanese suppliers control more than 99 % of the domestic market but export around 25 % of their production. Moreover, Japanese companies account for approximately half of the production in the USA and one quarter of the production in Europe. It is estimated that EU companies manufacture around 16 % of all audio-visual products in the world, whilst US companies produce 8 %. South Korean com-

**Figure 4: Consumer electronics  
international comparison of production in current prices**



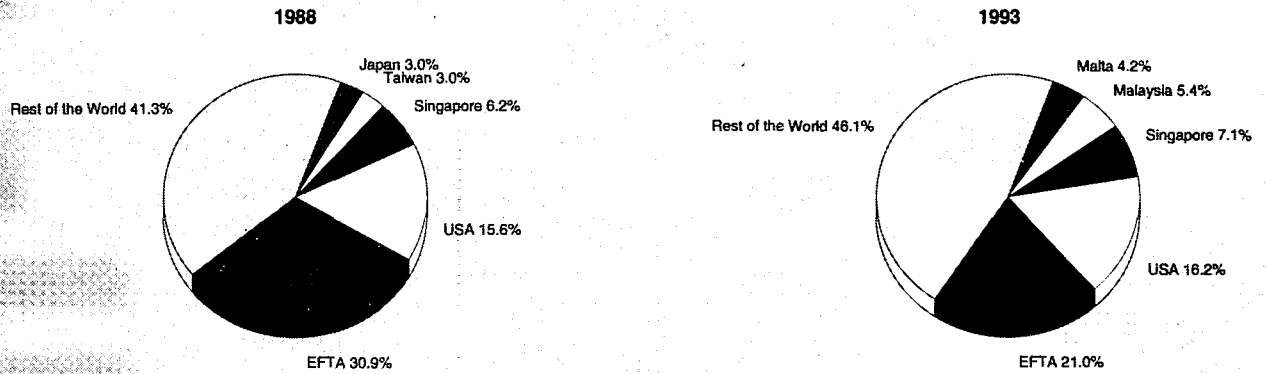
Source: DEBA

**Figure 5: Consumer electronics  
international comparison of production in constant prices**



Source: DEBA

**Figure 6: Consumer electronics  
Destination of EU exports**



Source: Eurostat

panies account for approximately 10 % of the total and export most of their production. Developing countries, where many production plants of western and Japanese companies are located, account for around 16 % of total production. Both the USA and the EU are significant net importers of consumer electronics, and have negative trade balances in the sector.

#### Foreign trade

Since 1992, extra-EU exports have grown faster than imports, resulting in a declining EU deficit. More specifically, in 1993 extra EU exports (10.8 billion ECU) increased by 21.4 % in comparison with the previous year, whilst extra EU imports (22.5 billion ECU) only increased by 9 %. EU exports destinations changed during the period 1988-1993, in fact the percentage of exports directed to the EFTA countries decreased, whilst exports to Singapore, Malaysia, Malta and the rest of the world (i.e. the less developed countries) grew. In 1988, exports to the rest of the world accounted for 41 % of the total, whereas in 1993 they accounted for 47 %. Very few products from the EU are exported to Japan which is a very closed and highly competitive market. Parts & accessories, TV sets and blank tapes & discs are the main categories of exported products. Imported products mainly come from Japan, China, South East Asian countries and the USA. Direct

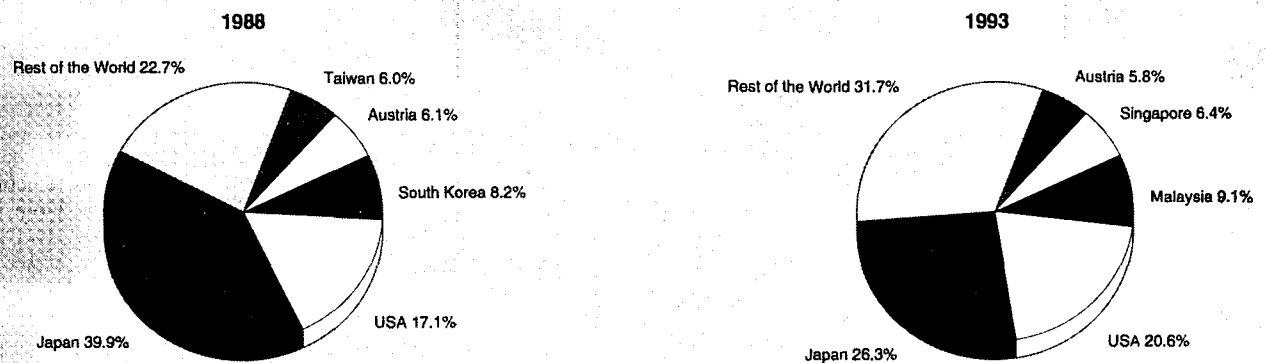
imports from Japan have declined since 1988, whilst imports from the USA, the South East Asian countries and the rest of the world have increased. Parts & accessories, home audio, TV sets, camcorders and blank tapes & discs are the main products imported.

#### MARKET FORCES

##### Demand

In the EU, purchases of audio and video hardware represent around 1 % of total consumer expenditures, a share that has not varied significantly over the last ten years. Meanwhile, however, prices have remained the same or fallen, whereas products have improved. As market developments are related to the total income of the consumers, the ongoing economic recovery in the EU is likely to favour market growth. However, since 1990 the sales volumes of some more traditional key products have ceased to grow. In fact, the proportion of households in the EU with at least one colour TV set is close to 100 %. Household penetration of VCRs is just over 50 %, but this equipment is not yet old enough for replacement demand to be an important part of the market. Sales mainly depend on the smaller number of new customers. It is estimated that TV sales will stabilise at around 20 million sets per year,

**Figure 7: Consumer electronics  
Origin of EU imports**



Source: Eurostat

**Table 5: Consumer electronics (1)**  
**Structure of imports and exports, 1993**

(million ECU)	Destination of EU exports	Origin of EU imports	Ratio exports / imports (%)
Japan	62	3 833	1.6
China	6	1 126	0.5
South Korea	24	853	2.8
Malaysia	15	828	1.8
Singapore	113	826	13.7
Austria	308	821	37.5
USA	370	714	51.8
Thailand	7	342	2.0
Hong Kong	74	293	25.3
Taiwan	27	272	9.9
Indonesia	4	213	1.9
Turkey	53	116	45.7
Brazil	18	49	36.7
Total extra-EU, of which EFTA	2 400 898	10 803 1 011	22.2 88.8

(1) Excluding music recording, mobile phones, home computers, telecommunications terminals, video games.

Source: EACEM

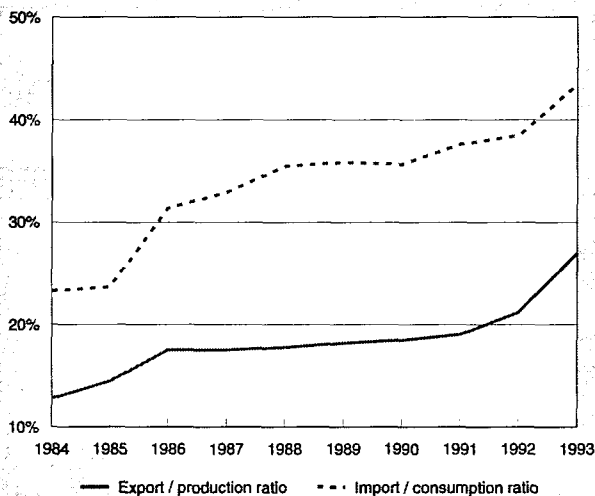
and VCR sales at approximately 11 million per year. In spite of the increasing saturation of the more mature segments of the market, more than 20 % of audio-visual hardware consumer expenditure is going to products which did not exist before the late 1980s, notably camcorders, CD players and satellite reception equipment.

Broadly speaking, consumer demand may be divided into two main segments. High end users ask for high quality products and services (for example improved definition and 16:9 format screen TV sets and VCRs) whilst low end users ask for less expensive products that are easier to use. It is also acknowledged that many functions of volume products (such as VCRs and camcorders) are not actually used because of their complexity. User friendliness, price and quality of products and services are the main factors of success in the consumer markets, and suppliers try to balance these features to get the right mix for the different segments of the market.

### Supply and competition

In real terms the cost of products such as colour television sets and VCRs have fallen by at least 50 % between 1980 and 1993, and a colour television set or a VCR in 1993 is a much more sophisticated and reliable product than in 1980. The reduction has been made possible by improved production methods and economies of scale, but lower trade margins and more efficient distribution systems have also contributed. Japanese companies dominate the sector world-wide, especially in products such as VCRs and camcorders by selling high volumes at low prices and with low profit margins. Europe still has a strong television tube industry. All television sets manufactured in Europe, whether by European or Asian companies, use tubes manufactured by European companies, with the exception of Sony which produces its own Triniton tube in the UK, and Samsung which is about to begin tube production in Berlin. This is important since the tube represents 30 % of the cost of a TV set. Above all, EU companies are strong in the colour television segment. South Korean manufacturers, such as Samsung, are improving their positions in the world ranking of consumer electronics companies, favoured by their low labour costs. They are particularly strong in the most mature and low end products, but also in VCRs and camcorders. Very few US companies can be found among the top ranking consumer electronics companies, due to the dominance of Japanese and EU companies (Philips and Thomson) on the US market itself. Japanese strengths in the sector are well known: Japanese companies benefit from large economies of scale, low capital costs and a highly skilled work force. They are also favoured by large investments in R&D, and international marketing expertise. Above all, Japanese companies are able to profit from their vertical integration and diversification. In fact, many large Japanese producers are also prominent in the electronic components market. Many of them are well diversified into other fields as well, such as computing, electronic professional systems and telecommunications. They are therefore able to share the large investment in R&D required in electronics, among the different divisions. Another key factor is brand image and the expansion of distribution channels, such as department stores for the mass market, or specialised retail channels for high quality and sophisticated products. Distribution is becoming increasingly concentrated, as large multiples and buying groups take a higher share of the market. The number of independent specialist retailers is declining in all countries. There is also a trend towards an increasing proportion of sales being made

**Figure 8: Consumer electronics**  
**Trade intensities**



Source: DEBA

**Table 6: Consumer electronics (excluding music recording)  
Principal producers of colour television sets and video recorders (1)**

(% of total market)	Colour televisions		Video recorders	
	1992	1993	1992	1993
Net EU production (2)	58.0	65.0	44.4	48.6
Extra-EU imports, of which	47.7	41.9	51.2	44.1
Thailand	8.5	8.1		
Malaysia	6.8	5.4		
South Korea	4.1	4.0	3.3	3.6
Singapore	5.1	3.9	7.6	11.6
China	3.8	3.5		
Turkey	4.6	2.6		
Hong Kong	1.3	1.0		
Taiwan	1.7	0.7		
Japan	1.6	0.6	28.1	11.2
USA			0.1	0.1
Austria			11.1	14.2

(1) Blank data are negligible.

(2) Home production minus extra-EU exports.

Due to different data collection techniques the net EU production and extra-EU imports do not equal one hundred per cent.

Source: EACEM

through large non-specialist distribution channels, especially for more inexpensive and less sophisticated items. As products have become more reliable, customers no longer deem it necessary to buy from specialists who can ensure after sales service. This is also the reason behind the decline in the importance of rentals, which, in the UK, have declined from 50 % of the TV market in 1982 to 15 % in 1992. A number of consumer electronics companies maximise the use of their sale and distribution networks, selling subscriber telecommunications equipment. On the whole, however, many consumer electronics companies do not manufacture such equipment. Similarly, "home and office" equipment, i.e. office equipment such as PCs, fax machines and photocopiers for use at home, are also suitable for sale through the channels used for consumer electronics. Again, these products are not usually manufactured by EU consumer electronics companies, in fact much of the technology used in fax and photocopiers is controlled by Japanese.

### Production process

In the period 1984-94, the EU productivity index increased by more than 60 %, whilst unit labour costs have increased by almost 20 % since 1990. Both Japanese and European companies are trying to rationalise their production facilities (in the EU there are approximately 125 plants manufacturing audio-visual products), and to move low value added production to South East Asian countries where labour costs are lower. In EU companies the trend is to have R&D, sales and marketing staff that is relatively large and to have less staff employed in production. There are exceptions to this general

trend, as some companies specialise in manufacturing TV sets on an OEM basis for large retail organisations. These companies maintain a very high proportion of their workforce in production. Due to the relocalisation of the production of low end products and the conversion of EU production sites into centres for piloting new production techniques, as well as for some production of high end products, the average skill levels of production workers will rise. The more important EU suppliers attempt to revitalise the market by introducing new sophisticated products and enhanced standards for new products. Philips launched the Digital Compact Cassette (DCC) for recording digital sound. Sony responded by launching the MiniDisc on the market, another optical product for recording digital sound. Both are trying to emulate the success of the -compact disc, replacing traditional analogue cassettes. They are also attempting to establish their standards through alliances with hardware suppliers (e.g. the Philips DCC is also produced by Matsushita, the largest Japanese electronics company). For both contenders, partnerships with the "software" industry, i.e. the music recording industry, is vital for the success of their new products. Philips also introduced CD-I, an interactive multimedia optical device connected to a traditional TV set and compatible also with the compact disc. In this case a partnership with the movie industry is seen as the key to success.

However, EU companies have not participated in the development of camcorders, the technology of which is exclusively controlled by Japanese. In the face of new digital compression technologies, both the HD-MAC system in Europe and the

**Table 7: Consumer electronics (excluding music recording)  
Equipment rates of EU households at the end of 1993 (1)**

(%)	B/NL/L	DK	D	GR	E	F	I	P	UK
Colour televisions	98.0	96.0	95.5	80.0	99.0	94.5	95.0	95.1	97.0
Video tape recorders	51.0	50.0	60.0	40.0	54.0	62.3	42.0	N/A	69.0
Camcorders	15.0	8.0	14.4	3.0	11.0	12.5	7.3	N/A	10.0
CD players	45.0	N/A	48.5	N/A	28.0	31.0	14.2	28.4	40.0

(1) At least one set.

Source: EACEM

**Table 8: Consumer electronics**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	65.8	69.8	73.8	77.5	85.9	93.7	100.0	104.1	106.9	111.9
Unit labour costs index (3)	109.7	110.7	111.0	112.3	106.5	102.3	100.0	103.9	106.4	104.2
Total unit costs index (4)	97.3	99.1	99.6	98.2	98.1	99.1	100.0	103.0	103.1	100.1
Gross operating rate (%) (5)	8.51	7.81	7.39	7.71	8.73	9.41	8.35	7.11	5.17	4.58

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

HD-MUSE system in Japan were abandoned as competing world standards. In the field of HDTV the European Digital Video Broadcasting Consortium is now expected to be the enabling forum for the definition of the future HDTV standard.

HDTV is a new standard for TV sets providing high definition images (comparable with the level of image definition of movie screens). In the past years, the EU has supported strong efforts in R&D to promote an EU analogue standard of HDTV competing with the existing Japanese one. However, the US electronics companies promoted a more advanced digital HDTV standard that will eventually become, in a modified version, the European standard. Philips and Thomson, already deeply involved in R&D development of the US HDTV digital standard, will eventually support the introduction of the new digital standard also in Europe (no target date has been set for digital HDTV).

New enhanced analogue TV sets with a 16:9 format screen have already been launched on the EU market. Moreover, the most prominent attempt to revitalise the mature market of TV sets will be the new initiatives to develop digital television. In fact, it is not necessary for digital television to be high definition. It can be broadcast from terrestrial transmitters as well as satellites and over cable, and allows broadcasters to offer far more services on the same channel than analogue technology does. Digital television will allow for a massive increase in the number of channels offered, as well as other facilities, such as interactive TV and video on demand services. The potential market is very large. To benefit from digital TV, consumers will need either a digital/analogue adapter for their existing set or, in the long term, a new TV set. Broadcasting will begin by satellite and over cable, perhaps in 1995. Terrestrial broadcasting will follow after satellite and cable transmission. There will also be an increasing demand for satellite reception equipment. Digital TV will create a demand for advanced electronic components and particularly semiconductors, which may be produced by EU companies. Large flat screens will be needed as well. Although the Japanese are more advanced than US and EU companies in the related R&D, much research is currently done in Europe in this and other technologies, through the Eureka, ACTS (Advanced Communications Technologies and Services) and JESSI programmes. Digital TV will also increase the need for TV programming and other media products, such as video and data banks. The digital TV standard will most likely lead the way in a hierarchical manner to digital HDTV with an intermediate digital 16:9 format.

In the long term, innovation in the field of consumer electronics is closely linked to the trend of convergence of telecommunications, computer and media technologies. Traditional industrial boundaries are disappearing and cross-sectoral competition will increase. Video-telephone and Personal Digital Assistant (PDA) are examples of technological convergence that promise increasing competition and more alliances. Mul-

timedia PCs is another example of technological convergence of the TV and the computer industries.

## INDUSTRY STRUCTURE

### Companies

The top ten companies account for three quarters of world production. Six of them are Japanese, two European and two South Korean. The only EU companies among the top ten are Philips and Thomson. Nokia is the third largest European manufacturer. Apart from Italy, where there are still some medium-sized TV manufacturers, such as Seleco that is attempting to develop into a Southern European multinational on the TV market after having acquired the Spanish manufacturer Elbe, small and medium-sized European consumer electronics companies are active only in the audio business, or in peripheral areas such as satellite TV reception equipment. Philips, Thomson and Nokia are vertically integrated and diversified, although to a lesser extent than the Japanese companies. Philips is also the main EU producer of electronic components and Thomson is one of the main shareholders in the semiconductor manufacturer SGS-Thomson. Nokia is getting an increasing share of its revenues, and the biggest share of its profits, from mobile telecommunications equipment and cellular phones.

Thanks to their diversification, cost rationalisation and the recovery of the EU economy, the most important electronics companies showed positive signals in 1994, after having suffered significant losses in the previous years. Many analysts claim that very few companies have been making profits in Europe in the last few years by producing only consumer electronics products. Although consumer electronics is a mature market, where established companies normally are in a position to consolidate good profits, fierce global competition and overcapacity seems to have forced the industry to give away the biggest share of its productivity gains to the customers.

### Strategies

The strategies of the consumer electronics companies are directed towards controlling costs, rationalising production, improving the quality and the user friendliness of the existing products, entering new fast growing markets and launching innovative products. On the one hand, companies are likely to concentrate on their core competence, and on the other hand, to co-operate and to establish joint ventures with companies that in fact may originate from other sectors, such as media, computer, satellite and cable broadcasting and telecommunications. In general, stiff competition is forcing companies to create networks of alliances and partnerships in very different segments of the market, such as audio, video, cable and satellite pay-TV and intelligent telephones. After a wave of mergers and acquisitions in the 1980s, strategies have shifted towards agreements concerning a limited range

**Table 9: Consumer electronics  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	N/A	N/A
BR Deutschland	0.70	0.55
Hellas	0.39	0.04
España	0.50	0.70
France	1.94	2.06
Ireland	N/A	N/A
Italia	0.77	0.79
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	N/A	N/A
United Kingdom	0.86	0.84

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Production has been estimated.  
Source: DEBA

of products or R&D in some technologies in the highly differentiated sectors of the consumer electronics market. Philips and Thomson, once partners in developing a European HDTV standard, are jointly developing a flat TV screen and LCD (Liquid Crystal Display) technology.

The digital TV standard in Europe will be developed by the Digital Video Broadcasting Group formed in 1993 by 120 interested parties, including television manufacturers, broadcasters, satellite operators, governments and the EU Commission itself. One of the objectives of the group is to establish common European standards for transmission and pay-TV decoders. However, it seems unlikely that these will be mandatory. Digital Audio Broadcasting (DAB) is another field of R&D co-operation.

The more important companies attempt to enter the new fast growing consumer electronics markets, especially in Asia. China and India are quickly expanding broadcasting networks and in these countries an increasing number of people are buying new TV sets and other TV equipment. This represents a strong business opportunity for the globally active EU companies.

### Impact of the Single Market

The European consumer electronics industry now mainly consists of a small number of multinational companies selling standardized products throughout the EU. The free movement of goods has enabled production to be concentrated on a smaller number of large units. As a consequence of this rationalization, employment has fallen and numerous small independent producers have gone out of business. The common external tariff and the threat of anti-dumping procedures have encouraged Japanese and other Asian manufacturers to establish production facilities within the EU. Foreign manufacturers now account for over 30 per cent of EU production.

Problems of technical harmonization are largely a matter of the past although the rival PAL and Secam color TV standards persist. For future technologies good progress has been made in establishing digital audio and video broadcast standards (DAB, DVB), and standards for information highways and multimedia will be established in due course.

The major area in which a Single European Market does not yet operate is distribution. Few manufacturers have European wide distribution systems. This is partly because, despite the existence of some Europe-wide buying groups, the retail distribution structure of each country is historically very different.

but also because of differing national legislations in areas such as trade practices, packaging and advertising.

## ENVIRONMENT

Laws on waste disposal have already been introduced in Germany and France. EU and national laws will push the suppliers to adopt recyclable materials. Consumer electronics companies are taking environmental questions seriously. This involves design that enables equipment to be recyclable and non-toxic, providing customers with facilities for disposal, providing return systems for packaging, and using non-polluting manufacturing processes and materials, such as water based paints.

## REGULATIONS

The Digital Video Broadcasting Group aims at setting up a multiplex digital standard for Europe (i.e. a standard that allows several channels to be broadcast on each digital signal) and works together with European standard-setting bodies, such as the ETSI and Cenelec. The purpose of the Commission is to avoid a proliferation of competing systems in Europe for encoding subscription satellite channels, as well the transmission standard themselves. In fact, it is not in the interest of the consumer to buy a variety of different decoders for each pay-TV channel. Whilst EU governments do not wish to dictate the exact standard for the future digital TV and HDTV, an EU regulation is however expected to establish the transmission standards policy for the future of digital and widescreen TV services in Europe.

## OUTLOOK

The future of the consumer electronic industry is heavily dependent on the developments of new technologies, such as digital TV, encryption systems and widescreen format TV, as well as on the successful marketing and adoption of new products, such as DCC, CD-I, DAB, in-car traffic guidance systems and personal electronics. Despite the recovery of the EU economy as a whole, difficult times are likely to continue in the next few years, because of market saturation, fierce price competition and production overcapacity. In the short term, the recovery of the electronics industry hinges upon the continuation of rationalisation programs initiated by the important companies in the sector. In the long term, the success of the EU consumer electronics industry also depends on its ability to increase its share of the global market and to create a wide range of technological and commercial alliances. The emergence of the new multi-media industry will present the biggest business opportunity, indicating convergence of the consumer electronics, computer, telecommunications and software industries.

The development of the "information society" is likely to accelerate the integration of certain classes of consumer electronics items (e.g. TV, in-car services, etc.) into intelligent computer and communication based systems. This in turn will drive new functionalities, e.g. embedded services that will enable the user to deal with the substantial increase in the range of services to which he/she will be connected and the need to profile these services to fit his/her individual requirements.

Written by: Databank Group - Teknibank

The industry is represented at the EU level by: European Association of Consumer Electronics Manufacturers (EACEM). Address: Rue d'Arlon 69-71, Bte 8, B-1040 Brussels; tel: (32 2) 230 5010; fax: (32 2) 230 9608.







## Overview NACE 35, 36

The transport equipment industry ranks among the major industries in the EU, and has a significant impact on important supplying sectors. Consequently, the deep recession that the industry has experienced in the past three years has had a dramatic effect on its suppliers. In 1994, the gradual economic recovery throughout the European Union has paved the way for improved performance of the transport equipment sector. Prospects are rosier for the next three year period too, thanks to the long awaited come back of the market.

In spite of this recovery however, the ongoing restructuring of the industry will continue, leading to further important layoffs in the EU transport equipment industry.

### INDUSTRY PROFILE

#### Description of the sector

The transport equipment industry covers a number of sectors that manufacture all types of vehicles, which may be motor driven or not. According to the NACE classification, it covers the following sub-sectors:

- motor vehicles (NACE 351 and 352);
- motor vehicle parts and accessories (NACE 353);
- shipbuilding (NACE 361);
- railway rolling stock (NACE 362);
- cycles, mopeds and motorcycles (NACE 363);
- aerospace equipment (NACE 364)
- perambulators, invalid chairs, etc. (NACE 365, not included in this Chapter).

The transport equipment sector ranks among the major industries in the EU, both in terms of turnover and of employment. It also has a significant impact on important supplying sectors, such as metals, rubber and plastics or mechanical and electrical engineering. The major category of the transport equipment sector is by far motor vehicles, which accounts for 82 % of the sector's output (including the manufacture of bodies and parts and accessories). Aerospace ranks second both in terms of production and employment.

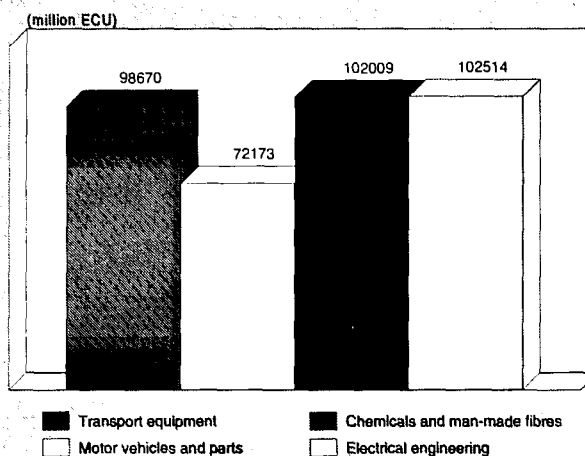
Germany, France, the United Kingdom and Italy are the four largest producers in the EU. These four countries accounted for 87 % of the value added created by the EU transport equipment sector in 1993.

#### Recent trends

The transport equipment sector maintained sustained growth between 1985 and 1989, driven by the particularly dynamic performance of the motor vehicle industry over the period. The aerospace industry also contributed significantly to the sector's growth. During the same period, EU shipbuilding production was under severe competitive pressure especially from Far-East producers.

1990 marked a turning point for the transport equipment sector. After a slowdown reported in 1990, real production started to fall in 1991 and 1992. 1993 saw a deep depression and will be remembered as the bleakest year in the EU transport equipment sector since World War II. Domestic demand, as measured by apparent consumption, plunged to 297 million

Figure 1: Transport equipment Value added in comparison with related industries, 1993



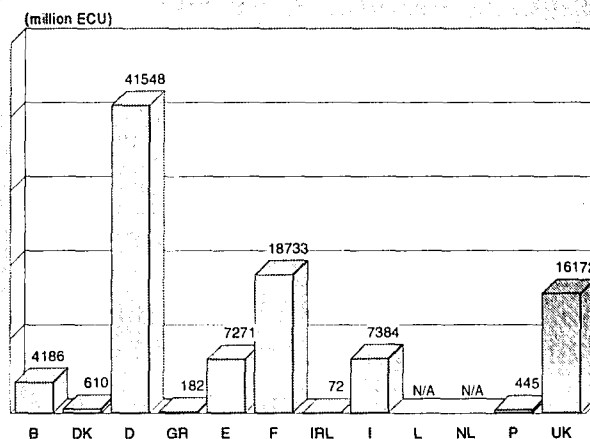
Source: DEBA

ECU, implying a tremendous 14.8 % drop over twelve months. All the segments of the industry have been affected, but the motor vehicles sector was hit hardest by the weakness of domestic demand. Demand for aerospace equipment was also very poor, as a result of a severe crisis in both the sector's military and civil markets.

The only good news came from a strong increase in extra-EU demand, which limited the fall in production to 14 % in real terms over the twelve months of 1993. This slump was much more pronounced than the 3.4 % fall registered in manufacturing production over the same period.

In such a climate, massive layoffs were reported in the sector in 1993. The transport equipment industry lost 196 000 employees, or 7.6 % of its total workforce.

Figure 2: Transport equipment Value added by Member State, 1993



Source: DEBA

**Table 1: Transport equipment  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	174 291	265 166	303 593	323 822	341 112	348 333	296 777	319 530	341 600	371 100	400 800
Production	200 325	281 014	317 846	337 982	349 162	360 927	315 475	345 154	367 500	397 500	427 700
Extra-EU exports	44 235	44 765	49 531	51 555	52 890	56 214	61 157	71 870	77 700	84 300	91 400
Trade balance	26 034	15 848	14 253	14 159	8 050	12 594	18 697	25 624	25 900	26 400	26 900
Employment (thousands)	2 790	2 597	2 626	2 688	2 655	2 585	2 389	2 181	2 220	2 250	2 260

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Transport equipment  
Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Aerospace	38 620	42 037	17 019
Assembly of motor vehicles	175 356	187 222	29 840
Bicycles, mopeds and motorcycles	7 175	4 657	652
Manufacture of bodies for motor vehicles	10 565	11 045	857
Parts and accessories for motor vehicles	44 453	46 903	5 981
Railways	6 364	7 145	1 145

(1) Apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Transport equipment  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	5.48	-3.24	1.51	-14.45
Production	5.25	-3.13	1.44	-13.98
Extra-EU exports	0.05	-0.05	0.00	-0.72
Extra-EU imports	-0.22	0.16	-0.05	0.28

(1) Some country data for apparent consumption and production have been estimated.

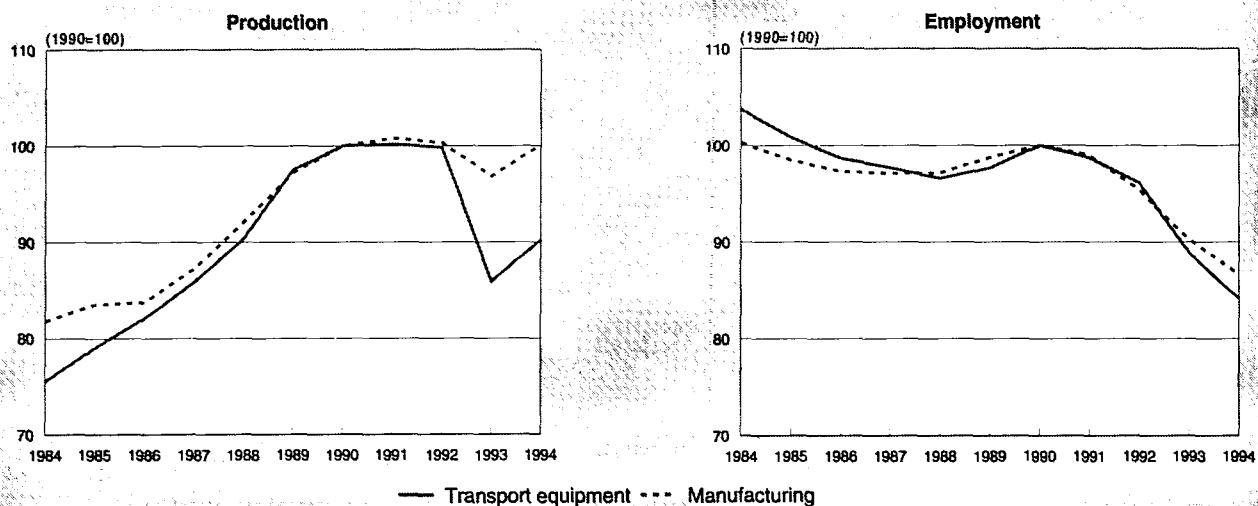
Source: DEBA

**Table 4: Transport equipment  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	44 235	46 303	43 837	44 178	44 765	49 531	51 555	52 890	56 214	61 157	71 870
Extra-EU imports	18 201	18 918	21 367	22 184	28 917	35 278	37 396	44 840	43 620	42 460	46 247
Trade balance	26 034	27 385	22 471	21 995	15 848	14 253	14 159	8 050	12 594	18 697	25 624
Ratio exports / imports	2.43	2.45	2.05	1.99	1.55	1.40	1.38	1.18	1.29	1.44	1.55
Terms of trade index	178.9	179.9	149.4	142.2	110.8	101.9	100.0	86.5	96.7	107.4	N/A

Source: DEBA

**Figure 3: Transport equipment  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

**International comparison**

The recession that hit the EU in 1993 had a profound impact on the international position of its transport equipment industry. Indeed, the EU transport equipment sector lost in 1993 the world leadership it had built up in the decade leading up to 1992 to the detriment of the USA. Thanks to a strong expansion in the decade to 1992, the EU became in that year the world's largest producer of transport equipment. The USA, after suffering cutbacks in activity in the 1988-1991 period, stepped back to second place. Japan, which had recorded an outstanding performance throughout the 1980s, attained third place in 1992.

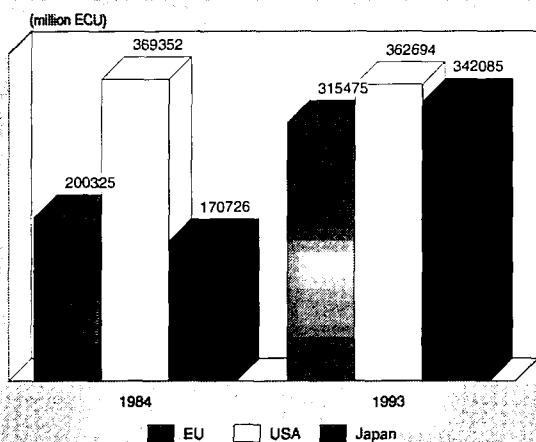
1993, however, witnessed a reversal of fortunes for the EU transport equipment industry. Boosted by economic recovery, the USA achieved strong production growth, and again became the leading manufacturer of transport equipment. Japan climbed up to second place in spite of severe production cuts in 1993, leaving the EU with the third rank of the Triad.

Considering the decade leading up to 1993 two important facts stand out. First, and in spite of the recent downturn, the EU has emerged as a leading producer of transport equipment (through the outstanding growth of its aerospace equipment industry). Second, Japan has shown an impressive ability to penetrate markets world-wide, and has risen to the second place of the world's leading transport equipment manufacturers.

**Foreign trade**

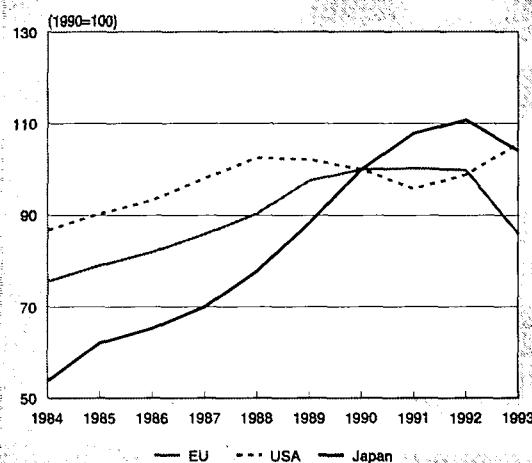
In 1993 the EU transport equipment industry exported almost 20 % of its production outside the EU. More than 14 % of EU expenditures on transport equipment was produced outside the European Union. Export intensity increased substantially in 1993 compared with the previous five-year period, which illustrates the shift operated by EU transport equipment manufacturers towards export markets to compensate for shrinking domestic demand.

**Figure 4: Transport equipment  
International comparison of production in current prices**



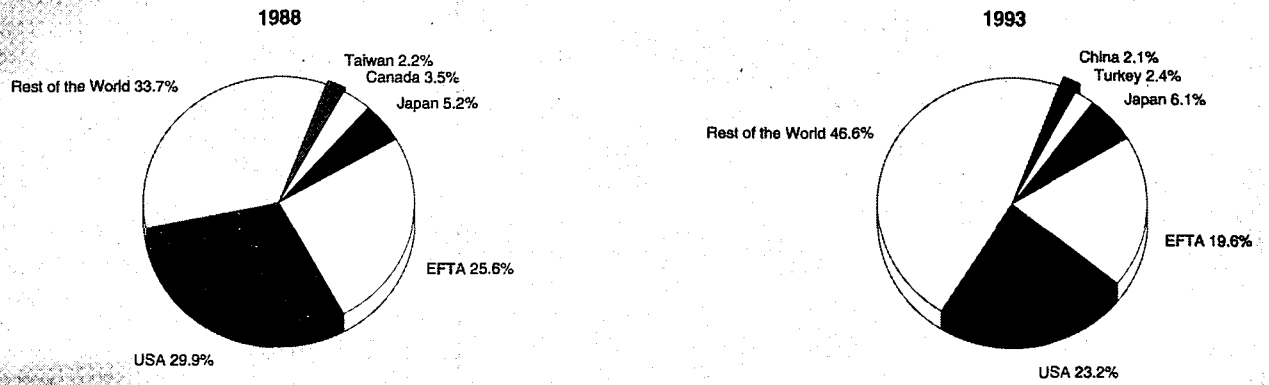
Source: DEBA

**Figure 5: Transport equipment  
International comparison of production in constant prices**



Source: DEBA

**Figure 6 : Transport equipment  
Destination of EU exports**



Source: Eurostat

Trade intensities differ significantly across sub-sectors. For example, in the motor vehicle sector imports account for less than 10 % of domestic apparent consumption, while only 12.5 % of production is exported. This peculiar aspect is the result of the strategy of internationalisation implemented by the major automotive producers, aimed at locating production plants near demand, leaving little need for extra-EU trade. In contrast, the aerospace industry is very open to trade, with both export intensity and import penetration at about 35 %.

Like in other industries open to trade, swings in currency values have made imported transport equipment cheaper than EU-produced equipment. This was among the factors that has tripled the value of extra-EU imports over the past decade and has significantly reduced the EU's trade surplus.

Since the mid 1980s, the EU transport equipment sector has experienced a number of major shifts in both the destination of extra-EU exports and the origin of intra-EU imports. Japan accounted for a higher share of EU exports in 1993 compared to 1988, to the detriment of the EFTA region and the USA. The notable decline in the share of exports destined for the USA can be mainly attributed to the depreciation of the dollar during that period. For the same reason, the USA has increased its share of extra-EU imports to 23.7 % in the five-year period

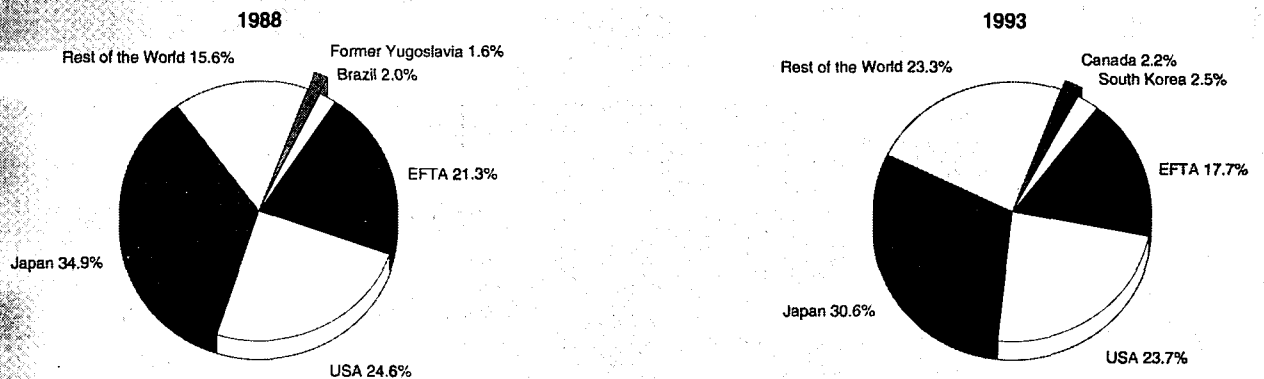
leading up to 1993, mainly to the detriment of the share imports from the EFTA countries and Japan. The latter country nevertheless keeps the lion's share of extra-EU imports, with more than 30 % of total extra-EU imports originating in Japan.

## MARKET FORCES

### Demand

The nature of demand for the different categories of transport equipment varies significantly. Private consumers are the single most important group of buyers for the bicycles industry, the mopeds and motorcycle industry, and for the motor vehicle industry (through demand for passenger cars). Consequently, overall economic activity, personal disposable income and demographic trends are overriding factors influencing demand for such equipment. It is no wonder, then, to observe that these sectors are characterised by a combination of short term cyclical fluctuations and long term growth. By contrast, the government sector is the aerospace industry's largest outlet through its military orders, followed by airline companies. As the latter, still constrained by financial difficulties, are not yet ready to make large investments, and demand for military equipment is severely constrained by shrinking de-

**Figure 7: Transport equipment  
Origin of EU imports**



Source: Eurostat

**Table 5: Transport equipment  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	72.8	78.4	83.1	87.9	93.5	99.9	100.0	101.5	103.9	96.7
Unit labour costs index (3)	95.4	95.4	95.3	95.7	94.7	94.4	100.0	105.9	110.6	119.0
Total unit costs index (4)	79.2	82.2	84.7	87.5	90.9	94.7	100.0	103.9	108.2	112.0
Gross operating rate (%) (5)	6.84	7.44	7.75	8.49	8.72	9.29	7.80	7.02	6.51	5.36

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

fence budgets, the aerospace industry is going through difficult times.

The shipbuilding and railway rolling stock industries have a relatively small number of customers, usually national or regional companies, which may be either private or public. These two industries are more sensitive to transportation and infrastructure policies, rather than to general income developments.

Certain factors may have a different impact on the various segments of the transport equipment industry, to the extent that forms of transportation are substitutes for each other (travelling by car versus rail or air travel, for example). For instance, an increased awareness of transportation's impact on the environment on the part of governments or of the general population may increase the use of public transportation, benefiting the manufacturers of public transportation equipment to the detriment of passenger vehicle producers.

### Supply and competition

As a whole, the EU transport equipment sector is fully capable of meeting the demand for transport equipment within Member States. As a matter of fact the EU maintains a trade surplus, albeit declining, in transport equipment on an annual basis. In the motor vehicle industry, Japanese competition clearly constitutes the main challenge faced by European producers over the next two decades. In response to such competition, EU car manufacturers need to further implement the lean pro-

duction techniques in order to at least maintain market shares. In the aerospace industry, the USA remains the formidable competitor, but newcomers, such as Indonesia, might represent a serious threat over the next two decades.

In the bicycle, mopeds and motorcycle industries, the EU has a growing trade deficit, and faces increasingly stiff competition from Asian NICs. In shipbuilding, countries such as Korea already are, while the CIS might become, strong competitors, challenging the EU's world market share.

The world-wide recession has been strongly felt in EU companies' profitability. The sales margin (ratio of profit to turnover), which peaked in 1989, has sharply declined since then. The most notable rise and subsequent fall in this trend occurred in the aerospace sub-sector, which experienced a considerable drop in orders for both civil and military aircraft.

### Production process

Confronted by a highly competitive market, the transport equipment industry has been forced to produce faster, better and cheaper. New forms of organisation and management of production have been implemented, along with new production methods. Innovations in the production process are particularly noticeable in the automotive industry, and to a lesser extent in the aerospace industry, where new techniques such as just-in-time production and increased emphasis on quality control are reducing production times and improving cost efficiency. The latter is of major concern for the transport equipment industry, which has experienced a strong deterioration of its cost structure, simultaneous to the inflation of unit labour costs.

Further rationalisation and implementations of automated production techniques are reducing employment in the sector. In spite of a brief period of relief in 1989 and 1990, the trend in employment is sharply downward. Since 1991, the decline has actually accelerated, with job losses of 2.6 % in 1992, followed by a further slump of 7.6 % in 1993.

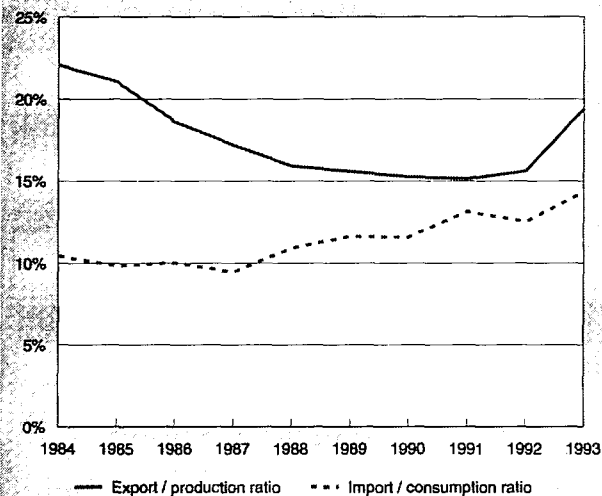
## INDUSTRY STRUCTURE

### Companies

The transport equipment sector is well represented among the leading European companies. Daimler-Benz (D) is the largest European transport equipment manufacturer in terms of turnover. It is the third largest industrial company in Europe, and the eleventh in the world. The sector is highly concentrated. The top 6 % of the companies (i.e. companies with more than 99 employees in 1990) accounted for 94 % of the transport equipment industry's turnover.

The leading corporations in the transport equipment sector have interests in several segments. Many of the large volume car manufacturers, such as Renault (F), Fiat (I) and Daim-

**Figure 8: Transport equipment  
Trade intensities**



Source: DEBA

**Table 6: Transport equipment  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	12 065	78.9	3.1	1.8
20-99 employees	2 092	13.7	4.9	2.9
100 or more employees	1 130	7.4	92.0	95.3

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

ler-Benz, also have interests in the truck industry. Peugeot SA (F) produces mopeds, motorcycles and bicycles, whereas both Fiat and Daimler-Benz are involved in both the motor and aerospace sectors. Although there does not seem much evidence of industrial synergy in general, companies with dual interests are at least able to allocate risks across their diversified branches.

### Strategies

The long term strategy of the European transport equipment industry follows two parallel tracks; globalisation and rationalisation.

The consolidation of the European motor vehicles industry advanced in another major step early 1994 with the acquisition of Rover (UK) by BMW (D). The merger has created a seventh large producer of passenger cars in Europe, and has introduced BMW firmly as a competitor on the markets for off-road vehicles and small cars.

While no new mergers took place in 1994, the industry pursued its consolidation through partnerships, alliances and joint ventures. Collaboration is strengthening the links not only among EU companies, but also between EU companies and their American and Japanese rivals. The aim of such ventures is generally the development of new models and components. Cooperation in development through transnational alliances is regarded as the most efficient way to both increase development speed and share development costs. Usually, the products resulting from these cooperative ventures are marketed separately by the partners in the venture, under their own name, to maintain a clear distinction between brands.

Japanese companies are favoured partners for joint manufacturing agreements. Examples of such collaboration include General Motors' arrangement with Isuzu (JPN) to jointly produce vans in the United Kingdom, and Piaggio's (I) agreement with Daihatsu (JPN) which led to their common development

of a new microvan called Hijet, which was introduced on the market in March 1993. The Rover-Honda (JPN) alliance has existed for over ten years, but will end soon. After the acquisition of Rover by BMW, which Honda opposed, Japanese firm announced that it would dispose of its minority stake of 20 %, and increase the licensing fees charged to the existing cooperative ventures.

The European aerospace industry also continues to move towards greater consolidation. Compared to its American competitor the European aerospace industry is very segmented, resulting in a cost disadvantage. Mergers and cooperative agreements are seen as a way to achieve economies of scale in production and share development costs of new aircraft. In the last few years the number of transnational mergers has increased markedly in the EU. In the area of space systems Matra (F) and General Electric Company, a subsidiary of British Aerospace (UK) are currently planning a joint venture. In the segment of regional aircraft, DASA (D) acquired Fokker (NL) in 1993, and British Aerospace is currently in talks with ATR about merging their regional aircraft activities. In large aircraft the three leading producers, Boeing (USA), Airbus (EU) and McDonnell Douglas have been discussing collaboration in the development of new aircraft, notably a very large aircraft with 600 to 800 seats.

Consolidation is proceeding slower in the defence-related segments, where governments are reluctant to reduce control over national companies. Large economies of scale in production and development are forcing the industry towards cooperation, however. The intention to integrate the future large military transport aircraft programme into the Airbus commercial aircraft manufacturing and development system is significant. The integration of military projects within the Airbus structure is seen as a chance for Europe's industry to compete more efficiently against its US competitors.

**Table 7: Transport equipment  
The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Daimler-Benz	D	50 535	675	366.7
Volkswagen	D	39 599	-975	251.6
Fiat	I	29 651	1 932	261.5
Renault	F	25 644	1 638	139.7
Peugeot	F	21 965	1 327	143.9
Robert Bosch	D	16 788	403	156.6
Adam Opel (1)	D	15 091	777	53.1
Bayerische Motoren Werke	D	15 003	657	71.0
British Aerospace	UK	13 019	594	87.4
Volvo	S	12 235	586	73.6

(1) 1992 figures.

Source: DABLE



**Table 8: Transport equipment  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.03	1.38
Danmark	0.43	0.38
BR Deutschland	1.21	1.17
Hellas	0.32	0.28
España	0.88	1.02
France	1.29	1.27
Ireland	0.12	0.06
Italia	0.73	0.59
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.38	0.43
United Kingdom	0.94	0.96

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

### Impact of the Single Market

In general terms, the Single Market programme had a positive effect on the EU transport equipment sector. The chief achievements of the programme have been the free circulation of goods and capital, as well as the progress made in the field of cross-border payments. As a result of the measures enshrined in the programme, there has been enhanced competition within the various subsectors.

The full completion of the Single Market programme requires further harmonisation in the areas of public procurement, indirect taxation and cross-border payments. The general feeling in the industry is, however, that both competition and environmental policy should be implemented by taking into account the situation at world level, in order to avoid a deterioration of the competitiveness of the EU transport equipment industry.

### REGIONAL DISTRIBUTION

In 1992, about 87 % of EU production was concentrated in four Member States: Germany, France, the United Kingdom and Italy. For motor vehicles, these four countries accounted for 91 % of all value added within the EU. In the aerospace sector, EU's Big four countries produced about 94 % of value added in Europe.

The opening of frontiers with Eastern Europe promises to have a significant impact on the distribution of European production facilities, particularly for the motor vehicle industry. For example, many major West European manufacturers have already entered into agreements with East European producers, in anticipation of future rewards. Opel (the German subsidiary of General Motors), Volkswagen (D), and Mercedes-Benz have all set up production units in former East Germany. Fiat took over FSM in Poland at the end of 1992, and acquired a 30 % stake in VAZ, the Russian car producer. Among the other deals which have been successfully finalised, it is worth mentioning the purchase by Volkswagen in 1991 of a 31 % stake in Skoda, the Czech manufacturer.

In the aerospace sector, the CIS and the EU have agreed on principles of cooperation in the space industry.

## ENVIRONMENT

Transport has been one of the main targets of environmental regulations for several years. Transport services account for one-quarter of total carbon dioxide emissions (carbon dioxide is the main gas responsible for the "greenhouse effect"). Given the strong link between carbon dioxide emissions and energy consumption, heavy energy users such as the products of the aerospace and motor vehicle industries are likely to be under attack over the course of this decade. This could be to the benefit of some of the smaller transport sub-sectors like rail. In the area of personal transport, increasing congestion in most towns and cities, coupled with growing environmental awareness should benefit the bicycle, moped and motorcycle industry, as well as the public transport equipment sector. In the long term, the kind of solution adopted to solve the global warming problem is of major importance, given that it could lead to a significant shift in production between certain branches of the sector.

## OUTLOOK

The European transport equipment industry is recovering in 1994 from the bleakest year in its history. The market is coming back slowly, thanks to increasing consumer confidence and recovering balance sheets for the sector's customers. The gradual economic recovery is paving the way for improved performance of the transport equipment market in 1994. Exports remain the driving force in the market, but demand from within the EU also is reviving, especially in the motor vehicles industry.

The next three year period looks undoubtedly better than the previous one. The transport equipment sector will again enter a period of growth, which is expected to average 2.5 % per year to 1997. In spite of this upturn in activity however, the ongoing restructuring of the industry will continue, leading to further sizeable layoffs.

During the 1990s, European transport equipment manufacturers will face a number of important challenges, such as rising Japanese competition, environmental pressures and the development of the East European market. But the sector will undoubtedly benefit from the projected development of the European transport network, considered as a crucial factor to the harmonised development of the European Union.

Written by: DRI Europe

# Motor vehicles

## NACE 351

The European car and commercial vehicle markets are presently recovering from the worst decline since World War II. In 1993 the industry suffered declines in sales greater than those which occurred after the first oil crisis in the early 1970s. Most of the industry operated at a loss in 1993, and car and commercial vehicle makers took drastic action to reduce production and cut jobs. The recession was accompanied by extensive short time working and increasing pressure on component suppliers to cut prices.

The recession highlighted the need for all vehicle manufacturers to accelerate the restructuring programmes needed to achieve global levels of competitiveness. All vehicle manufacturers are meeting this challenge by restructuring their development and production processes, re-evaluating their sourcing policies and improving skill and productivity levels.

### INDUSTRY PROFILE

#### Description of the sector

NACE 351 covers the manufacture and assembly of motor vehicles, and the manufacture of motor vehicle engines. Motor vehicles include passenger cars as well as commercial vehicles. All volume car producers also operate in the commercial vehicle market, especially the light commercial vehicle market.

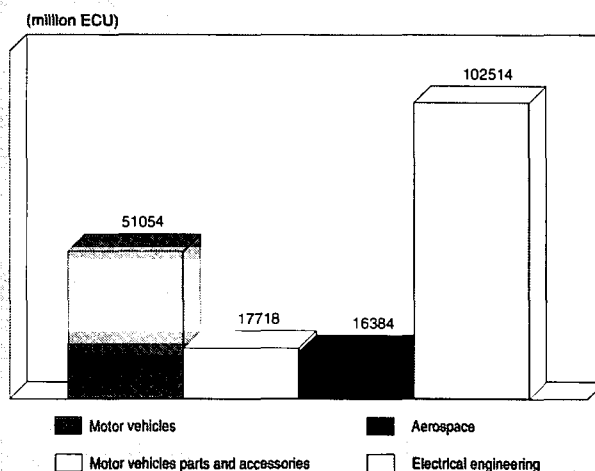
Vehicle manufacturers also produce motor vehicle components and accessories (NACE 353) and are engaged in the distribution and maintenance of vehicles.

#### Recent trends

Worldwide sales of new cars increased from 33.1 million units in 1993 to about 35.0 million in 1994. In the EU market, 1994 sales recovered to 11.2 million units from 10.7 million in 1993.

While the UK (+7.7 %), Spanish (+18.7 %) and French(+13.5 %) car markets recovered in 1994, the demand for new cars declined further in Germany (-0.6 %) and Italy

**Figure 1: Motor vehicles**  
Value added in comparison with related industries, 1993



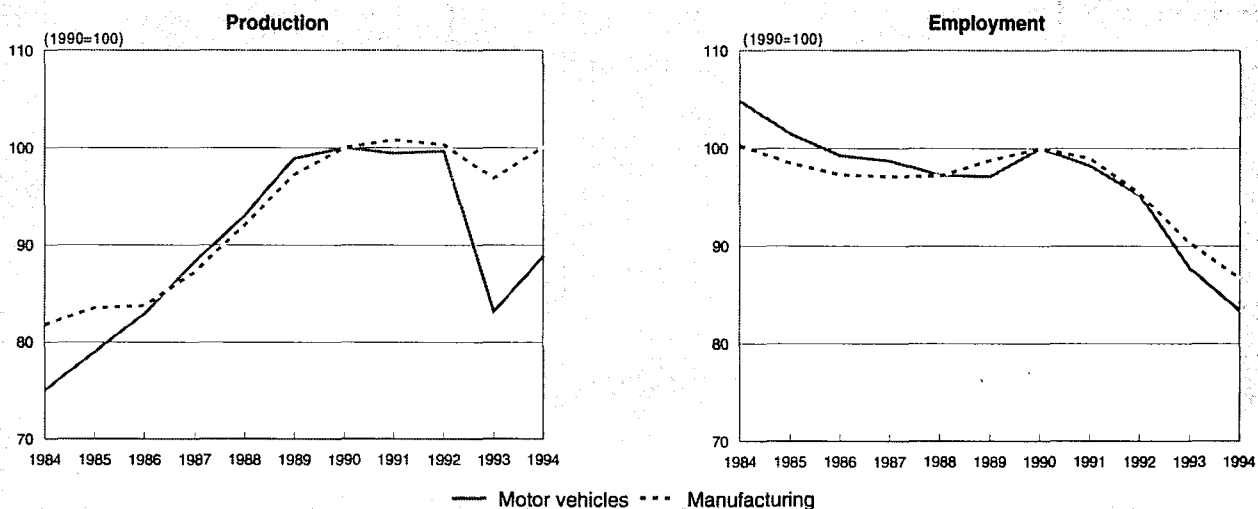
Source: DEBA

(-2.6 %). Recovery in the French and Spanish market was boosted by government-sponsored incentives for car replacement.

Sales of light commercial vehicles of less than 6 tonnes gw rose by 3.6 % from 1.57 million to an estimated 1.63 million between 1993 and 1994. Sales of trucks of more than 6 tonnes gw increased from 191 800 in 1993 to an estimated 199 300 in 1994 - an improvement of only 3.9 %. 1993 was the worst year for truck sales in Europe for some time.

According to Eurostat, the vehicle assembly industry employed 1.02 million people in the EU in 1994 (see Table 1), down from 1.23 million in 1990. Productivity improvements, restructuring, and rationalisation have all contributed to a steady decline in the level of employment in the industry. The downturn of the early 1990s exacerbated this situation and in 1993 many vehicle manufacturers announced the long term aim of large reductions in their workforce.

**Figure 2: Motor vehicles**  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
Source: DEBA

**Table 1: Motor vehicles**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	102 853	163 047	183 115	191 898	203 085	213 076	175 356	193 534	206 400	224 900	243 800
Production	116 922	174 046	194 030	203 865	209 749	218 692	187 222	212 013	224 400	243 200	262 300
Extra-EU exports	22 494	25 173	26 525	27 915	25 131	25 545	29 840	37 349	39 200	42 000	44 700
Trade balance	14 069	10 999	10 915	11 967	6 664	5 616	11 866	18 479	18 000	18 300	18 500
Employment (thousands)	1 288	1 195	1 193	1 229	1 207	1 170	1 077	1 026	1 000	1 000	1 000

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

Source: DEBA

**Table 2: Motor vehicles**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	7.49	-4.53	1.97	-20.13
Production	5.67	-4.26	1.14	-16.61
Extra-EU exports	-2.55	-0.82	-1.79	11.89
Extra-EU imports	8.04	-1.18	3.84	-17.30

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Motor vehicles**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	22 494	25 664	25 697	26 220	25 173	26 525	27 915	25 131	25 545	29 840	37 349
Extra-EU imports	8 425	9 426	11 544	12 372	14 174	15 610	15 948	18 467	19 929	17 974	18 870
Trade balance	14 069	16 238	14 154	13 848	10 999	10 915	11 967	6 664	5 616	11 866	18 479
Ratio exports/imports	2.67	2.72	2.23	2.12	1.78	1.70	1.75	1.36	1.28	1.66	1.98
Terms of trade index	89.1	89.4	92.2	96.4	91.5	95.0	100.0	98.3	95.6	91.5	N/A

Source: DEBA

**Table 4: Motor vehicles**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	71.6	77.8	83.5	89.4	95.6	101.9	100.0	101.2	104.7	94.8
Unit labour costs index (3)	96.4	95.5	95.0	94.9	93.1	93.3	100.0	106.1	111.1	124.2
Total unit costs index (4)	77.5	80.1	83.0	86.7	90.1	94.1	100.0	104.1	108.3	114.2
Gross operating rate (%) (5)	5.73	6.69	7.61	8.73	8.75	9.35	7.45	6.99	6.96	5.04

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

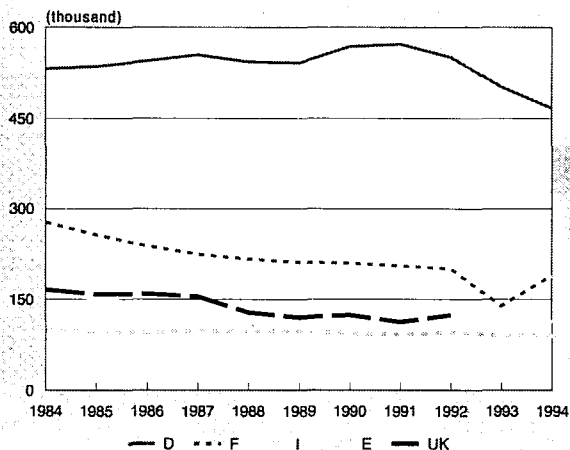
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Motor vehicles**  
**Vehicle assembly employment in the 5 principal EU manufacturing countries**



Source: DEBA

Imports from outside the EU accounted for 10 % of total consumption and exports to countries outside the EU accounted for 16 % of production in 1993.

The industry is a net exporter and an important positive contributor to the EU trade balance. Between 1985 and 1992 the surplus declined from 16.2 billion ECU to 5.6 billion ECU. The trade surplus recovered to 11.9 billion ECU in 1993. The main reason behind the decline was the loss by EU car-makers of third-country markets.

Vehicle manufacturers adopt pan-European if not global strategies, while exploiting strengths of specific countries and expanding their presence in the major markets through new investments, joint ventures and alliances.

Between 1984 and 1990, production increased in real terms by 33 % (see Figure 2). In the early 90s the industry was hit by recession, so that in 1993 production exceeded the 1984 level only by 11 %. In 1994 the industry recovered, but production still remained 11 % below the peak reached in 1990. New competitive dynamics have led to significant struc-

tural changes and implementation of new organisational and production processes. This has led to a reduction in employment levels. Total employment in the EU vehicle assembly industry fell from over 1.3 million in 1983 to 1.08 million in 1993, a reduction of 20 % (see Table 1). Employment, or rather unemployment, remains an important issue for the industry and the sharp downturn of vehicle production in 1993 exacerbated the situation. Over 260 000 jobs have been lost between 1984 and 1994. The recovery in 1994 did not prevent further job losses.

Figure 3 illustrates the employment trends in the five major EU countries. The German industry, which until 1991 witnessed increases in levels of employment, has suffered the largest job losses in recent years, as almost all manufacturers accelerate their rationalisation and productivity improvement programmes.

**International comparison**

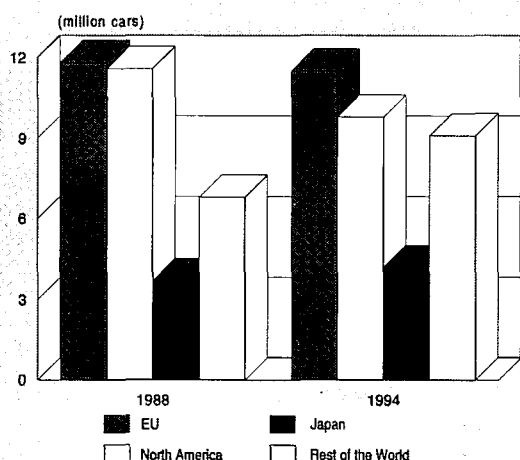
In 1992, EU accounted for 37.2 % of worldwide cars sales, but this figure fell to 32.2 % in 1993 and 31.9 % in 1994. 37.3 % of worldwide car production took place in the EU in 1992 and this figure fell to 32.6 % in 1993 and 33.8 % in 1994. The EU was both the largest consumer of vehicles and the largest producing region for automobiles during the period.

In 1994, sales of cars in EU countries (including the three new Member States) amounted to 11.55 million compared to 9.79 million in North America and 4.20 million in Japan. Production of cars in EU in 1994 was 12.82 million compared to 7.82 million in North America and 7.80 million in Japan.

Between 1988 and 1993, in a world market which declined by 0.8 %, sales of cars in EU countries declined by 9.3 %. North American sales dropped by around 19.0 % and sales in Japan rose by 13.5 % (see Figure 4). In 1992, car sales in EU countries exceeded sales in the North American market by 3.4 million units. However, in 1993, this gap had narrowed to 1.2 million units as EU sales declined and North American sales picked up. In 1994, the gap increased again to 1.7 million units, following general economic recovery in the EU and the success of car replacement incentive schemes.

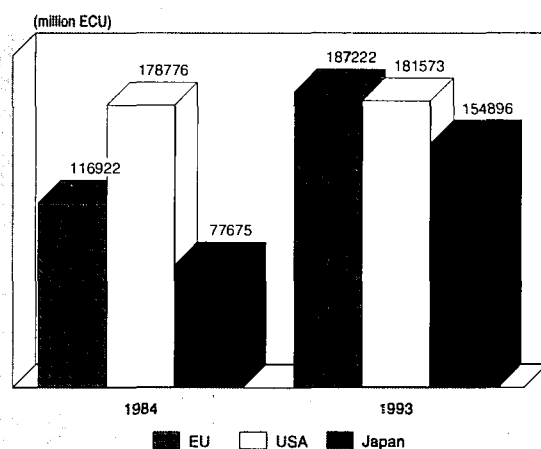
Trends in motor vehicle (car and commercial vehicle) production in value terms in the EU, USA and Japan are compared in Figure 5. The value of EU production in real terms has grown at a compound rate of 1.1 % p.a. between 1984 and 1993. This contrasts with 2.2 % per year in the USA and growth of 7.6 % per year in Japan (see Figure 6).

**Figure 4: Motor vehicles**  
**International comparison of sales**



Source: DRI Europe

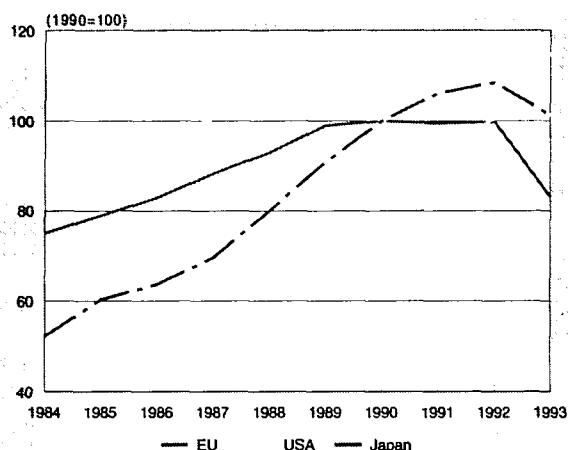
**Figure 5: Motor vehicles**  
**International comparison of production in current prices**



Source: DEBA



**Figure 6: Motor vehicles**  
International comparison of production in constant prices



Source: DEBA

### Foreign trade

In the mid-1980s, North America was the most important export market for EU car manufacturers, and the major outlet for European cars above 3 000 cc. Unfavourable currency movements, recession in North America, increased competition from domestic car manufacturers and encroachment into the luxury sector by Japanese manufacturers have all contributed to the decline in exports of EU produced cars to North America (see Figure 7). 1993 saw the start of a recovery in exports to the USA and Japan, a trend which has been confirmed in 1994.

In recent years, some EU car manufacturers operating in the luxury cars segment have responded by announcing plans to invest in North American production facilities. As this capacity comes on stream, the EU trade surplus with North America could be reduced further. Car manufacturers based in the USA are well established in Europe, and the absence of direct imports from the USA has contributed to the EU trade surplus.

Figure 8 shows the share of various regions of origin in the number of passenger cars imported into the EU (unit terms). Figure 9 also shows the distribution of the origin of EU car

imports, but in value terms and for the entire motor vehicle market (including commercial vehicles). The share of Japan in EU car imports has fallen by more than 20 % in unit terms between 1988 and 1994. In value terms the fall was just under 6 % between 1988 and 1993, indicating the move upmarket by Japanese manufacturers. The increase in the number of Japanese vehicles assembled in Europe helped offset the fall in imports. EFTA's share has declined in value terms, while imports from Korea increased sharply from 21 000 units in 1988 to 99 000 units in 1994. In 1993, Korea and the USA accounted for 3 % and 8 % respectively of the total imports in value terms, compared to 1 % and 2 % respectively in 1988.

## MARKET FORCES

### Demand

#### Cars

Demand for cars is determined by a number of factors including personal disposable income, wealth and consumer confidence. Changes in these factors account for the cyclical nature of sales over the past two decades with economic downturns generally triggering slumps in new car registrations.

The West European passenger car market has grown steadily over the last twenty years, punctuated by two periods of downturn (see Figure 10). Demand for passenger cars slowed down in the early 1990s, and 1993 marked a deep drop of sales in most EU markets. In 1994 demand recovered modestly.

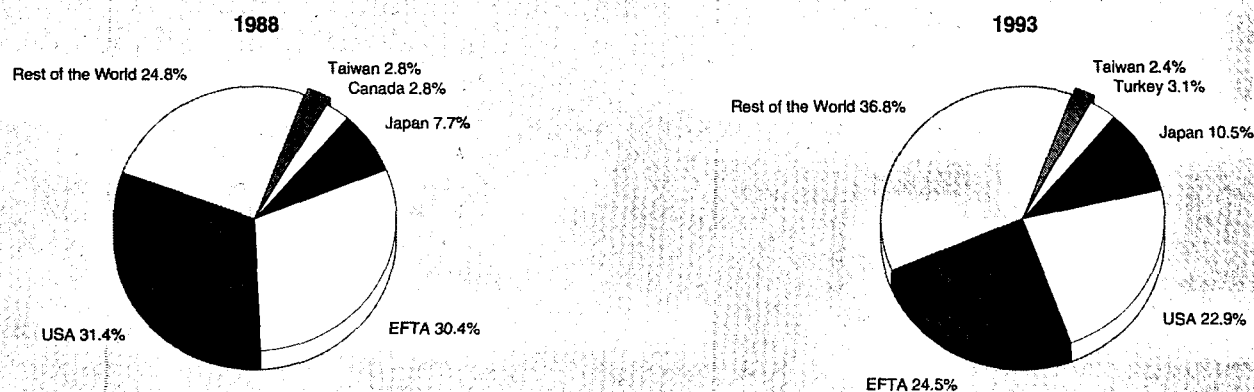
In the long term, as motorisation rate continues to grow, demand for cars will continue to rise. Average car ownership figures vary widely across countries as illustrated in Figure 11. It was nearly 600 units per 1 000 inhabitants in Western Germany prior to unification. In the larger EU economies (with the exception of Spain) over 400 cars per 1 000 inhabitants are counted, but in countries as Portugal, Greece and Ireland car ownership is considerably lower. There is further scope for increases in car ownership throughout the EU, especially in countries where car ownership per capita is currently low.

#### Trucks

Demand for trucks is highly correlated with trends in industrial output and in investment in plant and machinery.

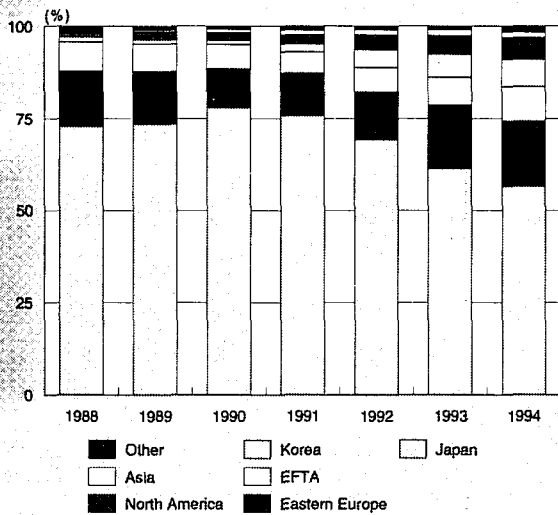
Long term demand for trucks is highly dependent on trends in the road haulage industry, which in turn is affected by the

**Figure 7: Motor vehicles**  
Destination of EU exports



Source: Eurostat

**Figure 8: Motor vehicles**  
Share of EU car imports of passenger cars



Source: DRI Europe

level of economic activity and by the competitiveness of road haulage with respect to other transport modes. Over the past two decades, the road haulage sector has consistently gained market shares against rail and inland waterways. This trend is expected to continue.

While demand for freight transport is expected to grow strongly in the future, demand for trucks will not follow all the way. Harmonisation and deregulation of the road haulage industry is resulting in the use of larger trucks and in increased efficiency. The EU truck fleet will still grow, but truck replacement patterns will be dominating factor in determining the overall levels of demand of new trucks.

The commercial vehicle market is highly cyclical. The market suffered dramatic downturns in the mid-1970s and the early 1980s. In the late 1980's, increased economic activity led to very strong growth in road freight transport demand, with a corresponding growth in the size of the EU fleet. This was accompanied by high replacement demand (to replace the vehicles initially registered in the late 1970s) and led to a boom in the truck market.

1990 saw the beginning of a cyclical downturn in EU sales of trucks of more than 6 tonnes gvw. Booming sales in Germany after the re-unification cushioned this decline but sales dropped sharply in 1992 and in 1993, with only the UK showing signs of recovery. In 1994 a more general recovery was underway.

**Supply and competition**

Cyclical under-utilisation of capacity is one of the key issues facing the European vehicle assembly industry at present. During the boom of the late 1980s, the industry was operating very close to full capacity. In this period the European assemblers expanded total capacity, mostly through elimination of bottlenecks and new shift practices.

With the recent addition of new transplant capacity as well as capacity in Eastern Europe and a steep decline in sales, there are serious implications for vehicle manufacturers' profitability. In stagnating markets, increases in productivity are only possible by further manpower reduction.

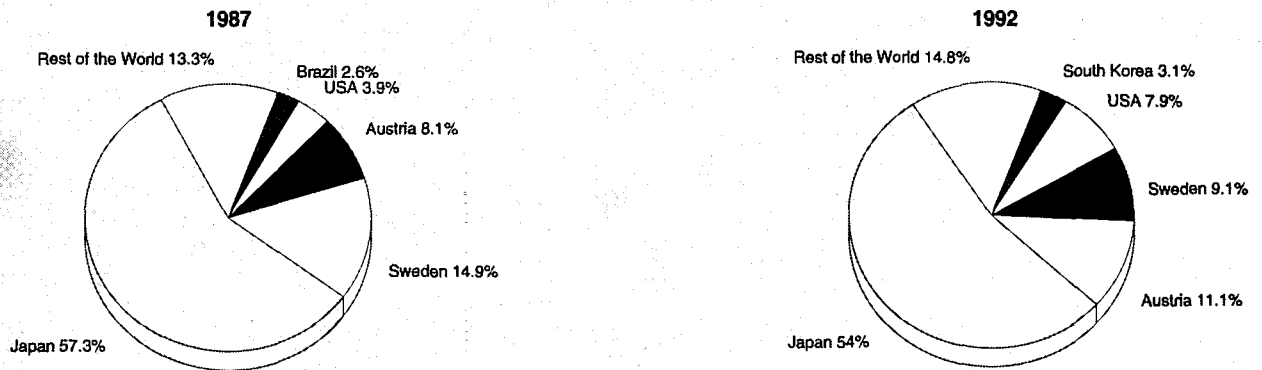
A challenge for European manufacturers is posed by Japanese production in Europe, where Nissan, Toyota and Honda are already claiming global competitive levels of quality and efficiency. While Japanese imports are liable to remain broadly stable in market share terms, chiefly as a consequence of the rise of the Yen and high labour costs in Japan, significant growth in Japanese manufacturers' market share will come from the output from these transplants.

Newly industrialised countries, for example in East Asia, and East European countries are adding to the competition in the EU. Although the volume of imports into the EU from these countries is still at a relatively low level, the EU market is attractive to importers. Plans for new models and distribution capacity indicate an ambition from Korean companies to raise European sales substantially. This would have a direct impact on European produced passenger car sales. Japanese car manufacturers played a key role in the development of the Korean and Malaysian automotive industries with Mitsubishi having close ties with Hyundai of Korea and Proton of Malaysia, and Mazda having ties with Kia of Korea.

Several studies have shown that Europeans have a relatively high cost to productivity ratio. Figure 12 shows an international comparison of wages and social costs for 1992. The data shown should be interpreted with caution, in particular the high labour costs of the German industry.

Employers in most EU Member States have higher social costs and have less flexibility to make adjustments to the

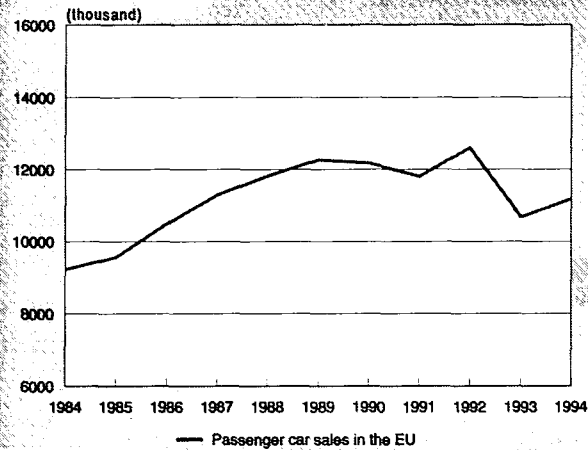
**Figure 9: Motor vehicles**  
Origin of EU imports



Source: Eurostat



**Figure 10: Motor vehicles  
Historic demand trends**



Source: DRI Europe

labour force in response to changing commercial requirements than their global competitors.

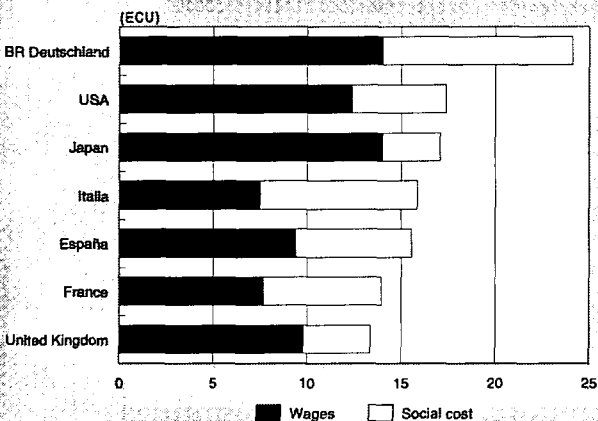
Reduction in unit costs through productivity improvements in all parts of the supply chain is, along with the search for innovation and quality, the most important issue facing the industry.

**Production process**

In recent years, changes in the production and operational philosophies in the motor vehicle industry have led to widespread adoption of "lean production" techniques, resulting in lower levels of vertical integration and substantial changes in the nature of :

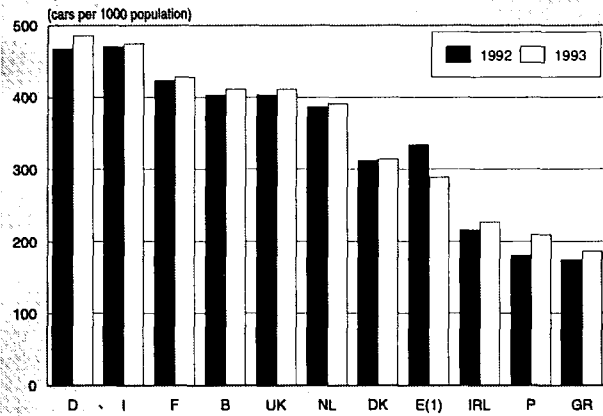
- relationship between vehicle manufacturers, its suppliers and dealers;
- coordination between product design and the production process;
- production and logistic operations;
- workforce responsibility, flexibility and skill levels.

**Figure 12: Motor vehicles  
International comparison of wages and social costs, 1993**



Source: VDA 1992

**Figure 11: Motor vehicles  
Comparison of car ownership levels in the EU**



Due to a change of statistical source, figures for 1992 and 1993 are not comparable.  
Source: DRI Europe

Benefits have included a reduction in the development time from initial concept to production, improvements in quality and productivity, and increased flexibility and responsiveness.

Changes in the interaction between vehicle manufacturers and component suppliers are widely seen as instrumental to achieving global standards of competitiveness. These changes imply a restructuring of the automotive component supply chain with ramifications for the production and logistics processes (see section on Industry Structure). It is now common for the level of co-operation between vehicle manufacturers and suppliers to extend to joint development of complete subsystems and assemblies, and their supply to the assembly plant on a Just-In-Time basis.

Shorter reporting lines, improved interfaces between management and workforce and better communication systems are contributing to the successful implementation of Total Quality Management, Quality Circles and Continuous Improvement programmes, with resulting improvements in productivity and quality. Flexible shift-working is already leading to better utilisation of plant and equipment.

Improvement in flexibility through reduction in machine set-up time, optimisation of batch size and reduction in raw materials, work in progress and finished goods inventory are all part of common continuous improvement programmes. The recession has placed additional emphasis on the need to reduce break-even volumes.

The Simultaneous (or Concurrent) Engineering approach, involving the use of multi-disciplinary teams to control a design project with the use of specific techniques such as QFD (Quality Function Deployment) and DFMA (Design for Manufacture and Assembly) and complemented by widespread use of tools such as Computer Aided Design (CAD) and Computer Aided Engineering (CAE), is widely implemented by car manufacturers.

New automated equipment has been introduced in the production steps, where working conditions are hardest and most repetitive. Widespread use of robot painting and welding in the industry is improving quality, reducing labour costs as well as reducing the mundane and hazardous manual operations. Optimisation of capital to labour ratio will remain a key factor in improving competitiveness. The latest trend no longer features an ever-increasing automation of operations. Final assembly largely remains the domain of the manual employee, due to the variety and complexity of the operations. While "state of art" work practices have been adopted in many

of the newer vehicle assembly plants. EU manufacturers face the task of extending these practices to all their plants and all aspects of their activities.

The abolishment of major elements of selective and exclusive distribution will constitute a barrier for the introduction of innovative integrated manufacturer-dealer partnerships.

## INDUSTRY STRUCTURE

### Companies

BMW's acquisition of the Rover Group has turned the "big 6" into the "big 7" EU manufacturers (see Figure 13). In 1993 the Japanese market share fell to 11 % from 12 % in 1992.

While five manufacturers have car market shares of between 10 % and 13 % at European level, a different picture emerges at country level. The individual markets are still dominated by domestic manufacturers. Vehicle manufacturers tend to have larger distribution infrastructure in their respective domestic markets and preference for locally produced cars still plays a significant role in some markets.

In the market for light trucks Renault and Ford have the largest shares due to their successful range of vans (see Figure 14).

In the market for trucks over 6 tonnes gvw, Mercedes-Benz is the clear leader. Its market share has risen from 23 % in 1989 to 31 % in 1993. Both Mercedes-Benz and MAN benefited from the reunification boom in Germany in 1992 and were the only manufacturer to record higher levels of sales in 1992 than in 1989 (see Figure 15).

### Strategies

Vehicle manufacturers' strategies respond to long term trends affecting the industry. The 1993 slump in motor vehicles sales has accelerated the implementation of long term strategies and resulted in a re-examination of the more ambitious expansion programmes. Key long term trends which shape vehicle manufacturers' strategies include:

- Globalisation: the need to reduce traditional dependencies on domestic market and improving ability to compete initially at European level and subsequently on a global level. While non-EU manufacturers have been investing in transplant production facilities in EU, EU manufacturers have been active in investing outside their home country as well

in non-EU countries, particularly in Eastern Europe and North America. Asian markets are enjoying high growth rates and this region has already attracted a lot of attention. EU manufacturers are expected to increase their presence in this region, especially through joint ventures.

- Product Development : the rate at which new vehicle models are introduced into the market place has become one of the key basis for competition in the automotive industry. Car manufacturers are speeding up and restructuring their innovation, product and process activities (Simultaneous Engineering) to reduce the time from initial concept to production. Continuous improvements in the flexibility of designs and processes are needed to ensure maximum customisation to consumer requirements. Evolution in manufacturers' market shares reflect the rates of new model introductions.
- Improved competitiveness through improvements in organisational processes: cost structure, productivity, quality and flexibility have all become crucial elements of competitiveness.

The 1993 recession in the industry has highlighted the need for all vehicle manufacturers to accelerate the restructuring programmes needed to achieve global levels of competitiveness. Manufacturers are:

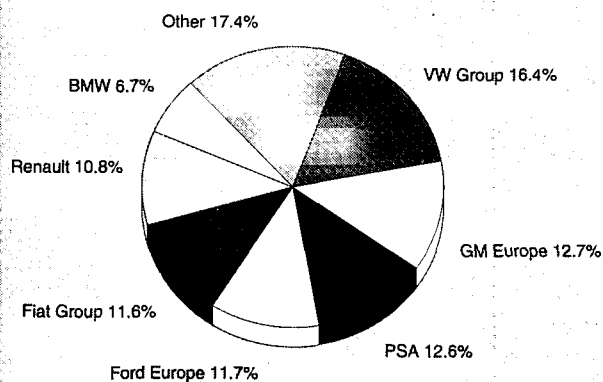
- restructuring their design and production processes (see section Production Process);
- re-evaluating the degree of vertical integration, out-sourcing policies and supplier relationships;
- improving workforce skill levels.

In the short term, each EU manufacturer is faced with different priorities and this is reflected in their strategies.

The late 1980s and the early 1990s saw a reduction in the number of independent motor vehicles manufacturers, as niche producers were acquired by volume manufacturers. As product and business development costs escalate, partnerships and alliances are increasingly regarded as providing the most cost effective method of developing a competitive product portfolio and reducing dependence on domestic markets.

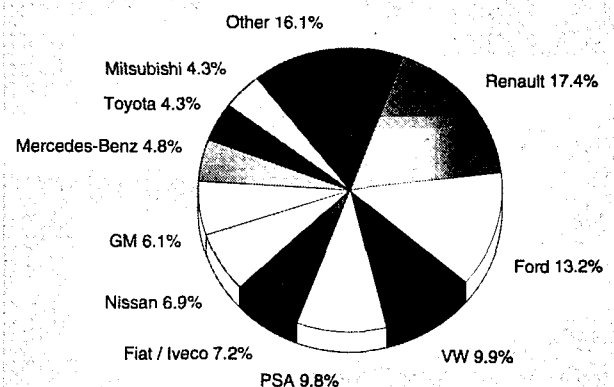
Alliances between Ford and Iveco in the light commercial vehicle market, between PSA and Fiat, and Ford and VW for development and production of a multi-purpose vehicle, and between Ford and Nissan for development of a four wheel

**Figure 13: Motor vehicles**  
Major European vehicle manufacturers' EU car market share, 1993



Source: DRI Europe

**Figure 14: Motor vehicles**  
Major European vehicle manufacturers' EU market share for trucks under 6 tonnes GVW, 1993



Source: DRI Europe



**Table 5: Motor vehicles**  
**Summary of unit sales and production**

(thousand units)	1992		1993		1994 (1)	
	Sales	Production	Sales	Production	Sales	Production
Passenger cars	12 601	13 061	10 668	11 054	11 171	11 830
Light trucks 6 tonnes gvw	1 276	1 386	1 043	1 071	1 070	1 160
Trucks 6 tonnes gvw	233	229	181	154	185	117

(1) Estimated.  
Source: DRI Europe

drive vehicle, are examples of joint product development and production alliances.

Rover and Honda worked together on a number of collaborative projects before taking a cross share holding of 20 % in each others UK businesses in 1990. Both companies now produce versions of jointly developed cars. This alliance has come to an end by the acquisition of the Rover holding company by BMW AG.

### Impact of the Single Market

According to the industry, the Single Market programme had a definitively positive impact on the car manufacturing sector. The free movement of goods has opened up new market opportunities, which the major manufacturers seized by spreading their production facilities throughout the EU. Carmakers' operations with subsidiaries have been also eased by the achievement of free movement of capitals and progress on the front of cross-border payments.

The full completion of the Single Market still requires the harmonisation of taxation systems and further progress in the field of cross-border payments. More specifically to the sector, the free movement of goods is still hampered by different national registration formalities. The first important step towards the free circulation of cars within the EU was the European type approval, i.e. a car whose technical specifications are approved in one Member State must be approved all over the EU. Since January 1, 1993, EU type approval has been in force on an optional basis, prior to its mandatory application in 1996. Since then, manufacturers have only needed to take into account a single set of rules to market their products (whole vehicles, or parts thereof) throughout the EU. Nowadays, harmonisation is still required in the national registration procedures, which still vary from country to country. Finally, the industry also asks for the harmonisation of classification systems within the EU: what is considered a passenger car

in one country can be defined as a light commercial vehicle in another country. This entails taxation differences and blurs the statistical picture.

### ENVIRONMENT

The reduction of emissions achieved by the EU motor vehicles in the past few years industry has been impressive. However, further technical improvements are becoming harder to achieve. Progress in the areas of driver education, more frequent and stringent vehicle inspection and the use of road telematics to reduce traffic congestion are likely to prove more effective strategies for reducing emissions.

Since the early 1970s, EU legislation has controlled the emission of both unburned hydrocarbons and carbon monoxide. In 1978, oxides of nitrogen also became subject to control. The "Luxembourg Agreement" of 1985 marked a significant step for future emissions standards and effectively initiated developments which were to lead to directive 88/76/EEC and the requirement of the 3-way catalyst system.

The EU has moved rapidly in introducing a series of further light duty vehicle directives, 89/458/EEC and the present newly consolidated Directive, 91/441/EEC. This directive added a high speed test to the standard test cycle to take account of emissions in suburban driving situations. In March 1994, the Commission issued directive 94/12/EEC aimed at tightening car emission limits further. This directive also incorporates a totally new method for conformity of production (COP) testing. These limits will come into force in 1996/1997.

Emissions of light commercial vehicles have been reduced to the level of passenger cars emissions with Directive 93/59/EEC of June 1992. Following the introduction of the most recent emissions standards at the end of 1992, passenger car CO emissions will have been reduced by over 90 % com-

**Table 6: Motor vehicles**  
**Financial performance of the main EU manufacturers**

(million ECU)	1991	Turnover 1992	1993	Change 1992/93 (%)
BMW	14 550	15 443	14 920	-3.4
Fiat Group	34 140	34 240	29 597	-13.6
Ford Europe	19 433	17 546	15 328	-12.6
GM Europe	20 498	22 186	20 604	-7.1
PSA	22 969	22 693	21 921	-3.4
Renault	23 801	26 199	25 592	-2.3
Volkswagen	37 213	42 272	39 753	-6.0
Volvo	10 325	11 019	12 187	10.6
Rover	5 341	4 989	5 510	10.4
Mercedes-Benz	31 850	32 099	33 401	4.1

Source: DRI Europe



**Table 7: Motor vehicles**  
**EU annual growth rates in number of vehicles 1993-1998**

(%)	1993	1994	1993-98 average
<b>Cars</b>			
New registrations	-15.3	4.7	5.2
Production	-15.4	7.0	6.1
<b>Commercial vehicles (under 6 tonnes gw)</b>			
New registrations	-18.3	2.6	6.2
Production	-22.7	8.3	8.0
<b>Commercial vehicles (over 6 tonnes gw)</b>			
New registrations	-23.1	2.5	7.1
Production	-32.6	14.6	10.2

Source: DRI Europe

pared to 1970 levels and HC plus NO<sub>x</sub> emissions by 80 % from 1970 levels.

During the last decade, the European automotive industry has invested heavily in improving the environmental performance of vehicles. The technical changes required to meet these regulations were substantial, with the consequence of higher costs which could not always be passed on to consumers. Gasoline engine passenger cars needed to be fitted with closed loop catalytic converter systems, which in turn required electronic fuel injection and management systems.

During the next decade, while vehicle ownership levels and traffic levels will continue to increase, older models will be replaced by models equipped with 3-way catalyst systems and the European car park is expected to produce substantially less emissions of CO, HC and NO<sub>x</sub> than today.

Legislation for heavy duty diesel vehicles followed along a similar path. Regulation No. 49 was introduced in 1982 and established limits for CO, HC and NO<sub>x</sub>. Directive 88/77/EEC lowered the emissions limits but it was not until the introduction of 91/542/EEC that fundamental changes in technology became necessary.

Euro 1 regulations came into force in 1992-93 and Euro 2 limits will come into force in 1995-96. Complying with Euro 2 limits without increasing fuel consumption and without using expensive after-treatment equipment presents a major technical challenge for the European industry. A further tightening of

emissions limits (Euro 3) can be expected before the end of the decade but this is still under discussion.

With the introduction of new limits for cars and trucks, a complete set of stringent standards, acknowledged to be as severe as the US 1994 requirements will be in force by 1996. These will set the EU on course for substantial improvements by the end of the century

Road transport is estimated to account for around 20 % of total European carbon dioxide emissions and reducing fuel consumption is the only method of reducing these emissions. Vehicle manufacturers have made substantial progress improving fuel efficiency, (for example through reducing drag factors and improving the combustion process and weight reduction) but in order to contribute to the goal of stabilising carbon dioxide emissions at 1990 levels by the year 2000, improvement in both traffic efficiency and fuel consumption will be needed.

Disposal/scraping of vehicles at the end of their lives, is another issue receiving attention, by the vehicle industry, regulators and environmental groups. Some of the manufacturers have already set up recycling plants and EU manufacturers appear to be leaders in this field.

## OUTLOOK

1993 will be remembered for the sharpest downturn in European production since the 1974 oil price induced recession. Output fell by 15.4 % or nearly 2 million units to 11.4 million units. Of the major EU markets, Germany, France, Italy and Spain all showed reductions in sales in 1993 of around 20 %, but the UK market recovered and increased by over 11 %.

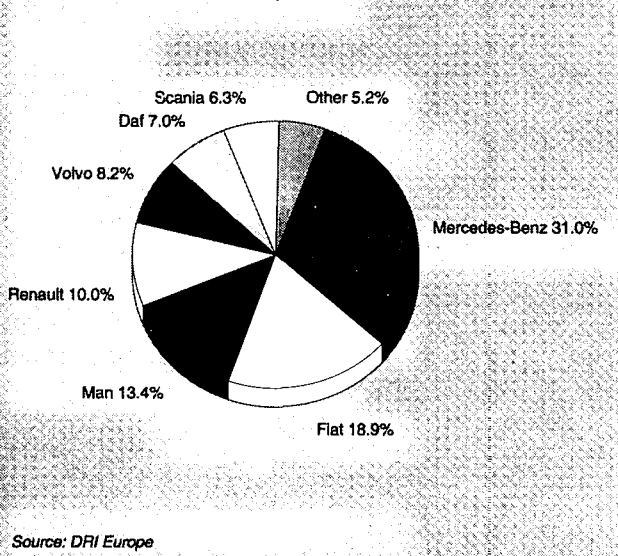
Car production recovered to 12.8 million units in 1994, with Japanese transplant production accounting for a significant part of this growth, increasing from 316 000 units in 1993 to 330 000 units in 1994. In 1994, car sales in the EU also rose by 5.6 %.

According to DRI, total EU sales are expected to increase in 1995 by around 4.0 %: 1995 should see growth in all the major EU markets. Sales in Germany, and France are expected to grow slowly (1.7 % and 1.3 % respectively); on the other hand, growth will be stronger in the UK (2.7 %) and particularly Italy (7.3 %). EU sales are not expected to reach 1992 level of 12.6 million units until 1997.

After achieving 5.1 % growth in 1992 (re-unification boom), the light truck market declined by 18.3 % in 1993. A 2.6 % recovery took place in 1994 and sales will not return to 1992 levels until 1997.

Truck sales dropped sharply in 1993, after sputtering for four years. The market declined by 23 %. Sales were down in all markets with the exception of the UK. Germany, Spain and the Benelux countries, in particular, suffered major falls in

**Figure 15: Motor vehicles**  
**Major European vehicle manufacturers' EU market share for trucks over 6 tonnes GVW, 1993**



Source: DRI Europe

demand. Demand for 1994 remained weak and the market grew by 2 %. A revival of demand of around 10 % is expected in 1995.

All EU vehicle manufacturers are expected to continue to streamline their operation to reduce costs and improve competitiveness. Introduction of four-wheel drive and multi-purpose vehicles will dominate car product development programmes in the short term. Joint development and production, already used with success in such programmes, is expected to continue as complexity increases, development costs escalate and manufacturers look for cost effective alternatives.

Apart from remaining financially viable in a difficult market, the attention of truck manufacturers will be focused on meeting the 1995-96 emissions legislation (Euro 2).

**Written by: DRI Europe**

**The industry is represented at the EU level by: Association des Constructeurs Européens d'Automobiles (ACEA). Address: Rue du Noyer 211, B-1040 Brussels; tel: (32 2) 732 5550; fax: (32 2) 732 6001.**

# Motor vehicle parts and accessories

NACE 353

The motor vehicle parts and accessories industry employs nearly the same number of people (approximately 1 million) as the motor vehicle industry it supplies. The parts and accessories sector presently includes a sizeable number of small firms; however, greater industry concentration is expected as trends in vehicle production techniques increasingly demand tighter cooperation with the parts and accessories industry. The business climate for parts and accessories is strongly tied to the cyclical performance of the motor vehicle sector. While supply of parts for new cars closely reflects fluctuations in new car demand, superimposed on this are several trends with long term influences. There has been a steady upgrade in car model mix to larger and better equipped models. At the same time, equipment levels on all vehicles is continuously improving, thereby increasing the value to component suppliers. Acting contrary to this, however, is the demand for improved durability and life expectancy of all vehicle components which has a significant effect on replacement demand. While the European car parc will continue to grow through the 1990's, much of the new car sales growth will be taken by Japanese transplants. The challenge for the European parts industry is to supply this demand and, in doing so, raise its performance to best world standards.

## INDUSTRY PROFILE

### Description of the sector

The parts and accessories market is traditionally broken down into two main segments. The first is the market for original equipment (OE), that is parts that car manufacturers buy from specialised producers for assembly into new vehicles. The second is the replacement market (or AM: after-market) which comprises parts destined for maintenance and repairs and automotive accessories. Roughly 75 % of the production goes to the OE market and 25 % to the AM market, although this can vary depending on the country and the individual product.

The precise coverage of the component industry in terms of products is difficult to assess. Data which corresponds to NACE 353 (parts and accessories for motor vehicles) is too narrow in its coverage as it excludes, for instance, heavy construction vehicles, tyre manufacturers who supply vehicle manufacturers, and most of the electrical and electronic components that are so important in vehicle manufacturing today. Furthermore, existing statistics, which are based on the production of companies of more than 20 employees, marginally understate the value of production of this highly fragmented industry.

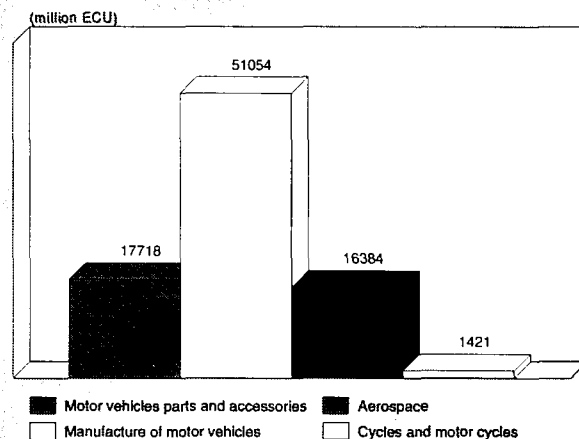
A study carried out for EU DGIII, also sourced in this monograph, covers a wider range of products than the strict NACE definition.

### Recent trends

With turnover estimated at almost 100 billion ECU, the EU parts industry is about half the size of the auto industry. In terms of employment, however, the parts and auto industries are much closer in size, with each having over 1 million workers. Figure 1 shows that the auto component industry adds more value than other well known industries in Europe.

Within the parts and accessories sector, independent manufacturers account for nearly 90 % of both production and

Figure 1: Motor vehicles parts and accessories Value added in comparison with related industries, 1993



Source: DEBA

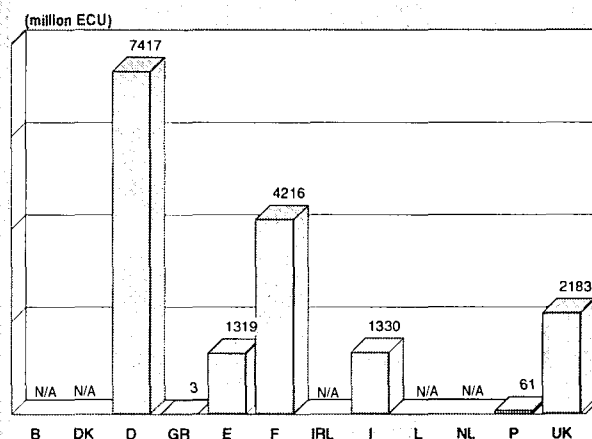
employment, with the remaining 10 % stemming from subsidiaries of vehicle manufacturers.

Turning to the breakdown of production by Member States, leading vehicle producing countries are also leading parts manufacturers. Germany accounts for more than 45 % of EU turnover, followed by France, the United Kingdom, Italy and Spain (see Figure 2). Similar rankings can be observed in the auto and parts industries. This is explained by a frequent geographical clustering of parts manufacturers in proximity to vehicle production sites.

During the 1980s, the parts industry expanded somewhat faster than its main industrial end-market, the auto industry. It grew consistently between 1982 and 1990, remained flat in 1991 and then dipped in 1992 and 1993, following the downturn in the vehicle market (see Figure 3).

After a 16 % drop in 1993, EU demand for passenger cars and light commercial vehicles increased by 5.6 % in 1994. Car makers are expecting new car demand to continue on its

Figure 2: Motor vehicles parts and accessories Value added by Member State, 1993



Source: DEBA

**Table 1: Motor vehicles parts and accessories**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	20 880	36 864	41 793	44 422	46 416	50 295	44 453	50 947	54 150	58 830	63 520
Production	26 862	39 943	44 743	47 077	48 889	52 476	46 903	53 012	55 850	60 230	64 620
Extra-EU exports	7 547	5 487	5 686	5 441	5 684	5 587	5 981	6 845	6 800	6 900	7 000
Trade balance	5 982	3 080	2 950	2 655	2 473	2 181	2 450	2 065	1 700	1 400	1 100
Employment (thousands)	496.6	515.8	530.3	540.4	538.9	534.4	499.7	475.5	480.0	490.0	490.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DPI forecasts.

Source: DEBA

way to recovery in 1995, although not quite to the 13.5 million level of 1992. This will continue to affect components suppliers, although they have the replacement parts market to marginally help buffer the fall in original equipment demand. In addition, a reduction in new car purchases results in the car parc (cars in use) getting older on average, resulting in more maintenance and replacement part expenditure.

Productivity improvements in the parts industry have been marginally faster than improvements in the vehicle manufacturing industry, on average. Improvements have been achieved thanks to rapidly expanding production rather than lay-offs and, as a result, employment was still higher in 1991 than in 1982. A substantial proportion of productivity gains have been transferred, by negotiation and sometimes by imposition, to the car makers so that upward price adjustments of parts and accessories have lagged far behind vehicle price increases. Car makers have partially reinvested their differential pricing gains in enriched vehicle equipment, thus keeping their suppliers' level of activity buoyant well into 1992. The sharp downturn in vehicle demand and production did not become visible until 1993 due to German reunification.

### International comparison

Once relatively sheltered from foreign competitors, EU component suppliers are now facing increased domestic, European and world-wide competition. This trend is fostered by several factors:

- The creation of the single market is forcing European suppliers to intensify cross-penetration of each others' markets.
- The increased internationalisation of EU car producers results in a geographically enlarged supply base, with tougher competition prompting a constant search for lower cost suppliers.
- The trend towards global supply contracts, rather than national and regional contracts of the past.

The Japanese component industry has several serious competitive advantages over its European counterpart. Although smaller than the EU industry (280 000 employees in first tier

suppliers, compared with 1 million people), the Japanese component industry is much less fragmented and already benefits from the tiered structural shape which the EU industry is presently constructing. Aside from the 40 000 sub-contractors who form the second and third tiers of the pyramidal structure in the Japanese industry, there are only 310 first tier component suppliers, compared to 3 200 companies in Europe. The average size of the first tier enterprises is 900 people compared with the European average of 270. Including the sub-contractors, the per company average of employees would be just 5.5. Of the Japanese firms, 45 % employ more than 500 people, compared with only 10 % in Europe.

Japanese companies have close organisational and financial links with vehicle manufacturers, and most of them are attached to groups around a major manufacturer. For instance, Nippondenso (the largest Japanese component producer) is partly owned by Toyota. Many component producers are owned by more than one vehicle producer. This system has resulted in an industry which is more specialised and concentrated than the European industry.

According to a study undertaken for the EU Commission, the EU industry remains competitive with Japan in terms of technology, but suffers (in its first-tier segment) from several disadvantages such as lower labour productivity, lower product quality, lower stock turnover, and slower design and development cycles.

When the Japanese car manufacturers started building cars in North America, their inclination was to put pressure on their traditional suppliers to come with them and set up new plants. While they needed high local content, they did not think that existing US component companies would be willing or able to provide them with components and systems of the quality and at the price they were accustomed to receiving from their close knit "keiretsu" suppliers. As a result, Japanese component companies set up over 300 plants in the US during the 1980s to support the growing vehicle production.

For several reasons this has not been repeated in Europe. One reason is that the projected volume of cars built in Europe

**Table 2: Motor vehicles parts and accessories**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	12.01	-0.76	6.14	-12.33
Production	7.19	-1.10	3.42	-11.46
Extra-EU exports	-10.83	-2.34	-7.15	1.54
Extra-EU imports	6.45	1.49	4.22	-3.92

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA



**Table 3: Motor vehicles parts and accessories  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	7 547	8 186	7 770	7 923	5 487	5 686	5 441	5 684	5 587	5 981	6 845
Extra-EU imports	1 565	1 685	1 863	2 079	2 408	2 736	2 785	3 211	3 406	3 530	4 780
Trade balance	5 982	6 501	5 907	5 844	3 080	2 950	2 655	2 473	2 181	2 450	2 065
Ratio exports / imports	4.82	4.86	4.17	3.81	2.28	2.08	1.95	1.77	1.64	1.69	1.43
Terms of trade index	104.2	108.8	111.3	111.2	106.6	108.9	100.0	96.5	105.9	103.5	N/A

Source: DEBA

is, in many cases, too small to justify setting up new plants solely for transplants. The financial performance of the Japanese component companies in the US, to date, has been a growing cause for concern and, with falling margins throughout the Japanese car industry, they are not looking to repeat this mistake. Another reason is the intense political concern in Europe over the arrival of the Japanese transplants. The Japanese car companies have taken pains to reassure governments that they will be good Europeans, and one way of doing this has been to choose European component suppliers. While there have been some 50 new component plants set up by Japanese companies to date, and a few notable acquisitions or joint ventures (such as Calsonic and Nippondenso), for the most part, Japanese car producers have selected existing European companies to supply their components. What is

more, the Japanese car companies, particularly Nissan and Toyota, have set out, where necessary, to bring these companies up to Japanese standards. In so doing, they are making a real contribution to the European component industry. In Europe there has traditionally been an adversarial relationship between the vehicle makers and their suppliers, with the vehicle makers continuously demanding lower prices and threatening to use competitors. While this is now beginning to change, the Japanese have been much more concerned about their suppliers' costs, and helping them to improve their quality and efficiency. Thus, they have developed more constructive and certainly more long-term partnerships. The long-term result of the arrival of the Japanese transplants in Europe will be to accelerate the restructuring of the components industry and to help raise its standards to world class. The benefits of this will be available, not only to transplants, but to all European vehicle makers.

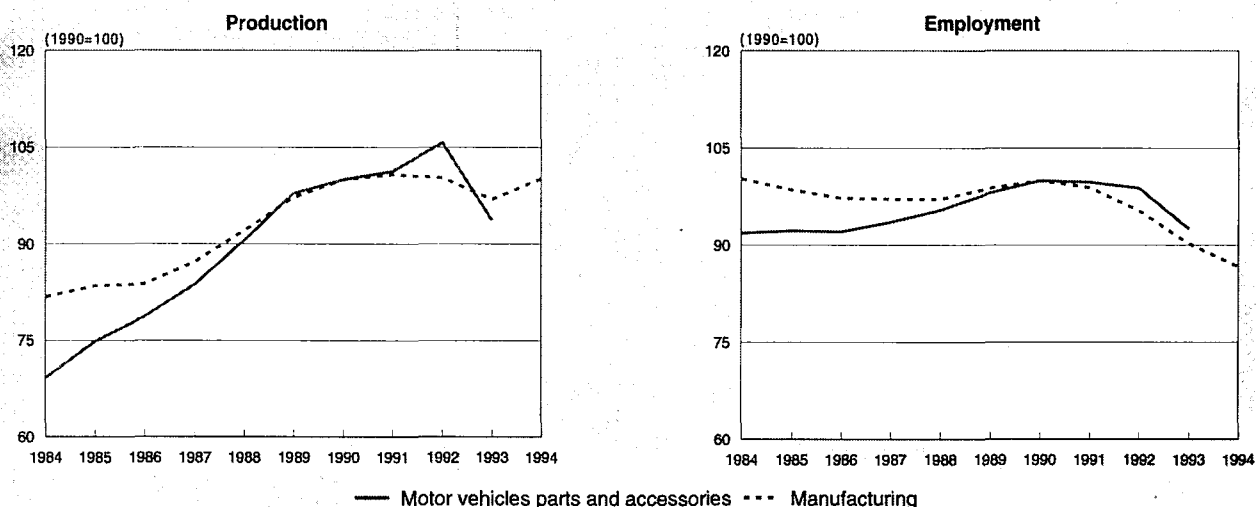
Starting from this idea that the collaboration between automobile manufacturers and automobile suppliers should be based on a mutual trust and a mutual gain relationship, ACEA, the representation of the European automobile industry, and CLEPA, the association of the European automotive supplier industry, have recently agreed on "European guidelines for cooperation between automobile manufacturers and their suppliers". These guidelines aim at further improving the two industries' relationship by means of joint problem and solution sharing, and joint search for perfection in quality, logistics, administration and customer satisfaction.

**Table 4: Motor vehicles parts and accessories  
Total component demand**

(billion ECU)	1992	1999
BR Deutschland	39.4	35.5
España	8.2	9.5
France	15.9	16.8
Italia	9.4	10.9
United Kingdom	11.2	17.7
Rest of the EU	4.8	6.1

Source: Boston Consulting Group

**Figure 3: Motor vehicles parts and accessories  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

**Table 5: Motor vehicles parts and accessories  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	75.2	81.1	85.5	89.4	94.9	99.7	100.0	101.6	106.9	101.2
Unit labour costs index (3)	94.7	94.2	94.9	96.2	94.8	95.0	100.0	105.6	106.2	113.0
Total unit costs index (4)	82.9	85.4	87.8	89.9	93.2	96.4	100.0	104.1	105.9	108.2
Gross operating rate (%) (5)	5.73	6.69	7.61	8.73	8.75	9.35	7.45	6.99	6.96	5.04

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

Figures 4 and 5 compare component production in the USA, Japan and Europe. In the USA production stagnated in the period from 1984 to 1993, while it doubled in Japan and increased by 75 % in Europe. However, while the USA was recovering in 1992 and 1993, Japan and Europe were still feeling the effects of recession.

### Foreign trade

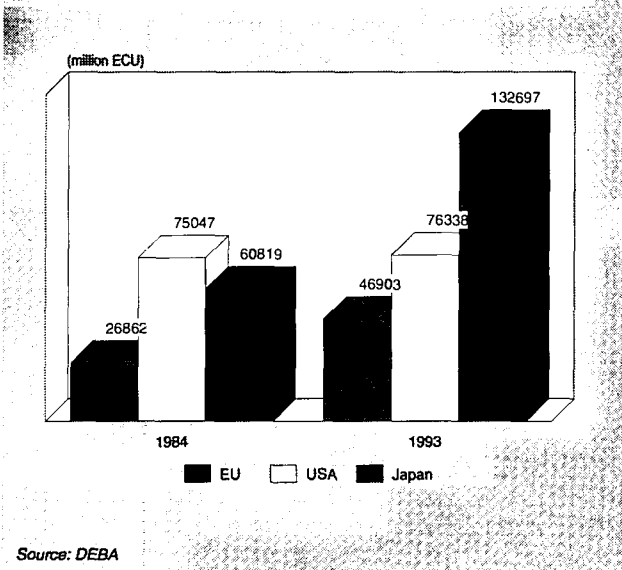
The internationalisation of the industry has been a determining factor in the substantial increase in foreign trade since 1980. The expansion of intra-EU trade has been particularly rapid in recent years as intra-EU trade reached the 14 billion ECU level in 1991, a threefold increase compared to 1980. The industry remains essentially intra-EU oriented and intra-EU imports are more than 4.4 times higher than extra-EU imports, a ratio which is usually in the 2 to 2.5 range for most of the other engineering and transport industries. Given the difficult nature of defining the industry, a word of caution regarding trade figures is in order. Statistics on trade are not necessarily related to the independent component industry's products, but frequently include the movements of the vehicle makers own in-house products to and from assembly plants across national borders, thus causing significant distortions in the data.

The industry is a traditional balance of payment earner. After a peak in 1985, when it reached 6.5 billion ECU, the EU trade surplus decreased to almost 2.5 billion ECU in 1991. The second half of the 1980s were marked by a rapid increase

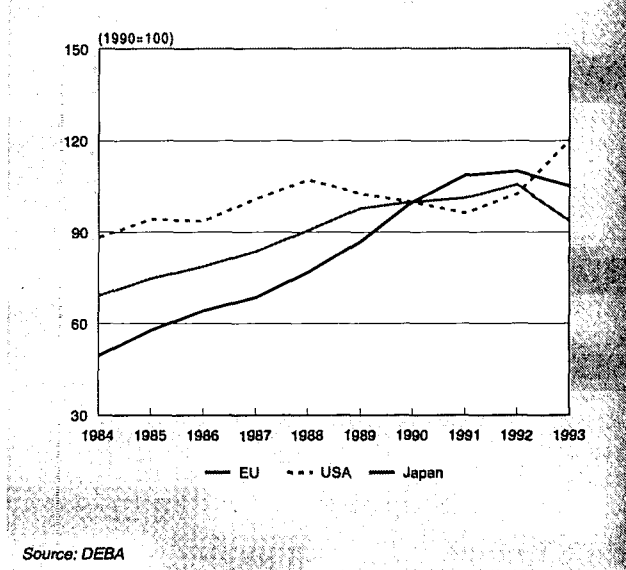
in extra-EU imports and a relative stagnation in extra-EU exports. This situation is partly attributable to a change in the classification of trade statistics and, more importantly, to the rapid growth of car demand experienced in Europe between 1986 and 1990. During that period, European parts producers were predominantly busy trying to meet increased demand from EU car manufacturers. As a result, their export effort remained limited, while imports were boosted by the buoyancy of the EU car market. Nevertheless, the trend was not really reversed in 1990 and 1991 when European vehicle demand was somewhat weaker. The dwindling European trade surplus certainly signals some of the structural problems presently encountered by the European industry.

Extra-EU exports are relatively diversified in terms of destinations with the EFTA countries and North America respectively accounting for about 24 % and 20 % of total shipments. Developing countries also remain an important end market with a share of more than 35 %. In terms of extra-EU imports, flows are more concentrated with 50 % of total non-EU supply originating from the EFTA countries, Sweden in particular. With a share of 20 %, Japan is the second largest supplier to the EU. Trade with North America has dwindled considerably in recent years both in terms of imports and exports. With regard to the EU trade surplus, Germany continues to be the major contributor.

**Figure 4: Motor vehicles parts and accessories  
International comparison of production in current prices**



**Figure 5: Motor vehicles parts and accessories  
International comparison of production in constant prices**



**Demand**

Component demand is linked to the level of automotive production. However, some components benefit from faster growth than the auto market in general. This situation exists where a component's rate of penetration of vehicles is still on the rise, such as where equipment which previously was optional (primarily in the upper car segment) is now fitted as standard on most models. Some examples include: electronic fuel injection, anti-lock brakes and air conditioning systems. In addition, component manufacturers have benefited from a trend towards increased out-sourcing.

On the other hand, demand for replacement parts depends on the usage of cars and other motor vehicles, as opposed to new sales. Demand is likely to be more stable in this market than in the original equipment market. The replacement parts market differs greatly from country to country. Market features in various EU countries depend largely on the annual mileage per vehicle, the age of the car parc and the existence of specific legislation with regard to obligatory inspection of vehicles when they reach a certain age.

**Supply and competition**

The supply of original equipment is undergoing fundamental structural change. Increasing internationalisation of vehicle manufacturers calls for the emergence of large international (sometimes world-wide) component manufacturers. In addition, the pattern of relationships between manufacturers and suppliers is being substantially modified. A rising share of the value added generated in the auto industry is transferred from vehicle to component manufacturers. To some extent, the balance of power is now shifting from the former to the latter. A good example is the Ford Mondeo launched in 1993, which uses the same supplier for many components in both North America and Europe.

A major reason behind such a change arises from the necessity for car manufacturers to limit investment and resources to essential activities which represent the core of their industry. One method is to increase out-sourcing and to pass on the responsibility for product development, manufacturing and quality assurance functions to their suppliers (systems suppliers and/or specialised affiliated companies). Component producers contribute to the competitiveness of the industry, and the two sectors become increasingly interdependent.

Although conceiving, designing and producing in accordance with manufacturers' specifications, the component producer is increasingly technically autonomous. This is typically the case with systems suppliers who possess proprietary technology and product know-how. As a result of these transfers of value added, car manufacturers reduce the number of their suppliers to a smaller number of large producers, who in turn out-source part of their output to smaller companies; thus, the whole supply chain forms a tiered structure.

It is generally accepted that the overall level of outside purchasing carried out by European car manufacturers (60 % to 70 % of total component requirements) is more important than in the US industry (40 % to 50 %), but less than in Japan (around 80 %). However, within the EU there is a great variation between manufacturers.

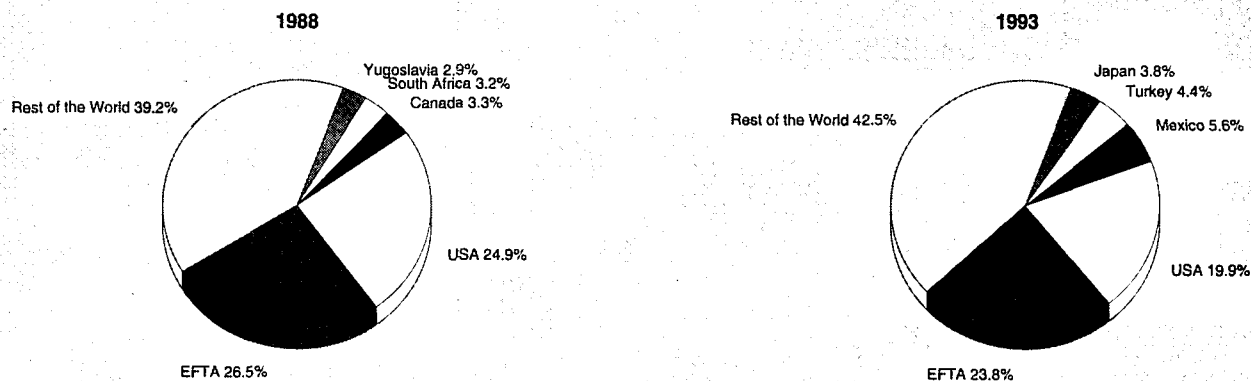
Turning to the market for replacement equipment, it is estimated that about 70 % of the market is supplied by independent parts manufacturers, with the remaining 30 % controlled by car manufacturers via their distribution and service networks. With regard to the origin of such parts, however, car manufacturers only take a 10 % share of the market.

**Production process**

The nature of automotive products, together with shorter product life cycles, has put increased emphasis on the technological content of automotive parts. More use of electronics and new materials has led to increased collaboration with other leading high-tech industries, and a sizeable investment in R&D at all levels of the pyramidal structure of the component sector. Once almost exclusively oriented towards applied engineering, R&D resources of the sector are now taking greater initiative in terms of new technologies offering improved performance, fuel economy, emission control, safety and comfort. Suppliers have an increasing involvement during the early stages of the development process of new vehicles.

Competitive pressure on costs, prices, quality and delivery standards has led the industry to restructure in a parallel manner to that of car manufacturers. Automotive parts suppliers compete on the basis of price, as well as, delivery and quality. Just-in-time, zero-defect, CAM (Computer-aided manufacturing), automation, and faster communication systems are some of the features which have allowed substantial productivity gains while improving flexibility and allowing quality assurance schemes to be put in place. Linking of these various systems, combined with electronic linking of component sup-

**Figure 6: Motor vehicles parts and accessories  
Destination of EU exports**

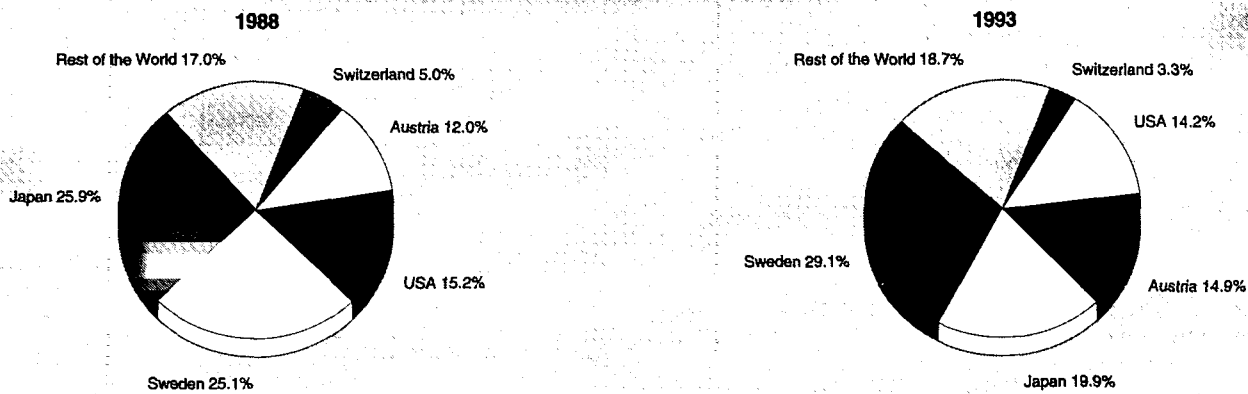


Source: Eurostat





**Figure 7: Motor vehicles parts and accessories  
Origin of EU imports**



Source: Eurostat

pliers and vehicle manufacturers will provide long term efficiency benefits. However, this process (requiring sizeable investment and a recourse to skilled manpower) is far from being complete, especially among small to medium-sized producers.

## INDUSTRY STRUCTURE

### Companies

The industry is basically composed of three types of producers: large system suppliers with a global presence and substantial R&D capability; medium-sized first-tier component suppliers also increasingly with in-house R&D capability; SME second- and third-tier parts suppliers.

The trend towards more component out-sourcing by car manufacturers combined with fundamental changes in the nature of the industry are having a dramatic impact on the number of independent operators present in the industry. Vehicle manufacturers are cutting back on the number of suppliers and committing larger shares of their purchasing requirements to preferred systems suppliers. These systems suppliers then out-

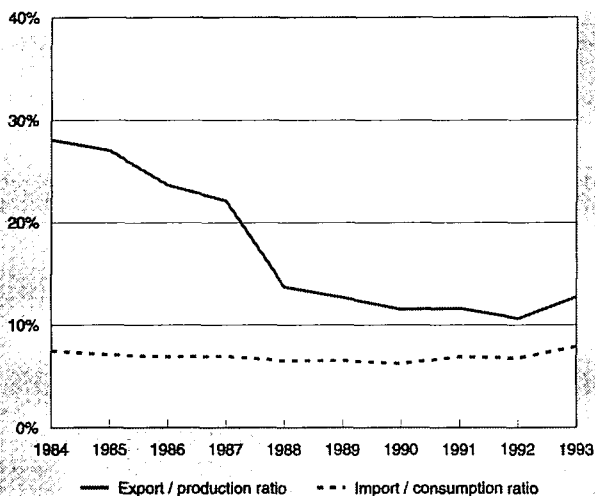
source part of their work to second or third tier suppliers. Overall, during the period 1988 to 1993, it is estimated that each single vehicle manufacturer has reduced by almost 50 % the number of its direct independent suppliers. A large part of this reduction has been achieved via mergers, take-overs and consolidations among previous competitors or companies having industrial synergies, such as Valeo and Neiman and also Magneti-Marelli, Solex, Jaeger and Weber. However, the total number of suppliers directly servicing the vehicle makers should not have decreased by more than 25 %. Supply relationships are, however, very difficult to estimate given the large number of models produced by manufacturers, and the underlying groups of parts suppliers supporting each model line.

In spite of the increased presence of large international companies, the original equipment sector continues to be very fragmented. The average size for firms is about 270 people, but 64 % of these enterprises employ less than 100 persons. Only 4 % of the companies account for 50 % of total employment (firms with more than 1 000 employees). This is essentially due to the nationally based nature of parts procurement. Although intra-EU trade has grown to extremely high levels during the past decade, most vehicle manufacturers continue to source largely from their domestic suppliers. For instance, Daimler-Benz procures approximately 90 % of its needs from Germany, Renault, about 70 % from France, and Fiat, about 85 % from Italy.

The independent German industry dominates the European market with over 45 % of total European production (estimated at 79 billion ECU in 1988). This strength comes from the sheer size of the German motor vehicle industry, the importance of the upper market segment, and from strict legislation on car maintenance. The large German firms have played a major role in developing new products as illustrated by Bosch (the world's largest unaffiliated auto parts producer) which is a pioneer in the fields of fuel injection and anti-locking brake systems. Bosch alone is estimated to account for nearly a quarter of German production. The leader's vitality aided many smaller firms and contributed (together with other large firms such as ZF, Fichtel and Sachs, Teves, and VDO) to Germany's unchallenged leadership within Europe.

The French industry is the second largest in Europe, with about 23 % of the European total. Its structure is still characterised by a large number of nationally oriented small to medium-sized producers. Major restructuring has taken place in recent years, led by the three international scale groups: Valeo, Bertrand-Faure and ECIA (PSA group).

**Figure 8: Motor vehicles parts and accessories  
Trade intensities**



Source: DEBA

**Table 6: Motor vehicles parts and accessories  
EU automotive components industry consumption, 1992**

(billion ECU)	Replacement OE market	market	Total
BR Deutschland	34.3	5.1	39.4
España	6.5	1.7	8.2
France	12.2	3.7	15.9
Italia	6.3	3.1	9.4
United Kingdom	6.9	4.3	11.2
Rest of the EU	1.9	2.8	4.7

Source: Boston Consulting Group

The Italian industry (which accounts for about 14 % of European production) is dominated by the Fiat group. The leading producer is Magneti-Marelli (a subsidiary of Fiat) which now has an increased presence in all major European markets. Widely dispersed in the early 1970s, the sector is being tightly restructured under the influence of Fiat.

The United Kingdom components industry (10 % of the total sector) has been badly hit by the decline of British vehicle production and its excessive dependence on domestic manufacturers. However, the major British component producers (such as Lucas, T&N and GKN) have performed well in the important replacement market. The increased rate of (Japanese) investment in automotive production in the United Kingdom has strengthened their position in a home market with considerable potential. British component manufacturers have expanded overseas through investment and acquisition. In addition, the decline in value of the pound sterling has greatly assisted the UK industry's exports during the 1992 to 1994 period.

The Spanish industry has emerged since the late 1970s as another important producer of automotive components, having reached a size comparable with the United Kingdom. Originally developed to comply with local content requirements, the industry has grown considerably since the early 1980s thanks to the increased importance of Spain as a car manufacturing country. However, most of the component producers present in Spain are subsidiaries of foreign companies.

### Strategies

As the Japanese car industry has shown, the trend for car manufacturers to rely on a smaller supply base implies fundamental changes in the structure of the sector. This means an increase in the out-sourcing of high-value added products, faster growth in R&D expenditure and a need for organisations to adapt to new constraints (excellence in quality, delivery and price, not to mention production flexibility). Finally, there is a need to share productivity gains with car manufacturers, and to finance a growing share of development and machinery costs (tooling and specific equipment) necessary for production dedicated to one vehicle manufacturer.

In return, car manufacturers are offering longer term purchasing commitments and closer co-operation, both of which contribute to improved stability in supplier/customer relationships.

As a result of this process, the component industry will increasingly be reshaped into a pyramidal structure. First tier suppliers with a world-wide presence, proprietary technology and scale economies will design and supply full systems rather than single components. They will out-source part of their work to smaller second or third tier suppliers. The observed trend toward increased concentration will continue during the decade, but a further radical reduction in the number of independent producers is unlikely since many will survive as second or third tier suppliers.

### Impact of the Single Market

The impact of the Single Market programme on the automotive components sector has been globally positive. Both production and trade of the industry's products have been greatly enhanced by the elimination of controls at internal borders and by the abolishment of all non-tariff barriers. Distribution channels have also been positively influenced by the creation of a Europe-wide trade area, albeit the impact has been reduced by the fact that distribution channels only play a significant role for the components destined for the replacement market (which represents only 25% of the market).

Additionally, the measures aiming at achieving free movement of capital and easing cross-border payments have been beneficial to this internationally-oriented sector.

The main remaining obstacle to the completion of Single European Market for automotive components is identified to be in the field of indirect taxation, where the lack of harmonisation makes trading conditions among Member States more complex.

### OUTLOOK

Automobile sales in 1994 are expected to rise to 12.0 million, an increase of 5.1 % over 1993. In addition, further increases of 4.2 %, 6.3 % and 6.5 % are expected for 1995 through 1997. In 1997, total European car production will exceed 14 million for the first time. The medium term outlook is therefore bright. However, most of the European industry expects a cyclical downturn around 1999 to 2000. The main source of overall component market growth will come from the Asia-Pacific region (excluding Japan); particularly China, Malaysia, Thailand, Taiwan and South Korea.

With regard to the original equipment market, most of the growth will result from: vehicles increasingly fitted with such standard equipment as automotive electronics, anti-pollution devices and more efficient safety restraint systems; the general "up-market" move in car demand with customers demanding more equipment, comfort and power; and, the increase in high added value component out-sourcing by car manufacturers.

With regard to the replacement market, it should be remembered that this segment is governed by the number and the condition of vehicles on the road, as well as changes in consumer behaviour. These changes can either come about spontaneously, or be spurred by legislation on vehicle testing or compulsory maintenance. The constitution of the single market makes it likely that such measures will spread to countries where they have been absent until now. This, combined with the consumer's desire for safer and more comfortable driving, and the expected growth of the total car parc in Europe, implies that there will be promising demand growth in the replacement parts market. Technological advances should, however, result in more durable parts and slow replacement cycles. Increased opportunities in East European markets will also have a positive influence on demand for automotive components.

The overall outlook for growth in motor vehicle parts and accessories is good, but major adaptation and competitive efforts from the industry are urgently required.

Written by: DRI Europe

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# Mopeds and motorcycles

NACE 363

Apparent consumption of mopeds and motorcycles increased steadily in the EU from 1985 to 1992 before falling in 1993 as the recession began to bite. Production value rose, albeit intermittently, until 1993, fell sharply in that year but showed slight growth in 1994. The EU has a substantial trade deficit on mopeds and motorcycles, following very sharp import growth throughout the last decade. The EU industry is instituting measures aimed at increasing competitiveness - restructuring, mergers, licensing production to low-cost labour markets, investment in R&D. With strong growth returning to EU Member States, the short term outlook is quite favourable. There are prospects of rising demand and a gradual increase in output of EU-produced mopeds and motorcycles from 1995 onwards. In the medium term continued growth in demand and output is expected, with the rate of growth slowing marginally.

## INDUSTRY PROFILE

### Description of the sector

NACE 363 comprises the manufacture of mopeds, motorcycles, scooters, bicycles and their parts and accessories (bicycles are discussed in another monograph). The largest component of the industry is the production of mopeds and motorcycles where mopeds are defined as motor driven vehicles of two to three wheels and an engine displacement not exceeding 50 cc and a maximum design speed of 45 km/h. Motorcycles are motor driven vehicles with two to three wheels with an engine displacement greater than that of mopeds. This sector covers a wide range of products with varying demand profiles. In both the moped and motorcycle sectors there are scooters, roads sport, trail and U-frames models. The motorcycle sector varies from small capacity motorcycles (51-125cc) which may be used for commuting, to large capacity 650cc to 1200cc sports and touring models.

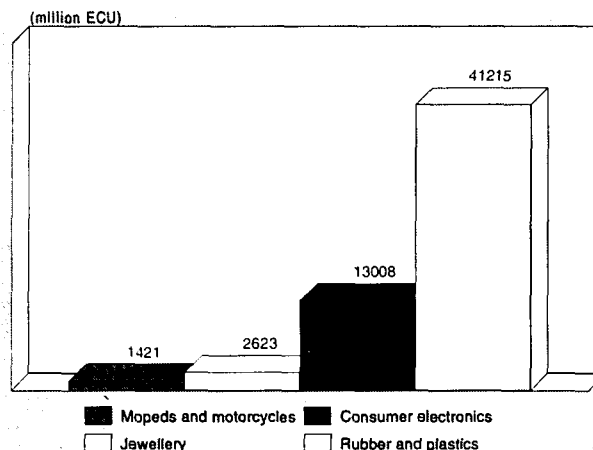
### Recent trends

Production of mopeds and motorcycles stagnated during the first half of the 1980s, with a turning point of sorts in 1988 and 1989 when demand began to increase. Production value in current prices more than doubled between 1984 and 1992 before falling sharply in 1993 as recession in the European markets reached its nadir. Output value is estimated to have risen slightly in 1994 as markets began to recover. Thus, in 1994 the value of EU production is estimated to be below its 1990 level. Growth in moped and motorcycle production compares poorly with most EU manufacturing industries. Output growth in constant prices between 1984 and 1993 was less than half of that achieved across all EU manufacturing. Similarly, employment has declined much faster than in most manufacturing sectors.

Italy dominates EU moped and motorcycle production in terms of volume and value. In 1993 Italian output accounted for 50 % of moped and 70 % of motorcycle production in unit terms. In value terms Italy accounted for over 40 % of total EU output.

Trends in production in Italy over the last ten years have run counter to those in other EU Member States. Output value in the Italian moped and motorcycle sector rose by 66 % and 51 % in current and constant prices, respectively. This increase has compensated for declining production in other Member

Figure 1: Bicycles, mopeds and motorcycles  
Value added in comparison with related industries, 1993



Source: DEBA

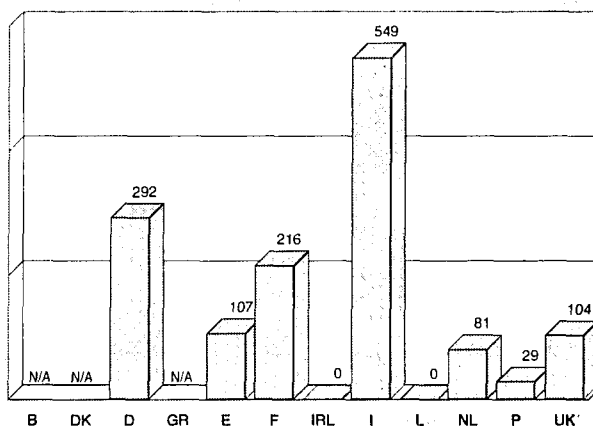
States. The fallout in terms of job reductions has been similar with employment falling by a third.

Italy's dominant position reflects its historically strong industry and government policy which promoted market growth and protected the industry by banning imports of mopeds and of motorcycles with an engine content of less than 380cc. Italy has also benefited from Yamaha's (JPN) license agreement to manufacture engines in cooperation with Minarelli and the establishment of a Honda (JPN) factory.

These favourable production trends have motivated Italian component manufacturers to invest, and has created in Italy's a relatively strong component industry. Italy was therefore better positioned to compete with other global companies when the market was reopened due to EU agreement.

In value terms Germany is the second largest producer with a 20 % share followed by France and Spain with 14 % and 6 % respectively. Of these major producers, only in France has real output fallen over the last 10 years. More recently,

Figure 2: Bicycles, mopeds and motorcycles  
Value added by Member State, 1993



Source: DEBA

**Table 1: Bicycles, mopeds and motorcycles**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	3 753	4 588	5 782	6 718	7 278	7 838	7 175	6 835	7 410	8 060	8 670
Production	3 434	3 816	4 570	5 087	5 060	5 393	4 657	4 719	5 010	5 260	5 470
Extra-EU exports	554.0	541.8	568.1	628.6	627.0	584.1	651.6	778.6	830	860	890
Trade balance	-319.1	-771.9	-1 212.6	-1 630.8	-2 217.9	-2 444.6	-2 517.5	-2 115.9	-2 400.0	-2 800.0	-3 200.0
Employment (thousands)	62.5	47.5	49.6	49.8	48.4	45.1	42.0	39.4	40.0	40.0	40.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Bicycles, mopeds and motorcycles**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.97	2.74	3.42	-11.15
Production	1.87	-0.67	0.73	-10.47
Extra-EU exports	-6.49	-0.41	-3.83	10.95
Extra-EU imports	5.10	9.98	7.24	-8.08

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Bicycles, mopeds and motorcycles**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	554	609	570	521	542	568	629	627	584	652	779
Extra-EU imports	873	795	887	1 079	1 314	1 781	2 259	2 845	3 029	3 169	2 895
Trade balance	-319	-186	-316	-558	-772	-1 213	-1 631	-2 218	-2 445	-2 517	-2 116
Ratio exports / imports	0.63	0.77	0.64	0.48	0.41	0.32	0.28	0.22	0.19	0.21	0.27
Terms of trade index	99.5	96.8	99.6	95.1	91.3	89.8	100.0	98.1	97.4	86.0	N/A

Source: DEBA

**Table 4: Bicycles, mopeds and motorcycles**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	68.0	70.6	78.5	78.3	87.0	93.9	100.0	99.3	112.4	108.1
Unit labour costs index (3)	99.9	104.5	98.3	103.4	98.4	97.3	100.0	108.4	99.5	99.6
Total unit costs index (4)	81.6	83.9	84.2	90.3	93.2	98.4	100.0	103.1	103.0	99.4
Gross operating rate (%) (5)	7.94	6.61	8.94	7.46	7.74	8.15	9.09	8.71	9.03	8.44

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

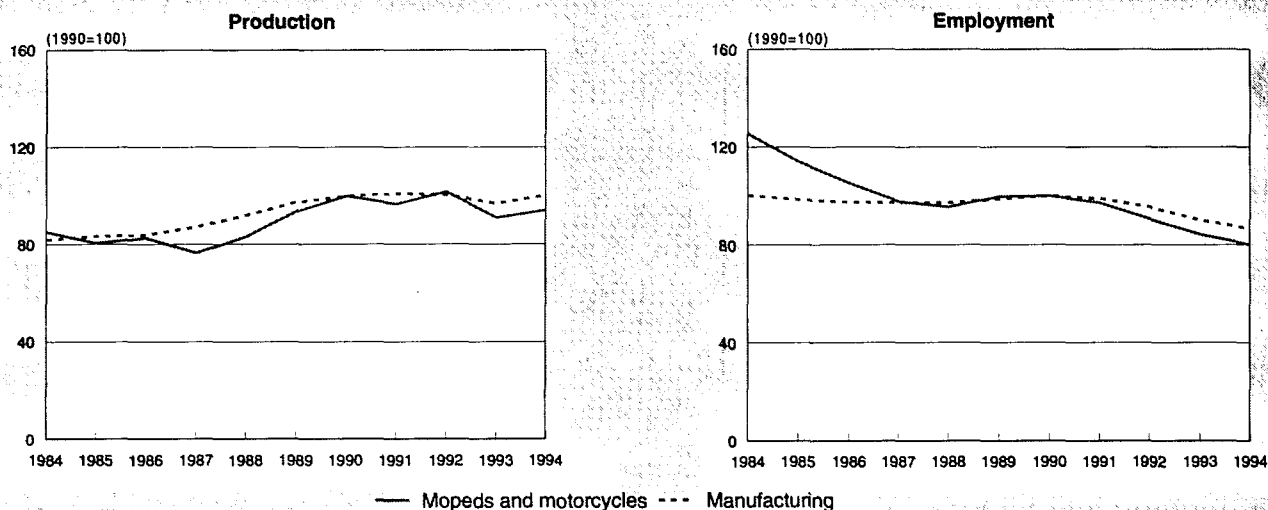
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Bicycles, mopeds and motorcycles**  
**Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
 Source: DEBA

output in Italy rose by nearly 13 % in current prices in 1994 and in Germany by 3 % but fell in most other Member States with a particularly sharp downturn in Spain, by 22 %.

Including vehicles produced or assembled by Japanese manufacturers, which account for approximately 200 000 units, the EU produced 1.5 million vehicles in 1992 of which 80 % were mopeds. In 1993 output was lower with approximately 1.1 million mopeds and 250 000 motorcycles. Production in 1994 is expected to have recovered to the 1992 level.

Apparent consumption in value terms of mopeds and motorcycles in the EU in 1993 was 91 % higher than a decade earlier. In real terms growth averaged a respectable 3.4 % per annum, between 1984 and 1993, although EU consumption fell by 13.6 % in current prices and by 11.2 % in constant prices in 1993. Annual purchases of vehicles in the EU amounted to approximately one million mopeds and 550 000 motorcycles in 1993. In volume terms, the EU manufactures more mopeds than are purchased within the EU, but EU consumers purchase over twice as many motorcycles as are manufactured in the EU.

In value terms apparent consumption of mopeds and motorcycles is highest in Germany. In 1993, Germany accounted for 30 % of the value of EU consumption, following 11 % growth in 1993. In the motorcycle segment Germany accounted for approximately 40 % of all motorcycle sales in 1994. The second largest market in value terms was Italy with a 20 % share, although consumption fell sharply by more than 30 %, in 1993. In 1994 Italians bought nearly half of all mopeds sold in the EU and more than one tenth of the motorcycles. French consumption in value grew slightly to an 18 % share. In Spain consumption fell by 15 % in 1993 to under 9 % of the EU total. The UK and the Netherlands each accounted for approximately 7 % of the value of EU consumption.

With the exception of 1989 and 1990 employment in the moped and motorcycle sector has fallen steadily over the last decade. In the ten years to 1994, jobs in the sector fell by over a third, three times faster than in the EU manufacturing sector as a whole.

#### International comparison

EU moped and motorcycle production in 1993 prices was equivalent to 65 % of Japanese production and three and one-half times the USA's output. This ranking reflects growth

trends over the last ten years. Trends in the moped and motorcycle industry have varied considerably between the EU, Japan and the USA. Only the EU experienced output growth which was significantly more rapid in current than in constant prices, i.e. average output prices increased. In contrast, output prices fell quite sharply in the USA and hardly changed in Japan.

Reflecting this, while real output in the USA increased moderately between 1984 and 1992, the current price value of this output fell. In the EU over the same period production in current prices increased by 36 % and in constant prices by 7 %. In Japan production in current prices grew by 88 % from 1984 to 1993, and in constant prices rose by 82 %, easily surpassing growth in both the EU and USA. Total numbers produced in Japan fell during the 1980s indicating a shift towards production of large motorcycles. The extent of the divergence between Europe, the USA and Japan is evident in the average annual production growth rates in constant prices from 1984 to 1993. For the EU, the USA and Japan these were respectively 0.7 %, 1.7 % and 6.9 %.

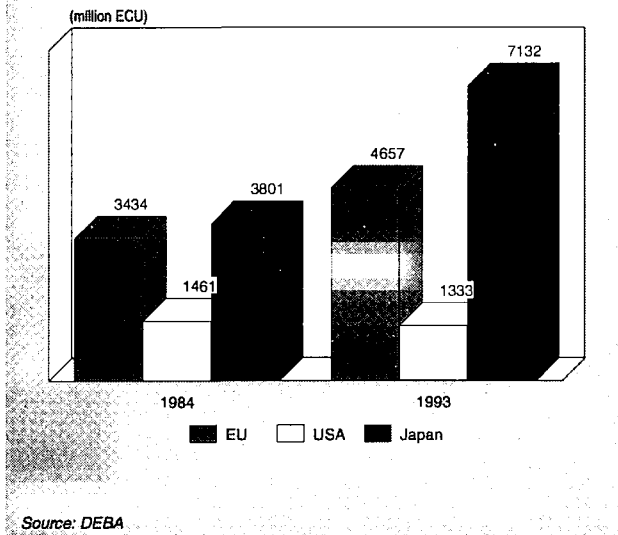
#### Foreign trade

Extra-EU exports have remained stable throughout most of the last decade, but with intermittent growth in some years contributing to an overall increase of 18 % over the 1984-93 period. Most growth years were in the second half of this period, with particularly sharp rises in 1989 and 1993. In 1993 export growth was an impressive 12 %. The value of extra-EU exports in 1993 amounted to 14 % of the total value of 1993 production. The export/production ratio showed no overall increase between 1983 and 1993.

Conversely, import growth has caused a sharp rise in the EU's external trade deficit. During the period 1984-1993 extra-EU imports increased by 263 % in current prices, an annual average growth rate of 15 %. Over this period growth in extra-EU import value slowed from a peak of 36 % in 1989 to 5 % in 1993. Import penetration in the EU in 1993 was 44 %, equivalent to 68 % of the total value of 1993 EU production. The EU's external trade deficit is driven by substantial imports of motor-cycles on which the EU runs a large trade deficit. The EU is a marginal net exporter of mopeds.

As a result of strong export growth and slowing import penetration, the increase of the external trade deficit slowed to

**Figure 4: Bicycles, mopeds and motorcycles  
International comparison of production in current prices**



3 % in 1993 compared to increases of 36 % and 10 % in 1991 and 1992. Overall, however, in the period 1984-93 the EU trade deficit in the moped and motorcycle sector grew nearly seven fold to 2 517 million ECU, equivalent to 54 % of EU production in current prices. Reflecting this the value of extra-EU exports as a proportion of imports fell from 77 % in 1984 to 21 % by 1993.

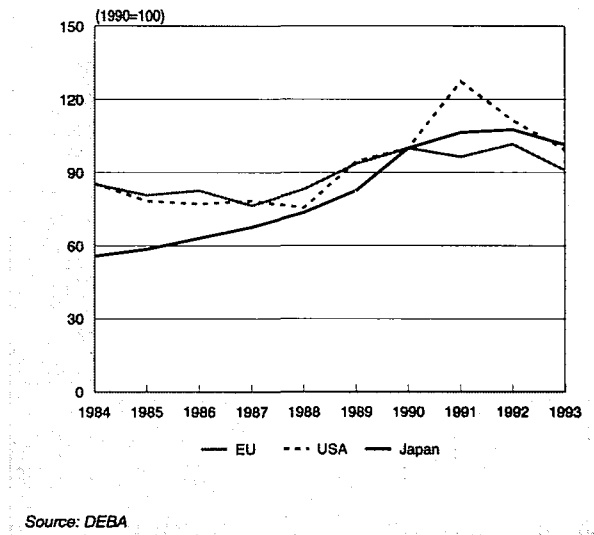
Intra-EU trade experienced strong growth during the 1980s and into the 1990s. Internal trade increased 92 % in current prices from 1988-1992.

Growth in extra-EU exports in the last five years has seen some diversification of export markets. In both 1993 and 1988, the then EFTA countries accounted for the highest share of extra-EU markets. However, while these countries purchased 41 % of EU exports in 1988, their share had fallen to 30 % by 1990. Over the same period the proportion of extra-EU exports to the USA also fell. There was slow growth in exports to Japan and significant growth in the share of the rest of the world. Worldwide, Asia is the largest market for mopeds and motorcycles with almost 3 out of 4 motorcycles and mopeds being sold in that continent, with China alone accounting for around a third of worldwide demand, about three times that of the EU.

This reflects the low car ownership and large population in Asian countries. These markets are also expected to grow rapidly over the remainder of this decade - in China moped and motorcycle ownership stands at only 3 per 1 000 inhabitants compared to 420 per 1 000 in Taiwan, which has the highest density in the world. While EU producers command a significant market share in Europe and despite recent, albeit small, advances they are virtually absent from these growth markets. In volume the EU's share of the USA market is approximately 3 % and in Japan less than 1 %.

The majority of imports to the EU (56 %) come from Japan with the main importing companies being Honda, Yamaha, Kawasaki and Suzuki. The proportion of Japanese imports declined in recent years, reflecting the transfer of Japanese production to the East Asian NICs. These countries are now major exporters of Japanese (and EU Member State) brands back to the EU. Between 1988-93 Taiwan more than doubled its share of extra-EU imports and consolidated its position as the second largest supplier. The third largest extra-EU supplier, the USA, also increased its share over 1989-93 period. The main USA exporter to the EU is Harley Davidson, which specialises in the 750cc plus market niche.

**Figure 5: Bicycles, mopeds and motorcycles  
International comparison of production in constant prices**



## MARKET FORCES

### Demand

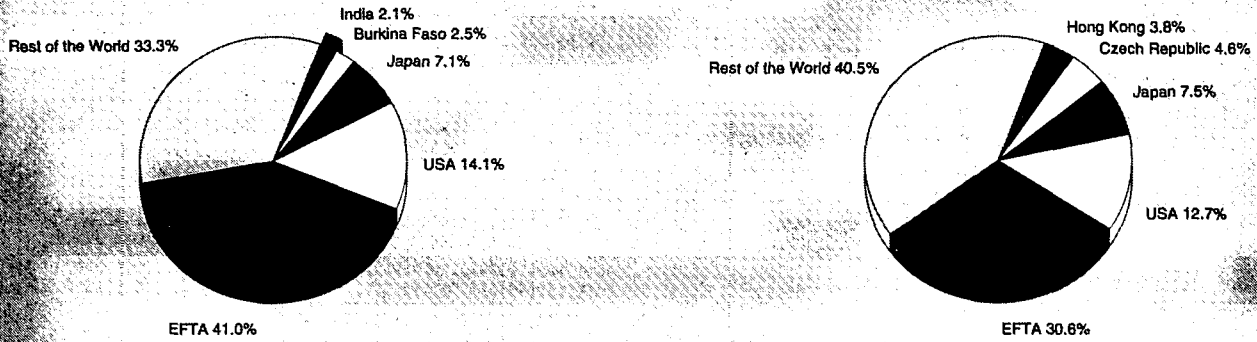
Overall economic conditions, personal disposable income and population trends, particularly the number of males aged 15-24, are key determinants of demand for mopeds and motorcycles. The recent recession led to a sharp fall in EU demand for these products as personal disposable income fell and unemployment increased.

Mopeds and motorcycles are an attractive means of transportation as they are more economical to run and generally carry a lower purchasing price than a car. Mopeds and motorcycles are also perceived to be more energy efficient and faster in congested traffic. Increasing congestion and pollution in European cities is likely to lead to increased restrictions on automobile access to sections of city centres. More cities may follow Rome and Milan in passing laws governing automobile access, which should increase the attractiveness of mopeds and motorcycles.

Increased traffic volumes can have a negative effect on demand as safety concerns surface regarding the operation of mopeds and motorcycles in dense traffic. Also, increasing safety requirements for drivers of these vehicles (helmet requirements, training, testing and licensing) serve to distract attention from the attractiveness of purchasing a moped or motorcycle.

Of the approximately 7.2 million motorcycles (excluding mopeds) operating in EU Member States during 1992, 78 % were in the EU's major markets of Italy (34 %), Germany (17 %), the United Kingdom (14 %) and France (13 %). Excluding the UK, where the number of motorcycles in use fell by 18 %, these countries experienced double digit growth rates in the numbers of motorcycles in use from 1987 to 1992 (Italy, 30 %, Germany, 16 % and France, 12 %). While the demand for new motorcycles had fallen in the UK it maintains a relatively large motorcycle park and there was 13 % growth in the number of motorcycle in use in 1993. Italy has the highest density of motorcycles per capita in Europe with 43 in use per 1 000 inhabitants, followed by Switzerland with 40, Spain with 24 and Luxembourg with 21. Similar statistics are not available for mopeds, although ACEM estimates the total park of motorcycles and mopeds at around 20 million vehicles. However, in 1990, the total number of motorised two-wheeled vehicles (mopeds and motorcycles) in use per 1 000 inhabitants was highest in the EU in Italy (142) followed by France (110), the Netherlands (64) and

**Figure 6: Bicycles, mopeds and motorcycles  
Destination of EU exports**



Source: Eurostat

Belgium (52). Switzerland lead Europe with a density of 145 vehicles per 1 000 persons. These figures must be treated with caution, however, since they include estimates of un-registered vehicles.

**Supply and competition**

Within the EU, Italy has consolidated its dominance as the most important producer of mopeds and motorcycles over the 1990s. About one third of Italy's total production of mopeds and motorcycles is bound for countries outside the EU. Extra-EU exports of motorcycles from all Member States declined 28 % from 1991-1992, while foreign sales of EU produced mopeds increased 40 % from 159 000 to 222 000 units during the same period. Foreign demand is most important for Italy, whose exports of mopeds increased by nearly 60 % from 1991-92.

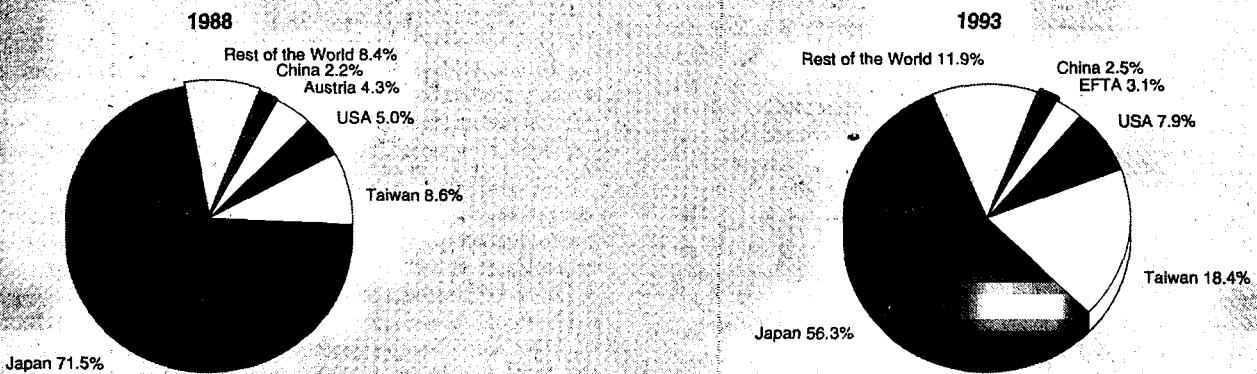
The recent EU recession hastened restructuring with an estimated 20 % fall in employment between 1990 and 1994. In Italy, which accounts for nearly 35 % of EU employment in this sector, employment fell by 7.6 % between 1992-94. Over the same period employment in this sector fell by 10 % in France and Germany, and by 27 % in Spain. In 1994 France was the second largest employer with 18.5 % of EU employ-

ment, Germany was third with 18.2 % and Spain fourth with 9 % share.

Labour productivity has risen steadily, alongside the shake out in employment, with increases particularly evident in the second half of the 1980s. Unit labour costs, on the other hand, have shown little change, while total unit costs rose. Difficulties in reducing costs of production in the EU has helped spur the growth in production in the East Asian NICs as EU producers license the manufacture of their products to low-wage countries.

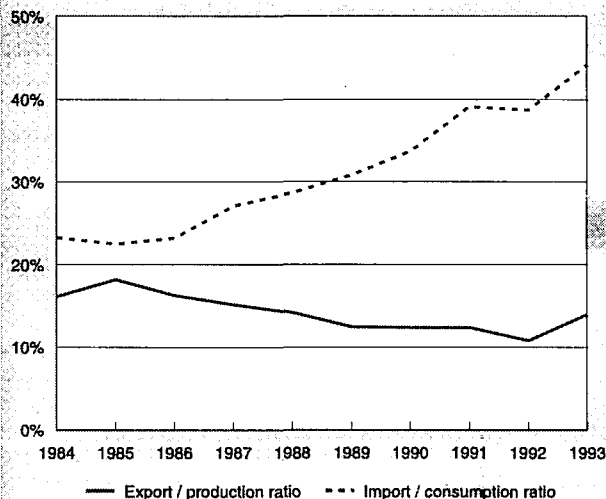
In the motorcycle segment European producers are lagging behind their Japanese competitors in terms of manufacturing cost and the ability to mass produce technologically advanced components. For certain key components European manufacturers are entirely dependent upon non-EU suppliers whose main customers are the Japanese firms which dominate the world market for motorcycles and mopeds. To some extent this constitutes a strategic risk. This risk is magnified by weakness in Europe's component suppliers who are in the main relatively small firms and characterised by relatively high prices and moderate output quality. Some companies manufacturing components for the car industry also supply the motorcycle/moped sector, and those are relatively large

**Figure 7: Bicycles, mopeds and motorcycles  
Origin of EU imports**



Source: Eurostat

**Figure 8: Bicycles, mopeds and motorcycles  
Trade intensities**



Source: DEBA

and secure. Among specialist motorcycle/moped parts suppliers, however, losses, under-capitalisation and a predominance of family-owned enterprises have restricted the availability of investment funds for expansion and increased R&D. The specialist component supply sector requires development and restructuring if European dependence on foreign suppliers is to be reduced. ACEM is currently campaigning for more inter-firm cooperation to help ameliorate this problem. A programme of joint purchasing and pre-competitive joint R&D for component suppliers has been suggested as a step in this direction.

The existence of many tariff and non-tariff barriers, particularly in the growth markets of Asia also restrict growth of European firms. Barriers relate to local manufacturing by European companies as well as product imports. In particular, these barriers limit or preclude sales of upmarket motorcycles, a niche where European brands' reputation for design and technical quality often give them an important competitive advantage. Restricted access to these markets, by constraining growth of European firms, limits the extent to which they can benefit from economies of scale and resulting lower unit costs.

### Production process

Falling levels of production as the 1980s progressed led to plant closures, restructuring and lower employment. Associated improvements in productivity have been one factor of increased competitiveness. The impetus to improve competitiveness has also come from the Single Market as major EU manufacturers actively pursue strategies to help capitalise on opportunities offered by the new EU environment. Common standards adopted by the EU will lead to further rationalisation and automation of manufacturing processes. Standards currently differ widely across the EU. This is apparent from differing requirements on the gearing on mopeds. In Belgium, France and Portugal, automotive gears are required; in Denmark, the maximum number of gears is 2 and in Spain, 4. The opportunities arising from the single market will also depend on a common transport policy and the result of trade talks with Japan regarding the opening of its market and easier access to its distribution network.

The industry is developing new technologies both in terms of the design of the vehicles and their construction. The use of CAD/CAM and robotics, laser cutting machines, improved

painting systems and more sophisticated quality control systems are assisting productivity improvements as manufacturers begin to produce single models marketable across the entire EU. In the large motorcycle segment European producers are leading in important areas of technology such as anti-lock braking systems.

The adoption of modular design concepts has allowed manufacturers to improve production and increase their range of models. A survey by ACEM of European manufacturers suggests substantial progress in output quality and in the introduction of "lean production" methods, with further advances in the pipeline.

Labour productivity varies, depending on the type of model produced by each company. Thus, in 1987, labour productivity ranged from 18 units per employee per year at BMW (D) in Germany to 102 at Honda (JPN) in Italy, and 122 at Moto Vespa (E) in Spain. On average, labour productivity is around 100 units per employee per year for the larger companies.

## INDUSTRY STRUCTURE

### Companies

The European moped and motorcycle industry is very concentrated, composed of a few large and very many small companies. However, by global standards the top European companies are relatively moderate in size by comparison to their global competitors. In the motorcycle segment sales of the 10 most popular European models accounted for approximately 27 000 units in 1992 while the top 10 Japanese models accounted for approximately 140 000 units.

The three largest manufacturers, Piaggio Group (I), Peugeot MTC (F) and MBK (F) account for more than 60 % of European production of mopeds and motorcycles. The remainder are produced by more than 30 small firms, including assemblers, and Japanese owned or controlled producers. More than half of the EU firms are located in Italy. Based on sales, the Italian Piaggio Group is the largest supplier of moped and motorcycles to the EU market. Piaggio is followed by Peugeot MTC.

The Piaggio Group includes Piaggio, Gilera (I), Puch (A) and Moto Vespa (Spain's largest producer). Other important Italian producers are the Cagiva Group (Cagiva, Ducati, Husqvarna and Moto Morini), Aprilia and the Moto Guzzi Group. Ducati and Moto Guzzi specialise in the large capacity motorcycles from 750cc to 1100cc. In 1993, the Piaggio Group announced the closure of its Gilera subsidiary's Arcore plant. Gilera will now only manufacture one line, the Typhoon 50 cc scooter. Production of this will be shifted to Piaggio's Pontedera plant. It is estimated that this cutback has resulted in a 40 % decrease in Piaggio's 125 cc production in 1993. Italy also has a large number of smaller producers.

France's largest producer is Peugeot MTC, primarily engaged in the manufacture of mopeds and scooters (50-80 cc). Some Peugeot scooters and 50 cc engines are built under licence by Honda (JPN). In Spain, Moto Vespa and Derbi are the main manufacturers accounting for 59 % of Spain's output of mopeds and motorcycles. The assembly operations of three Japanese companies, Honda, Yamaha and Suzuki, account for one-third of local production in Spain.

Germany's largest producer is BMW. It focuses strictly on the manufacture of top of the line motorcycles with large capacity engines. In Portugal, SIS Vehiculos Motorizados LTDA is the largest manufacturer, producing mopeds equipped with engines either from Fichtel & Sachs (D) or Franco Morini (I). The second largest manufacturer in Portugal is Famel. In the Netherlands, the most important manufacturer, Sparta BV, produces light mopeds. The assembly of mopeds and motorcycles is also carried out by Tomos (E).



**Table 5: Bicycles, mopeds and motorcycles  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	0.00
Danmark	N/A	N/A
BR Deutschland	0.54	0.62
Hellas	N/A	N/A
España	0.92	1.19
France	1.29	0.81
Ireland	0.00	0.00
Italia	2.40	2.85
Luxembourg	0.00	0.00
Nederland	0.87	1.27
Portugal	1.11	1.09
United Kingdom	0.34	0.36

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

March 1991 saw the start of production by the new Triumph Motorcycle Company in the United Kingdom. This company accounted for more than two-thirds of UK production in 1993. Triumph has successfully established distribution throughout the EU, Japan, Australia and New Zealand and entered the Canadian market at end-1993 and the USA market at end-1994. Further sales have been made to a number of other markets including South America. To supply these new markets, production has increased substantially rising from 2 800 units in 1992 to 8 500 units in 1994. The other, much smaller, UK producer is BSA, who specialises in the supply of machines for the African market.

Japan controls 15 % of EU production through licence agreements and financial holdings in local plants. Yamaha, Suzuki and Honda are the three largest Japanese producers in the EU. These companies target the larger engine market (251 cc). They held 82 % share of this market in the EU in 1992.

Some Peugeot MTC scooters are built under license from Honda, which owns a 25 % share of Peugeot MTC. The second largest manufacturer in France, MBK Industrie, is fully controlled by Yamaha and assembles Yamaha scooters and light motorcycles and manufactures mopeds under the Motobécane design. SIS (P) also assembles Yamaha trail bikes.

### Strategies

Since the early 1980s, many European manufacturers have carried out major investment projects to improve competitiveness, yielding advances in the area of moped, scooter and low capacity motorcycle production. To capitalise on the improved demand outlook at the end of the 1980s, companies undertook investment to improve production facilities and to develop new models.

Investment in R&D to develop new, more advanced, cleaner burning models is becoming increasingly important in the face of heightened competition.

In recent years some European manufacturers have implemented a successful niche strategy whereby their range of models are designed to meet the specific tastes and requirements of buyers and are therefore more attractive than mass produced vehicles. This strategy builds on a unique European strength in design and reflects European producers ability to produce specialised vehicles as a result of their small scale. In line with this strategy European producers have primarily focused on the introduction of new products in existing markets.

In response to the poor economic situation of the early 1980s, a number of companies engaged in merger and acquisition

activities to buy market share and to take advantage of economies of scale in production. For example, the Italian Piaggio Group acquired Puch (A), and Cagiva Ducati (I) merged with Moto Morini (I) and Husqvarna (I). However, merger and acquisition activity has been dominated by Japanese companies interested in acquiring a base in Europe. For example, Suzuki bought Avello-Puch of Spain in 1986, while the following year, Yamaha bought Banesto (E). The investments are now showing positive returns. Although the Japanese have acquired about 15 % of EU moped and motorcycle enterprises, they accounted for 36 % of sales in 1989.

There has also been increasing international cooperation, both among European producers, and between European and the globally dominant Japanese manufacturers. An example of the former is the cooperation between BMW (D), Rotax (A) and Aprilia (I) to develop and produce the F650. BMW leads the cooperative venture, and is responsible for the concept, testing and marketing. Rotax has provided the engine design and produces the engines. Aprilia is responsible for sourcing components and assembly. Minarelli (I) is manufacturing 50cc engines under license from Yamaha (JPN). It produces approximately 250 000 units and serves a quarter of the EU market. Franco Morini(I) produces 50cc engines under license from Suzuki (JPN), but on a much smaller scale than Minarelli. The aim of the strategy of international industrial cooperation is to gain scale and competitive strength by accelerated technology and captive volume transfer through international alliances.

### Impact of the Single Market

The full integration of the Internal Market for mopeds and motorcycles will only be completed with the implementation of a European Whole Vehicle Type Approval, which is expected by the end of the decade. Nevertheless, the strategies adopted by the producers of mopeds, motorcycles and components in anticipation of the completed Single Market are already transforming the sector towards greater efficiency and competitiveness. Notably, motorcycle producers and component suppliers, both European companies and international companies active on the European market, are integrating their operations on a European scale to achieve economies of scale. Closer links between manufacturers and suppliers are established to improve the quality and productivity of the components industry. In this restructuring process the fragmentation of the sector is reduced and efficiency is enhanced. However, even after the adoption of the European Whole Vehicle Type Approval, a number of internal barriers remain, preventing manufacturers from marketing the same type of motorcycle in all Member States. Those barriers are mainly related to the insufficient harmonisation of driver license categories and to the differences in categories of vehicle taxes and as applied by insurance companies across Member States. The motorcycle industry regards the timely completion of the European Whole Vehicle Type Approval as the prerequisite for future policy initiatives to improve the functioning of the Internal Market for mopeds and motorcycles. The levelling of user regulations (for instance concerning driver license), and of road tax and insurance categories) should allow additional effects of scale and market expansion.

### ENVIRONMENT

The main environmental considerations that may have an effect on the moped and motorcycle industry relate to urban traffic congestion and exhaust emissions. Mopeds in particular provide a flexible transport mode that uses space efficiently with relatively low energy consumption. Manufacturers of both mopeds and motorcycles continue to concentrate on more fuel efficient and cleaner burning engines.

The adoption of Directive 94/12/EU on measures to reduce air pollution from motor vehicles amends the earlier 1970

Directive 70/220/EU. The main features are limiting pollutant emissions from private cars - for new designs from January 1996, and for all new cars from January 1997 - and setting conditions under which Member States may give tax incentives for new vehicles sold. While it is too early to assess the impact of this Directive it is likely to increase the cost of new cars. To the extent that they are regarded as substitutes for cars this will make motorcycles and mopeds a more attractive purchase option. Similarly the introduction of broader or stricter government restrictions on traffic circulation in the larger cities, may stimulate demand for mopeds and motorcycles.

## REGULATIONS

The Community is putting in place a harmonised type-approval procedure for two and three-wheel motor vehicles in order to insure the proper functioning of the internal market. The Council of Ministers adopted a framework Directive relating to the type-approval of these vehicles in June 1992 (Directive 92/61/EU). This provides the conditions attached to the granting of vehicle and component type-approval and contains an exhaustive list of components and characteristics to be approved in conformity with specific requirements laid down in ten separate Directives. So far, all but one of these separate Directives have been adopted.

The so called "multi-directive" relating to certain components or characteristics is the last act required to complete the vehicle type-approval procedure for these vehicles.

The chapters on noise limits, emissions and anti-tampering measures contained in the proposal for a Directive on certain components or characteristics of two or three-wheel motor vehicles are currently being examined by the Council and the European Parliament.

Under the provisions of Directive 87/56 EEC, the maximum noise limit value for newly-built motorcycles with an engine capacity of more than 175 cc was reduced to 80dB(A), effective from 1 October 1993. The proposals on limiting exhaust emissions are in line with those of the existing regulations and limit values are already met by the vast majority of manufacturers.

The purpose of the proposal to fit anti-tampering devices is to ensure that vehicles such as mopeds and motorcycles remain safe and secure. The proposed anti-tampering measures, initially restricted to mopeds only, have been extended to all motorcycles. The anti-tampering proposal reflects concerns that tuning may significantly change the performance characteristics of these vehicles and render them unsafe. This proposal may increase the price of EU produced motorcycles and would have a detrimental affect on EU manufacturers, such as Triumph, who produce a range of engines based on a modular design concept.

Safety regulations, such as the 1986 Italian crash helmet requirement, and increased regulation governing the registration of mopeds in Germany, may have dampened demand in the short term but are unlikely to affect long term demand as consumers adjust to the new regulations. In the UK tighter controls on drivers have reduced demand. Toughened regulations include a Compulsory Basic Training (CBT) course which must be completed before driving on the road, a two part motorcycle test required before machines exceeding 125cc can be driven, and a restriction of moped speed to 30 mph.

Competition policy has an important impact in the area of design and distribution. Current proposals regarding design protection are meeting opposition from the motorcycle and moped industry.

Reflecting different technical standards and procedures at national level the industry is fragmented with producers having to offer many different models. The harmonisation of norms and standards in line with the Single Market programme has only begun, but should allow manufacturers to standardise parts and products. This would increase economies of scale by lengthening production runs and could instigate further rationalisation in the industry.

## OUTLOOK

The main factor affecting future consumption of mopeds and motorcycles is the forecast upturn in world economies and consumer spending. Consumption in 1994 is estimated to have increased by approximately 5 % in current prices from a low 1993 base. A further increase from 1994 to 1995 of approximately 9 % is forecast, implying a growth rate slightly higher than over the period 1990-1992. It is expected that stronger growth will occur in the larger capacity machines which are expected to gain ground in volume as the volume of smaller motorcycles and mopeds declines. Due to this shift to larger capacity machines the value of this sector is likely to increase faster than volume. Medium term prospects look good with consumption forecast to increase at a rate of approximately 9 % per year from 1995-7.

Similarly, the optimistic outlook for European economies suggests short term prospects for the EU production of mopeds and motorcycles are favourable, with growth of 6 % in 1995. European motorcycle manufacturers should also increase EU market share. Production is also expected to increase in 1994 and 1997, albeit at a slightly slower rate.

The moped and motorcycle market is likely to broaden. Demand is expected to increase for smaller machines, for learning and commuting, and for larger sports and touring models for recreational use. Production is expected to see continued growth as economies show moderate growth rates, particularly the economies of Italy, Germany, France and Spain.

Future success will depend on the sector's ability to benefit from economies of scale in production and research and development resulting from increased cooperation. Standardised parts development could also help bring costs down and help encourage further restructuring of the sector. Continued environmental concerns may result in limitations on automobile access in many congested urban areas, thus encouraging demand for mopeds and motorcycles.

Significant improvements in the EU manufacturers' medium to long term prospects are dependent upon their ability to access the higher growth rate markets, particularly those in Asia. As a result of continued consolidation efforts, which will leave the remaining firms in a better growth position to take advantage of a future upturn in consumer spending, employment is forecast to fall only marginally in the medium term.

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# Bicycles

## NACE 363

Overall bicycle consumption in the EU has been increasing in the last decade. However, most of this increased consumption was accounted for by cheaper imports from non-EU countries, particularly from the Far East. Since 1992, the economic recession and changes in fashion have severely reduced consumption levels. European manufacturers expect a revival to take place in the course of 1995.

The importance of bicycles as an alternative and environmentally friendly means of transport has been recently recognised by the European Commission in its White Paper on Transport Policy. It is widely recognised that action to promote the use of bicycles can make a useful contribution to the solution of traffic congestion problems in urban areas.

### INDUSTRY PROFILE

#### Description of the sector

Bicycles are considered within the NACE 363 category, which also includes mopeds and motorcycles.

There are different types of bicycles, according to the end-user to whom they are destined: sports/touring bicycles (light weight), conventional adult bicycles, All Terrain Bicycles (ATB, or mountain bikes), hybrid bicycles (a cross between a mountain bike and a touring bicycle), small wheeled bicycles (for short distances, mainly aimed at the commuter) and children's bicycles.

#### Recent trends

In 1993, about 11.3 million bicycles were produced in the EU according to data published by the association EBMA. Bicycle production in the EU has been decreasing since 1991, when output reached a peak of 13 million units.

In 1992 and 1993, production fell by 5.4 % and 8.4 % respectively, as manufacturers adjusted production levels to falling demand. The only bright spot was Italy where the currency devaluation has greatly benefited local manufacturers who have strongly increased their export activity.

Consumption of bicycles in the EU rose in the years 1990-91, mainly thanks to the boom in the German market, where reunification has propped up bicycle sales from 4.6 million units in 1989 to 6.2 million units in 1991.

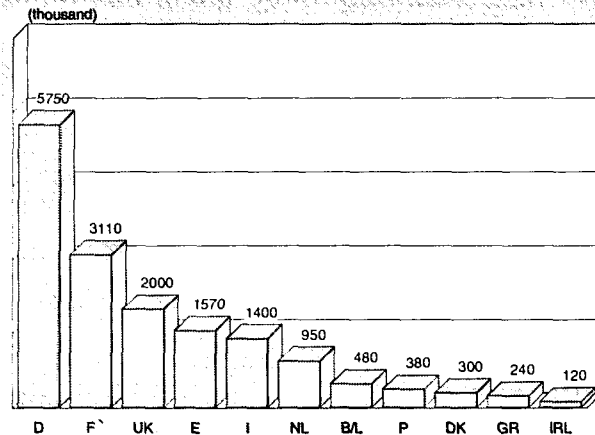
The general economic recession which hit Europe in 1992 and 1993 negatively affected bicycle consumption in the EU: sales dropped by 8 % in 1992 and by a further 8 % in 1993. Preliminary estimates confirm that the fall in consumption is set to continue in 1994.

#### Foreign trade

In 1993, bicycle imports from non-EU countries stood at around 5.7 million units, down 9.2 % from the level of 1992. Geographically speaking, most of EU imports (about 88 % in 1993) come from the Far-East, and particularly from those countries which enjoy a preferential trade treatment under the Generalised System of Preferences (GSP) scheme.

Taiwan remains the most aggressive exporter to the EU (2.4 million units in 1993). The most dramatic change concerns the sharp reduction in bicycle imports originating from China, following the application of anti-dumping legislation. The drop is from about 2.2 million units in 1991 to 395 000 in 1993, that is a 76.5 % fall. Over the 1992-93 period, there has also been a decline of exports from Thailand (-13.3 %) and Indonesia (-8.6 %).

Figure 1: Bicycles  
Breakdown of EU bicycle consumption, 1993



Source: EBMA

The gap left by falling Chinese exports has been largely filled by other South-East Asian countries, notably Malaysia (52.8 % rise in export in 1993), India (193.0 %) and South Korea (81.1 %). It is also worth to note the sudden appearance of Vietnam, a complete newcomer on the bicycle market: in 1993 it exported 310 000 units to the EU, that is a 233.7 % increase over 1992. There are reports of Chinese factories using Vietnam as a convenient way to circumvent the anti-dumping duty recently imposed on Chinese bicycles.

On the other hand, bicycle imports from Japan and the USA are quite low (about 27 000 and 119 000 units respectively in 1993). Imports from East European countries are generally increasing. Some West European producers are said to have relocated production units in the region. The most important exporter to the EU is the Czech Republic (237 000 units in 1993), followed by Poland (178 000) and the rapidly rising Slovenia (106 000).

### MARKET FORCES

#### Demand

The surge in bicycles sales which has taken place in most recent years can be fully attributed to the success encountered by mountain bikes, particularly among persons of the 15-39 age group. At the same time, demand for traditional adult bicycles has been falling rapidly.

Since 1992, however, the boom in sales of mountain bikes has levelled off. It is still questionable whether the fall in sales is due to the fact that the mountain bike boom is over, or is the fall a function of the recession only. The answer to this question will soon become apparent. It is incontestable, however, that average prices of mountain bikes have been falling throughout Europe.

Demand for bicycles is principally related to leisure and fun activities, and secondarily to the desire of consumers to keep fit. Fashion considerations also play an important role in this respect. Other popular reasons to buy a bicycle are for recreational purposes, for local trips (i.e. shopping), or to commute to the workplace.

Concerning this last reason, the use of bicycles as an alternative to private and/or public transport is increasing particularly in large cities, where traffic congestion is strong. Recently, there have been encouraging signs of growing cooperation from various local authorities to bolster the use of bicycles in town by providing safer driving conditions.

**Table 1: Bicycles  
EU production and consumption**

(thousand)	Production			Consumption		
	1991	1992	1993	1991	1992	1993
Belgique/België, Luxembourg	92	91	75	507	533	480
Denmark	230	188	145	350	340	300
BR Deutschland	4 932	4 550	3 900	6 200	6 000	5 750
Hellas	N/A	N/A	N/A	240	280	240
España	584	505	360	1 287	1 850	1 570
France	1 168	1 035	850	3 260	2 878	3 110
Ireland	N/A	N/A	N/A	180	140	120
Italia	3 580	3 500	3 800	2 200	1 854	1 400
Nederland	894	882	800	1 079	1 100	950
Portugal	406	413	370	455	425	380
United Kingdom	1 164	1 180	1 000	2 800	2 270	2 000

Source: EBMA

### Supply and competition

Within the EU, the two largest bicycle producers are traditionally Germany and Italy, which in 1993 produced respectively 3.9 million and 3.8 million units. These two countries account together for about 70 % of total bicycle production in the EU. The third largest producer in Europe is the United Kingdom (1 million units in 1993), while domestic French output has been rapidly falling since the beginning of the decade to reach 850 000 units in 1993.

In terms of international competitors, Taiwan has become in the recent past the largest source of EU imports. Other major competitors are located in the Far East, namely China, Malaysia and Thailand.

These countries enjoy low labour costs, which allow them to undercut the prices offered by European producers. Moreover, Far East producers often make use of the so-called "screwdriver plants", i.e. they produce locally all the components which are later assembled in factories located in other countries. As a consequence of this unfair competition, several European manufacturers were thrown out of the market or nowadays design bicycles which are produced in the Far East and imported as finished products.

The component market is dominated by Shimano, a Japanese manufacturer which specialises particularly in the gear and brake mechanisms. The other dominating source of components is Taiwan: Taiwanese producers are reported to have shifted production lines in China in order to further reduce costs and to get the preferential GSP rate.

The entry in the market of Far-East manufacturers has seriously affected the level of activity of their European counterparts, which is now mostly confined to the most expensive models' segment (i.e. racing bikes). On the other hand, European manufacturers have increased their R&D efforts in order to promote innovative product developments.

The bicycle sector in Europe has also witnessed a major change in distribution channels. Not a long time ago, bicycles were sold uniquely in specialised shops, while at present an increasing share of bikes is sold in large department stores, supermarkets or by mail order.

The domination of mass-distributors in the bicycle market is becoming more marked. For example, in France and Spain large distributors account already for about 75 % of total sales, while the correspondent figure for Germany is 50 %. The only market where traditional dealers have for the moment maintained their control of the retail market is The Netherlands.

### INDUSTRY STRUCTURE

#### Companies

The industry is composed of a number of large, medium and small-sized companies, some specialising into niche-markets such as children's bikes. At the same time, each European country has local producers which operate in all market segments and which take the biggest market share.

The following enterprises are the market leaders within their respective countries: Kynast, Derby Cycle Werke and Nürnberger Hercules (Germany); Bianchi, Rizzato and Carnielli (Italy); Peugeot, MBK and Gitane (France); Raleigh, Townsend and Dawes (United Kingdom); BH, Orbea and Rabasa (Spain); Gazelle and Batavus (Netherlands).

#### Strategies

In order to face the threat represented by import competition from Far East manufacturers, European companies have established alliances or cooperation agreements. The main aim of these alliances is to rationalise the production process and realise economies of scale in purchasing components.

In 1992, for example, the largest Spanish bicycle manufacturer BH announced the creation of a consortium with Peugeot and Gitane under the name of Cycleurope. Other major consortia are the Derby Group (formed by Raleigh, Gazelle and Derby) and the ATAG group (formed by Batavus and Dawes).

**Table 2: Bicycles  
Significant bicycle imports to the EU**

(thousand units)	1992	1993
Taiwan	2 308.3	2 420.0
Malaysia	344.1	526.0
Thailand	521.9	452.6
China	1 681.3	395.0
India	121.3	355.4
Indonesia	359.6	328.6
Vietnam	92.9	310.0
Czech Republic	162.7	236.6
Poland	189.9	178.0
USA	127.9	119.1
Slovenia	49.0	106.4

Source: EBMA

## Impact of the Single Market

The impact of the creation of the single market on the EU bicycle industry has been globally positive, albeit somewhat limited. This is mainly due to the fact that the EU bicycle market is still characterised by fragmentation along national boundaries: intra-EU trade is not very developed, and manufacturers have adapted to the situation by chiefly producing for their national markets.

The most important set of measures of the Single Market programme for the EU bicycle sector is the legislation aimed at achieving the free movement of goods. The elimination of controls at internal frontiers has speeded up formalities and reduced the timing of delivery and of stocking. Distribution channels have also been positively influenced by the creation of a Europe-wide trade area.

The most important remaining internal obstacle is the mutual recognition of rules, as specific technical requirements still hinder trade between EU countries. Secondly, the access to finance for SMEs is still to be improved: this would mainly benefit bicycle components segment of the market.

## REGIONAL DISTRIBUTION

The largest market for bicycles in the EU is Germany. In 1993, one out of three bikes sold in the EU was sold in Germany (5.7 million). France comes second with 3.1 million bikes sold, and the United Kingdom third with 2.0 million units.

The Netherlands and Denmark are the two countries with the highest bike density in the EU. However, the highest growth rates in bicycle consumption in the last years come from Southern countries such as Spain, where bicycle sales nearly doubled from 860 000 units in 1990 to 1.6 million in 1993. On the other hand, in recent years consumption has been decreasing or stagnating in traditional bicycle markets such as the United Kingdom, the Netherlands and particularly Denmark.

## ENVIRONMENT

The bicycle is increasingly viewed as one of the most environmentally friendly means of transport. Its contribution to the solution of traffic congestion problems in large urban areas is undergoing a revival with local authorities within the EU.

In order to promote the use of bicycles in urban areas, it is necessary to provide facilities for cyclists such as bicycle lanes and specific parking areas. Unfortunately, this is still more the exception than the rule in most large urban areas of the EU. In some European countries where the bicycle is traditionally a popular means of transport (i.e. the Netherlands, Germany and the Scandinavian countries), facilities are widespread. On the other hand, in the Southern European countries the absence of such infrastructures makes the use of bicycles in the city quite hazardous.

## REGULATIONS

The unfair competition and dumping practices which are commonly used by Far East producers have been recently sanctioned by the EU authorities.

In August 1993, the European Commission proposed a council regulation which imposes a definitive anti-dumping duty on imports into the EU of bicycles originating in China. The European Council subsequently adopted the regulation: the rate of the duty has been set at 30.6 %.

The latest action of the European Commission is to investigate a complaint by EBMA of dumping by producers in Indonesia, Malaysia and Thailand. A decision on this case is expected by the end of 1994.

## OUTLOOK

The general economic recession which is affecting Europe has badly influenced sales of bicycles over the last couple of years: in fact, during recessionary periods, consumers tend to postpone the purchase of new bikes. Moreover, if there is a lessening of the consumers' excitement for mountain bikes, this will further reduce consumption, at least until a new cycling fashion appears.

On the other hand, the action of the EU authorities to prevent unfair competition practices by Far East manufacturers is expected to help reducing the price gap which hampered the activity of EU producers.

Finally, the new regulations and conditions which will result from the Uruguay Round ratification will certainly have a reshaping effect on the European cycle market.

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# Shipbuilding

## NACE 361

*In 1993 and 1994, the world shipbuilding industry faced the problems it has been dealing with for years: i.e. a bulk fleet which still comprises a number of substandard ships and the general overcapacity of the shipbuilding nations. Uncertainty about South Korea's move towards capacity expansion, as well as concern for environmental and safety issues, has shifted the industry's focus onto quality over quantity.*

*The affirmed need for newer, more efficient ships and more advanced technology have led to legislative requirements for ship design which favour some of the EU acquired expertise, offering it the potential to remain competitive with the Far East into the future. The outlook for the EU shipbuilding industry would appear to be positive overall, in light of the substantial increase of new orders in 1993 (up more than 100 % since 1992), principally for passenger ships and container ships.*

### INDUSTRY PROFILE

#### Description of the sector

NACE 361 comprises the building and repair of seagoing vessels (NACE 361.1); building and repair of vessels for inland navigation (NACE 361.2); building and repair of boats and yachts (NACE 361.3); painting of ships (NACE 361.4); and ship breaking (NACE 361.5).

Most of the industry is accounted for by the construction of seagoing merchant vessels (NACE 361.1). Given the smaller economic significance of the other sub-sectors and the limited availability of data, this article deals primarily with trends in the manufacture and repair of seagoing merchant vessels.

#### Recent trends

In 1993 the growth of world trade was moderate, staying at a level of 2.5 %, according to OECD estimates. World seaborne trade (measured in tonnes miles) increased by approximately 3.1 % in 1993 compared to 2.0 % in 1992. AWES (The Association of West European Shipbuilders, i.e. the EU plus Finland, Norway and Sweden) member associations recorded a decrease in shipbuilding production (measured in compensated gross tonnes, or cgt) of around 12 % since 1992. This gave the region a 24.3 % share of world production (cgt), down from 28.0 % in 1992. On its own, the EU contributed 21 % of world production in 1993, down from almost 24 % in 1992.

On the other hand, the volume of new orders within AWES increased by 73.5 %, after having reached its lowest level

ever of 2.1 million cgt in 1992. At 3.7 million cgt, the order volume of AWES members was dominated by the share of container ships, with 27.9 %, followed by passenger ships (1.1 million cgt or 25.3 %). The EU is the world leader in the production of passenger ships (74 %), and contributes almost 32 % to the world production of full container vessels.

Thus, the AWES area had a 25 % market share of world new orders and a 26 % share of the world order book.

The EU's market share of new orders was 20.1 % for 1993. Despite this dramatic in new orders' volume, the workforce of AWES (and, specifically, EU) shipyards was reduced in 1993.

International freight rate performance, which is an important factor in scrapping and new-building decisions, generally improved in 1993 compared to the end of 1992, when freight market prices reached their lowest point in years. World freight rates for oil tankers almost doubled during 1993, whereas freight rates for bulk carriers showed a more moderate growth.

Meanwhile, newbuilding prices fluctuated in 1993, but weakened for most ship types, in spite of the vigorous ordering activity. This was caused in part by the assertive sales drive of South Korean shipyards. In the case of tankers, especially VLCCs, the higher cost involved in implementing new designs to match the double hull requirements were not reflected in the level of prices. Instead, the appreciation of the Japanese yen against the Korean won - which continued to depreciate - resulted in world price setting based on the activity of Korean shipyards.

The short period of surging tanker oil movements and storage following the Gulf War in early 1991, and the attractive prices which ensued, seems to have come to an end, as the slow evolution of oil prices has dampened interest in increasing stocks, thereby limiting the possibility for more energetic demand. Similarly, in the bulk carrier market, the freight level had become increasingly stagnant by the early months of 1994.

In May 1991 the AWES Working Group on Market and Forecast issued a report on the development in global capacity for the construction of merchant ships which concluded that available world capacity, having decreased by one-third from 1975 to 1990, would rise by some 15-20 % up through 1995. Developments since then show not only that capacity has been expanding at a rate approximately 35 % higher than actual output (much higher than that projected initially), but also that substantial capacity expansions may be realised in the coming years, which will lead to a level estimated at 20 million cgt in the year 2000.

This increased shipbuilding capacity has arisen from the ongoing efforts to improve productivity (e.g. better work planning, standardisation and automation), as well as the substitution of naval ship production to merchant ship production (e.g. in the US). Furthermore, physical capacity has

**Table 1: Shipbuilding  
Main indicators**

(thousand CGT)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
Production (1)	2 998.7	2 958.5	2 388.4	2 087.5	2 020.1	2 346.3	2 703.4	2 651.3	2 843.0	2 592.0
% of world production (1)	23.7	20.9	19.7	22.6	23.5	23.7	23.2	23.0	23.5	21.0
Employment (units) (2)	124 229.0	109 242.0	96 145.0	79 904.0	72 460.0	69 738.0	68 875.0	78 424.0	77 152.0	67 988.0

(1) Completed and includes former East Germany.

(2) Includes jobs in naval and para-naval building in France from 1986; includes East Germany from 1991; includes naval dockyards in the Netherlands in 1980.

Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services (production), DG III (employment)

**Table 2: Shipbuilding**  
Development of new merchant shipbuilding by region

(thousand CGT)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	3 130.7	2 958.5	2 388.4	2 087.5	2 020.1	2 346.3	2 703.4	2 651.3	2 843.0	2 592.0
AWES (2)	3 905.5	3 590.9	2 927.1	2 537.1	2 510.1	2 781.3	3 285.4	3 157.8	3 396.0	3 010.0
Japan	6 951.0	6 498.0	5 085.0	3 795.0	2 953.0	3 664.0	4 456.0	4 417.0	4 379.0	4 854.0
South Korea	1 015.0	1 633.0	1 971.0	1 194.0	1 505.0	1 389.0	1 564.0	1 729.5	1 995.0	1 835.0
Rest of the world	3 126.5	2 447.1	2 155.9	1 718.9	1 629.9	2 046.7	2 350.6	2 221.7	2 348.0	2 681.0
Total	14 998.0	14 169.0	12 139.0	9 245.0	8 598.0	9 881.0	11 656.0	11 526.0	12 118.0	12 380.0

(1) Includes former East Germany.

(2) Association of West European Shipbuilders: EU plus Finland, Norway and Sweden.

Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services, DG III

been and will continue to be bolstered by the addition of new facilities planned in South Korea (from 5 to 9 million cgt). According to AWES and SAJ (Shipbuilders' Association of Japan) estimates, this will cause an increase of the already existing overcapacity.

### International comparison

The EU's major competitors in shipbuilding are Japan, with a world share of almost 40 % (up from 36 % in 1992) and South Korea. The AWES countries marginally lost share in 1993 (down 4 % from 1992), whilst Japan's share increased by 3 %. South Korean yards, which increased their share from 11.5 % in 1985 to 16.5 % in 1992, maintained a 15 % share in 1993.

The 1993 EU share of its principal product lines in world production is as follows: passenger ships (74 %); ferries (46 %), full container (32 %); general cargo (31 %); LPG carriers (23 %), fishing vessels (19 %); oil carriers (17 %) and chemical carriers (11 %). The EU is the leading world producer of combined carriers, general cargo ships, roll on/off vessels, ferries, passenger ships and fishing vessels.

Within the EU, the most important exporting countries by cgt in 1993 were Germany, Spain, Denmark, the Netherlands, and the UK, in order of rank.

## MARKET FORCES

### Demand

As was seen above, demand for manufactured vessels in 1993 took a huge leap from its low levels in 1991 and 1992. The 1992 result of new orders of 1.8 million cgt was a substantial decline from the 3.2 million peak in 1989, which was not surpassed in 1993 (2.9 million cgt). The EU reached a 20.1 % share of the world market, which is comparable to that which it had previously (19.9 % in 1992).

In 1993, the largest ship producing Member State was Germany (853 thousand cgt for a share of 33 %), followed by Italy (19 %), Spain (14 %) and Denmark (13.7 %). The order book for the EU producers at the end of 1993 kept Germany in the pole position with 30 %, while putting Italy in second place with almost 20 % and Denmark in third place with almost 14 %.

### Supply and competition

Three-quarters of world shipbuilding is carried out by industrialised countries. During 1993, the EU had a good performance as far as combined carriers, general cargo ships, ferries and passenger ships are concerned, while South Korea and Japan dominate in LNG and dry bulk carriers, and tanker shipbuilding. The EC yards continue to maintain a good record in the high value added segment of the market. For instance,

**Table 3: Shipbuilding**  
Development of contract prices for new vessels (1)

shiptype	shiptype (in thousand dwt)	(million US dollars)									
		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
motor tanker	30	14.5	13	14	20	27	31	30	30.5	27	28
motor tanker	80	21	18.5	21	29	38	43	44	44.5	40	
motor tanker	130	29	25	26.5	34	46	54	55	55.5	49.5	
motor tanker	250	44	37	42.5	54	73	82	86	90	85	
motor tanker	400	51	44	50.5	60	88	101	120	125	119	
motor tanker	40 DH (2)							36	37	33	31
motor tanker	95 DH (2)							51	52	47	44
motor tanker	130 DH (2)							68	70	62	56
motor tanker	280 DH (2)							110	115	100	90
oil/ore/bulk	96	26	22.5	25.5	32	44	55	62	64.5	56	52
bulk carrier	27	11	10	11.5	14	20	22.5	21.5	22	20	20
bulk carrier	38/45	13.5	11.3	12.7	16.2	22.3	25	24.8	25.3	23.5	25
bulk carrier	60/70	15.5	14	15	20.5	27	30	31.5	32	28	29
bulk carrier	120/145	24	20.5	23	30	39	45	46	50	44	45
roll-on roll-off	5	10	9	10	13	16	19	21	22	19	19

(1) Japanese/Korean yards' prices are used as basis. From 1992, the type size have changed for representative bulk carrier sizes, which explains the blanks in the table

(2) DH = double hull.

Source: Fearnleys



**Table 4: Shipbuilding  
Production by type, 1993**

(thousand CGT)	World	EU (1)	Share of world total (%)	
			Japan	South Korea
Crude oil tankers	2 486	17.3	51.1	20.6
Chemical carriers	1 661	10.7	45.1	19.3
Bulk carriers	1 893	0.0	43.5	30.0
Combined carriers	113	74.6	0.0	25.4
General cargo ships	982	30.9	19.5	2.3
Reefers	412	24.0	47.6	0.0
Full containers	1 599	31.6	37.1	18.8
Roll on/off vessels	962	2.8	16.5	0.0
Car carriers	282	7.7	92.3	0.0
LPG carriers	402	22.6	59.7	15.8
LNG carriers	259	0.0	100.0	0.0
Ferries	556	45.8	20.5	0.4
Passenger ships	501	73.5	4.7	0.0
Fishing vessels	598	18.6	8.7	2.5
Other non-cargo vessels (2)	540	22.9	12.4	0.1
Total	12 380	20.9	39.2	14.8

(1) Including former East Germany.

(2) Excluding naval vessels.

Source: AWES, DG III

although the Japanese industry has had a virtual monopoly on LNG carriers, the French yard of Chantiers de l'Atlantique recently won an order for a series of five LNG carriers. And, in 1994 it again beat out Japanese competitors for two steamship contracts.

There are several hundred shipyards in the EU that manufacture and/or repair vessels of varying sizes. However, of these, only a small number are capable of producing and/or repairing ships over 5 000 cgt. Shipyards have suffered greatly in the past few years from the combined effects of recession, poor markets and currency fluctuations, causing many to shut down despite a dearth of new orders (e.g. Ostend's Beliard Polyship). At the same time, the repair industry has been faced with declining business as owners and operators have tried to strike a balance between keeping costs low and maintaining the absolute minimum level of maintenance required to match the demands of the various regulatory bodies. This, despite an ageing fleet, which should necessitate more maintenance.

#### Ship repair

Lingering effects of the recession and a loss of market share to the Middle and Far East (i.e. repair of tankers in the former and bulk vessels in the latter), as well as Poland, made 1993 another painful year for the AWES shiprepairing industry, which hit its lowest point in the last three years. Very low prices did not adequately cover costs, and the cost-saving measures by ship owners mentioned above, combined with a higher quality of ships overall, led to a lower amount of work.

Within the EU, increased competition was seen from the UK, Italy and Greece, partially due to the currency devaluation in these countries. In the same way, Finland also became more competitive. New areas of competition sprung up outside of the EU, namely in Albania and Croatia. Of perhaps greater concern is the emerging strength of China, where lower labour costs and therefore more attractive prices reign. China is joined by Singapore - which, in anticipation of a renewed period of

**Table 5: Shipbuilding  
World development of merchant shipbuilding by type of ship**

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Dry cargo ships	4 457	3 891	3 062	2 885	2 523	3 192	3 456	3 775	3 369
%	31.5	32.1	33.1	33.6	25.5	27.4	30.0	31.2	27.2
Bulk carriers	4 991	3 555	2 093	1 099	1 909	2 536	1 816	1 603	2 005
%	35.2	29.3	22.6	12.8	19.3	21.8	15.8	13.2	16.2
Oil tankers	486	830	646	787	1 138	1 163	1 624	2 588	2 486
%	3.4	6.8	7.0	9.2	11.5	10.0	14.1	21.4	20.1
Other tankers	1 934	1 557	1 193	1 530	1 795	1 906	2 291	2 146	2 322
%	13.6	12.8	12.9	17.8	18.2	16.4	19.9	17.7	18.8
Fishing vessels	669	791	890	1 150	1 117	1 027	734	560	598
%	4.7	6.5	9.6	13.4	11.3	8.8	6.4	4.6	4.8
Other	1 632	1 515	1 362	1 148	1 399	1 833	1 604	1 445	1 599
%	11.5	12.5	14.7	13.4	14.2	15.7	13.9	11.9	12.9
Total	14 169	12 139	9 245	8 598	9 881	11 656	11 526	12 118	12 380

Source: Lloyd's Register of Shipping, DG III



**Table 6: Shipbuilding**  
World shipbuilding production, 1992-1993

(million CGT)	1992	share (%)	1993	share (%)
AWES (1)	3.40	28.0	3.01	24.3
Japan	4.38	36.0	4.85	39.2
Other European countries	1.04	8.6	1.20	9.7
Other industrialised countries	0.15	1.3	0.17	1.4
Industrialised countries - total	8.97	74.0	9.24	74.6
South Korea	2.00	16.5	1.84	14.8
Other newly industrialised countries	0.66	5.4	0.54	4.4
People's Republic of China	0.28	2.3	0.45	3.6
Other developing countries	0.22	1.8	0.31	2.5
Developing countries - total	3.15	26.0	3.14	25.4
Total	12.12	100.0	12.38	100.0

(1) Association of West European Shipbuilders: EU plus Finland, Norway and Sweden. Includes former East Germany.  
Source: AWES - DG III

boom yet to materialise, is increasing its capacity through an expansion programme and investment in low wage countries - and Korea. Hence, the Far East market will motivate the EU ship repair sector to find ways to strengthen its market position.

Some EU companies have held on to their success by becoming highly specialised (e.g. Société Bretonne de Réparations Navales (Sobrena) in Brest, the 25 container repair companies in Antwerp, or northern companies engaging in ferry refits). But others remain more sensitive to the cutbacks, reorganisations and closures of shipbuilding companies throughout Europe.

The US aggressively began to promote its shipbuilding and ship repair market in early 1993. However, it will have to overcome its inflated pricing level (with prices typically 20-30 % higher than those of northern European shiprepairing companies) and continue efforts to improve its quality and productivity levels before it becomes a competitive threat to the European industry.

#### Scrapping

The scrapping of ships at the end of their usable life is decided not only by the age of the ship but by a combination of factors such as the vessel's operating profit margin, changes in environmental legislation, quality considerations and market psychology (i.e. the expected return on a vessel). Given the aforementioned criteria, it is not surprising that many shipping firms have decided to scrap their vessels. By the end of 1993, 59 % of the tanker fleet was 15 years old or more, while the average age for dry bulk vessels was 15.5 years. This is indicative of the fact that a considerable number of ships were retained during the favourable economic climate in the late 1980s.

However, the surplus in the bulk carrier fleet has been on the decline (down another 1.3 % from 1992 by the end of 1993). This decrease in surplus has led to a decrease in the total of laid-up tonnage, from 11.4 million dwt (dead-weight tonnes) in 1992 to 8.8 million dwt at the end of 1993. Comparably, the fleet of combined carriers experienced a decrease in million dwt laid-up at the end of 1992 (2.3 million dwt) to only 0.7 million dwt at the end of 1993.

Given the substantial increase in scrapping since 1989 (3.9 million dwt as compared with 15.3 million dwt in 1992), the prices paid for scrapping in 1992 have declined for nearly all vessel types, the major exception being vessels containing high-quality stainless steel (such as chemical carriers). Despite the maintenance of these low price levels in 1993, scrapping yards increased their activity another 25 % over that in 1992 (20.4 million dwt).

#### Labour

Employment in the EU shipbuilding industry has experienced a prolonged period of downsizing. The world shipbuilding industry underwent an unprecedented period of expansion during the 1970s, when shipbuilding tonnage doubled over a ten-year period. The sudden influx of new tonnage resulted in an overcapacity, which the shipping industry has yet to recover from, despite the fact that a number of ships were prematurely scrapped in the mid-1980s (some after less than 10 years of service). A secondary development was the shift in production centres away from Europe and the USA towards new shipyards in Japan and South Korea. For example, South Korea launched only 0.1 % of new ships in 1972. By 1992 that share had become 16.5 %.

**Table 7: Shipbuilding**  
New orders in world shipbuilding

(thousand CGT)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	2 568	2 209	2 583	2 550	2 310	2 485	3 220	3 143	2 170	1 758	2 919
AWES (2)	3 091	2 840	2 887	2 948	3 158	2 719	3 792	3 595	2 432	2 125	3 687
Japan	7 389	6 040	4 440	3 432	3 121	3 361	5 880	6 116	4 433	3 268	4 681
South Korea	2 147	1 181	807	1 352	1 943	1 203	1 671	2 169	2 278	1 085	3 673
Rest of the world	2 223	1 717	2 187	1 751	1 518	1 844	2 222	2 425	2 772	2 342	2 485
Total	14 850	11 778	10 321	9 482	9 740	9 126	13 564	14 304	11 915	8 820	14 526

(1) Includes former East Germany.

(2) Association of West European Shipbuilders: EU plus Finland, Norway and Sweden.

Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services, DG III



**Table 8: Shipbuilding**  
**Ships completed by Member State**

(thousand CGT)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	3 129	2 955	2 388	2 088	2 020	2 346	2 707	2 651	2 843	2 591
Belgique/België	102	124	45	26	47	36	72	22	98	5
Danmark	355	440	351	194	277	287	306	351	414	354
BR Deutschland (1)	1 165	1 143	1 067	765	885	847	1 002	810	958	853
Hellas	40	44	25	7	12	13	46	67		
España	346	400	230	328	326	306	365	301	428	365
France	357	164	145	208	63	199	114	171	182	65
Ireland	0	0	0	0	0	0	0	0	0	0
Italia	182	124	61	225	120	285	328	424	289	496
Nederland	259	310	263	146	153	172	264	357	271	236
Portugal	17	40	61	26	23	46	65	39	64	62
United Kingdom	305	164	142	162	113	157	145	170	139	148

(1) Includes former East Germany.

Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Informations services, DG III

In 1993, the European shipbuilding workforce reduced further, despite the improved order situation described above. The number of all workers in the shipbuilding sector within the AWES region decreased by around 9 %, to 132 436 in 1993. Likewise, the percentage of those employees active in merchant ship newbuilding declined by 6 %, to 85 647 (65 % of total employment). Cutbacks in the EU new shipbuilding workforce continued in 1993, standing at below one-third of the 1975 total of employment for the current Member States.

Employment is dominated by Germany, which employs 35 % of the total, followed at a significant distance by Spain with almost 15 %. Denmark comes in next, with almost 11 %, and then Italy with 10 % (unless one includes also the number of currently inactive employees, which gives it a total of over 12 %). The country that has seen the most substantial decrease in employment over the last two decades is the United Kingdom, with a labour force one-tenth of what it was during the mid-1970s- which, at that time, was the largest individual workforce of the current Member States. And, 1994 marked

the year when north-east England would see its last shipbuilder, Swan Hunter - formerly Europe's biggest shipbuilding and shiprepairing consortium going through severe difficulties.

### Production process

A highlight of 1993 was the large-scale investment in the modernisation of shipbuilding yards, with the focus on improved or advanced steel fabrication and materials handling systems. In the EU, the industry has had to invest in automating the production process wherever possible, e.g. by using computerised sheet-cutters and automated welders, in order to respond to increasing competition from the lower-cost manufacture taking place outside the EU. Part of the process of adjustment has included the adoption of eastern-style management techniques, multi-skilled work practises and purchases of complete systems and sub-systems from external suppliers. Several European shipbuilding firms already have finished or at least started selective schemes aimed at ensuring their position in the business, now that quality has become so significant a factor.

**Table 9: Shipbuilding**  
**Total order book by country at year's end**

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	3 710	3 827	4 451	5 006	6 176	6 850	6 153	5 058	5 395
Belgique/België	62	60	75	82	148	154	213	117	134
Danmark	442	430	474	460	590	928	877	674	734
BR Deutschland (1)	1 119	1 282	1 426	1 429	1 974	1 955	1 530	1 471	1 634
Hellas	120	103	122	117	114	69	73	42	44
España	492	528	636	838	854	1 004	757	476	475
France	383	371	235	380	362	397	557	411	569
Italia	346	466	865	904	1 189	1 298	1 191	1 036	1 049
Nederland	300	196	142	365	415	443	388	322	389
Portugal	94	67	108	114	156	182	153	97	46
United Kingdom	353	325	370	317	377	419	414	412	321
Finland	544	484	991	963	652	589	494	467	791
Norway	148	147	137	114	423	464	382	284	371
Sweden	182	138	94	39	115	64	24	24	
AWES (2)	4 584	4 595	5 673	6 122	7 366	7 967	7 052	5 833	6 556
Japan	5 915	3 916	2 919	3 474	5 697	7 495	7 622	6 483	6 267
South Korea	2 579	1 909	2 639	2 343	2 813	3 501	3 924	3 012	4 801
Rest of the World	5 486	5 226	5 325	5 735	6 092	6 683	7 482	7 321	7 296
Total	18 564	15 646	16 556	17 673	21 968	25 646	26 080	22 649	24 920

(1) Includes former East Germany.

(2) Association of West European Shipbuilders: EU plus Finland, Norway and Sweden.

Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Informations services - DG III

**Table 10: Shipbuilding  
Employment in new shipbuilding**

(units)	1975	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	208 833	124 229	109 242	96 145	79 904	72 460	69 738	68 875	78 424	77 152	67 988
Belgique/België	7 467	6 523	3 923	2 995	2 548	2 270	2 307	2 377	2 418	2 391	1 665
Danmark	16 630	11 400	10 200	7 000	7 000	7 300	7 900	8 400	8 600	8 300	7 300
BR Deutschland	46 839	24 784	22 260	18 184	12 875	14 845	14 732	15 297(3)	27 763(4)	28 146(5)	24 143(6)
Hellas	2 316	2 672	2 000	1 709	1 621	1 855	1 535	550	0	0	0
España	N/A	N/A	18 000	18 000	17 300	14 000	12 550	11 940	11 440	10 735	10 085
France (1)	32 500	22 200	15 053	13 700	8 940	6 850	6 800	6 600	6 100	6 040	5 880
Ireland	869	750	0	0	0	0	0	0	0	0	0
Italia	25 000	18 000	12 000	11 570	9 500	8 428	9 675	9 840	8 299	8 200(7)	7 100(8)
Nederland (2)	22 662	13 100	6 236	5 400	3 600	3 500	3 500	3 900	4 000	4 000	4 000
Portugal	N/A	N/A	5 370	5 087	5 020	4 412	4 245	3 845	3 820	3 520	3 150
United Kingdom	54 550	24 800	14 200	12 500	11 500	9 000	6 494	6 126	5 984	5 820	4 665

(1) From 1986 on, the figure covers jobs in new shipbuilding, naval and para-naval building.

(2) From 1975 to 1984 including naval dockyards.

(3) Excluding jobs in ex-GDR's yards.

(4) Including 11700 jobs in ex-GDR's yards.

(5) Including 12441 jobs in ex-GDR's yards.

(6) Including 9000 jobs in ex-GDR's yards.

(7) 700 unemployed should be added to this figure, representing the structural overcapacity.

(8) 1160 currently inactive should be added to this figure.

Source: European Commission, DG III

## INDUSTRY STRUCTURE

### Strategies

West European yards decreased their capacity by almost 60 % between 1976 and 1990, and do not intend to reopen obsolete facilities. Still, they have to think of ways to stay competitive with shipbuilders in the Far East. The number of shipbuilding firms in the EU has been reduced by yards either going out of business or by mergers and acquisition activity, and many of the remaining shipyards have been forced to find niches in the shipbuilding market in order to survive. The EU shipbuilding industry in general seeks to differentiate itself from its main competitors in Asia by specialising in the construction of ships with relatively high value added rather than somewhat simpler dry-bulk vessels or oil tankers. Examples of such ships include dedicated refrigerator vessels ("reefers"), dedicated container vessels, gas tankers, chemical tankers and cruise ships.

The most outstanding centre of activity has been the privatisation of shipyards in former East Germany by the Treuhandanstalt, the German agency responsible for privatising former East German industries following unification. Most of the largest acquisitions have created Germany's largest shipbuilding group, Bremer Vulkan. Other firms, such as Norway's Kvaerner, also have acquired facilities in the new Länder and other Member States.

One of the features of 1993 was the spread of cooperation between yards in forming joint bidding groups for major contracts or fleet development programmes. This has been encouraged by the client market, since purchasers often commission more than one shipbuilder to guarantee deliveries of a series of newbuildings within a set amount of time. In Europe, the E3 collaboration between five of the biggest shipyard organisations resulted in the innovative VLCC design proposals. And, it yielded a firm contract for Spanish partner Astilleros Españoles (AESAs) for one newbuilding, as well as a deal between the Italian E3 participant Fincantieri and the well-respected Danish shipbuilder Burmeister & Wain Skibsværft, thus helping to attract orders for panamax bulkers.

Germany's Howaldtswerke-Deutsch Werft and South Korea's Daewoo Shipbuilding & Heavy Machinery paved the way for collaboration with American President Lines' boxship pro-

gramme. Observers will be watching to see if such Europe-Far East cooperation expands in the future.

### Impact of the Single Market

After many years of decline, world ship production began to recover in 1989. However, at the beginning of the nineties weaker than hoped for growth in sea-borne trade and the lingering overcapacity in the shipping industry worked against the prospect for an immediate upturn in production volumes or employment.

Concerning the EU shipbuilders, exchange rate fluctuations (particularly vis-à-vis the US dollar) have also helped weaken them. So pushed by the increasing competition from lower cost manufacture taking place outside the EU, they have had to invest in automating the production process wherever possible, usually by introducing computerised sheet-cutter and automated welders. Part of adjustment has included the adoption of Eastern style management techniques, multi-skilled work practices and purchases of complete systems and sub-systems from external suppliers. Thus, the number of shipbuilding firms in the EU has been reduced by yards either going out of business or by mergers and acquisition activity, and many of the remaining shipyards have been forced to find niches in the shipbuilding market in order to survive. The EU shipbuilding industry in general seeks to differentiate itself from its main competitors in Asia by specialising in the construction of ships with relatively high value added rather than relatively simpler dry-bulk vessels or oil tankers.

Concerning the European legislation the competition policy, more precisely the monitoring of state-aid, is relevant to the sector as the global shipbuilding industry is subject to competitive distortions due primarily to differing levels of subsidies by geographic region. With regard to environmental regulations, the EU and the USA are leading the industry with the preparation of legislation designed to reduce solvent emissions resulting from particular paint substances. In addition, increasing pressure on the shipping industry on maritime safety may act as a boon to the shipbuilding industry depending on the level and degree of legislation that is applied. Besides, the longer term outlook is potentially positive for the EU shipbuilding industry as the world fleet becomes increasingly aged, and legislative requirements for ship design favour some of the EU acquired expertise.

## ENVIRONMENT

1993 was a year in which issues surrounding marine casualties came to the fore. The US Oil Pollution Act - OPA 90 - and debates on double-hulled tankers focused on environmental protection, while concern was expressed within the industry about the value and safety of human life and not only the insured gross tonnage involved in such casualties (see Regulations).

Oil spills are often considered to be the greatest environmental threat posed by the shipping industry as a whole, as evidenced by the IMO regulations for new tankers to be constructed with double hulls. However, the prevention of oil spills is by no means the only major environmental issue confronting the shipbuilding sector. Rather, much of the current focus has been on the painting of ships where the paint and coating (anti-fouling) substances and abrasive blasting done to prepare a painting surface are of particular concern.

A number of anti-fouling substances have been brought under scrutiny. Paint components, e.g. red lead (Pb3O4) and zinc chromate (ZnCrO4), and tin compounds are expected to be banned along with previously discontinued substances such as cadmium and other heavy metals. The development of effective tin-free antifouling in response to environmental concerns over tributyltin (TBT)-containing systems has widened the choice for operators. Unfortunately, while such tin-free antifouling have proven to be environmentally-correct indeed, none is yet available that has achieved the same standard as the best self-polishing copolymer (SPC) antifouling. Hence, most operators are still opting for SPCs, with Japan being the only country to have adopted the tin-free antifouling widely. The race is now on to find an economically viable alternative to TBT-based antifouling, through either the development of new generations of environment-friendly biocides, or the development of alternative biocide-free coatings.

Meanwhile, other substances used such as carbonates, silicates, coal tar, organic chloride compounds and polyurethanes are all suspected to cause specific health hazards. Abrasive blasting is another source of concern because of the vast amounts of hazardous dust which result from the preparation of metal or concrete surfaces before painting.

## REGULATIONS

The global shipbuilding industry is subject to competitive distortions due primarily to differing levels of subsidies by geographic region. The EU level of subsidies to shipbuilding comes under the rules of the 7th directive on aid to shipbuilding (approved in November 1990) which was extended through year-end 1994. Each year, the Commission determines the common ceiling for state aid, which is based on the difference in costs between the most efficient EU yards and their major competitors (typically from the Far East). A level of 9 % was maintained in the years 1992-1994. This means that ships contracted in 1994 for delivery in or before 1997 may be allowed a maximum level of 9 % of the contract value. The ceiling for ships with a contract value less than 10 million ECU was 4.5 % of that value. In connection with the decision to maintain the same subsidy level again in 1994, the Commission stipulated that in case an OECD agreement was reached on the elimination of all subsidies for the industry, a further lowering of the subsidy ceiling for 1994 would be reconsidered.

In fact, the OECD negotiations, which involved the world's largest shipbuilding countries and had been ongoing since 1989, were finalised in the summer of 1994. Home credit schemes, e.g. those of Japan and South Korea; injurious pricing control instruments; and the US Jones Act, which requires that a fixed proportion of cargo passing through US ports be

carried in US-registered ships, were perhaps the most controversial issues blocking agreement. Resistance against the overall content of the agreement came most strongly from the French, who found it to be beneficial to those countries already with strong internal markets, and the Japanese, who feared further breakdown of the market.

While the talks were originally pushed for by the US shipbuilders' council, the EU Commission saw the OECD agreement as crucial to its efforts to phase out national shipbuilding subsidies in this sector worldwide. The accord will effectively end all forms of governmental subsidies, allow for anti-dumping duties and cap the tonnages covered by the Jones Act while providing for counter-measures in the case of misuse. Overall, the deal was a welcome one, as it eliminated the risk of a subsidy war between the bigger shipbuilding nations.

In parallel to the OECD negotiations was the Communication from the Commission (COM (93) 526), "The European Maritime Industries Forum: Towards the Implementation of a Comprehensive policy for the Maritime Industries: the First Tangible Results." The Communication was an assessment of the recommendations of the report of the Maritime Industries Forum (Athens, 1993). In this respect, it was recommended that Member States which are supporting their shipbuilding industries consider amending the terms of their Home Credit Schemes in line with the objectives of the OECD agreement, even before it was approved. Further, it encouraged the EIB and EIF to expand their role in ship finance.

To facilitate collaboration, and to show its support for the work of the maritime regions in Europe, the European Parliament created the Alliance of Maritime Regional Interests in Europe (AMRIE).

With regard to environmental regulations, the EU and the USA are leading the industry with the preparation of legislation designed to reduce solvent emissions resulting from particular paint substances. Such legislation is expected to be similar to the German TA Luft legislation. Member States such as Denmark and the Netherlands have already initiated programmes designed to reduce solvent emissions.

Recent research has shown that of the bulkers of over 20 000 dwt which have gone missing or sunk during the past ten years, 40 % of the incidents were resulting from structural and equipment failures. The industry has taken the matter to heart. In March of 1994, the AWES, Korean Shipbuilders Association (KSA) and the SAJ agreed on a common statement regarding substandard vessels which stressed the need for better enforcement of existing rules and stricter implementation of new ones.

The main targets of tightened inspection of environmental and safety standards by flag states (Classification Societies) and Port State Control (PSC) are crew skills (i.e. operation and manoeuvring) and safety and fire-fighting equipment. Particular emphasis will be placed on hull structures and stability, especially of vessels aged over 20 years, and action is to be taken by each national government, with joint research and development activities by and between them and international organisations and/or related industries.

Increasing pressure on the shipping industry to ameliorate maritime safety may act as a boon to the shipbuilding industry, depending on the level and degree of legislation that is applied. This, due to the potential for shipbuilders to incorporate additional, high value added safety features in new vessels, as well as for ship repairers to outfit existing shipping with add-on equipment.

## OUTLOOK

Although the outlook for the EU shipbuilding industry does not appear to offer obvious change from the persistent contraction of production and employment in the short term, the

surprising upsurge in new orders in 1993, combined with signs that the recession felt worldwide is nearing an end (a more balanced growth of between 2.3-2.5 % is anticipated for 1995), offer some hope for the future of the sector.

Additionally, as the relevant authorities apply more stringent ship surveys to ensure the improvement of sub-standard tonnage, there should be a substantial pick-up in repair demand in the short term. And, as over half of the current fleet will be over 25 years old by the year 2000, up to one-third will need to be replaced during the interim period. The realisation that the initial higher cost of producing safer ships will be offset in the long run by the reduced risk of loss, damage and ecological disaster will up the demand for value added ships.

In short, the new, large-scale commitments to the modernisation of shipbuilding yards seen during 1993 will contribute to the future structural well-being of the industry. Such commitments have stemmed not only from the factors mentioned above, but also from the acknowledgement that the future of the industry impinges upon the repercussions of any possible increased capacity, perhaps one of the most pertinent issues for shipbuilding today.

Thus, the EU shipbuilding industry will be keenly focused on the development of the next generation of shipping vessels which are predominantly being developed in Japan by Mitsubishi Heavy Industries. Although Mitsubishi is the primary developer of the super conductive electromagnetic propulsion (SEMP) vessels, certain EU firms are performing crucial roles in the development of the SEMP project. The most significant contributor is Germany's Motoren und Turbinen Union division of Daimler-Benz, which won a prestigious contract to develop two high-speed engines used to power the SEMP's innovative magnetohydrodynamic (MHD) propulsion system.

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# Railway rolling stock

## NACE 362

Supply and demand both rose strongly during the early 1990s. Employment fell in 1993, following the pattern of the last decade and it is likely that any future employment growth will be very low as a result of productivity improvements, increased concentration within the industry and the elimination of overcapacity as competition increases. The industry has relatively few clients and demand for rolling stock is dependent upon transport and infrastructure policies. Products are tailored to clients and continuous innovation is necessary to satisfy them and to ensure that EU firms stay competitive. The industry is concentrated but as national governments open bidding procedures to all EU manufacturers the industry will become increasingly competitive. Supply and demand are forecast to grow, but at a declining rate. Future demand depends largely upon the railway operators' ability to attract public and private financial support for Europe's high-speed railway and for developing urban transport systems.

### INDUSTRY PROFILE

#### Description of the sector

The railway rolling stock industry includes the manufacture of standard large and narrow gauge railway and urban transport railway equipment. This includes:

- locomotives;
- heads of motor coaches and motor coach trains;
- mainline passenger coaches, metro cars and tramways;
- goods wagons;
- rolling stock equipment;
- fixed track equipment;
- electric signalling, safety and control devices for railways.

Production of passenger coaches includes coaches for regional services and for additional services such as mail vans, restaurant cars and sleeping cars.

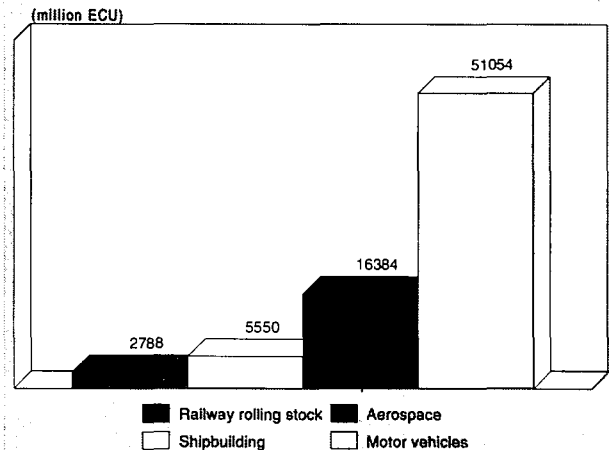
The performance of the industry is dependent upon transportation needs and on public policies regarding the development of the railway lines and purchase of rolling stock. In 1993, the railway rolling stock sector generated nearly 3 billion ECU in value added, equal to approximately one sixth of the value added by the aerospace industry.

#### Recent trends

Production of railway rolling stock in current prices fell between 1985 and 1987, remained static during 1988-89 but showed continued growth in 1990-93, with a particularly strong increase in 1992. In 1993, the value of production exceeded 7 billion ECU which was more than 80 % above its 1987 level. Growth in railway rolling stock production compares favourably with most EU manufacturing industries. Output growth in constant prices between 1984 and 1993 was nearly two thirds higher than that achieved across all EU manufacturing.

In value terms, Germany is the main EU producer followed by France. Between 1992 and 1993, German production fell by nearly 20 % in current prices with a marked decline in the production of passenger coaches and goods wagons. Over the same period, French production grew by more than 25 % in current prices with the value of goods wagon production doubling, and that of locomotives increasing by a quarter.

Figure 1: Railway rolling stock Value added in comparison with related industries, 1993



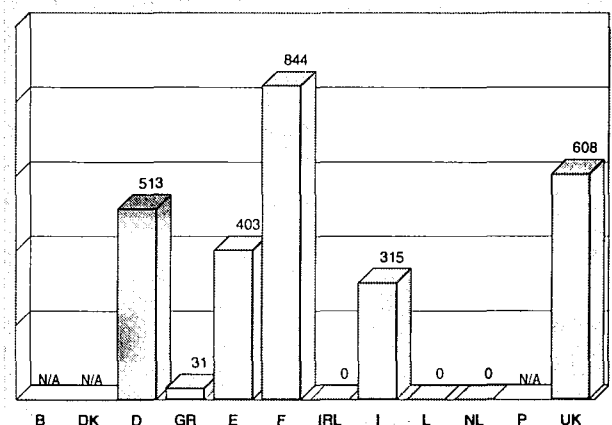
Source: DEBA

In terms of production specialisation, the railway rolling stock sector as a proportion of total manufacturing was particularly important in Italy, the UK and Spain in 1984. By 1993 it was less significant in Italy and the UK and much more important in France. While Germany is the main EU producer, and has become more specialised in this sector, it is the least specialised of the main EU producers.

Apparent consumption stagnated over the period 1985-88 with a slight upturn in 1989 and more than 20 % growth in 1990. Consumption fell slightly in 1991, grew by more than 40 % in current prices in 1992 and, following continued growth, was twice as high as its 1984 level by 1993. Between 1984 and 1989, consumption grew by less than 1 % per year in real terms. The strong recovery of the sector in the 1990s led to a real annual growth rate in consumption that was nearly 12 times higher over the 1989-93 period.

Declining production between 1984 and 1989 led to a 30 % fall in employment, followed by slight growth in 1990 and 1991 and strong growth in 1992. Reflecting increasing pro-

Figure 2: Railway rolling stock Value added by Member State, 1993



Source: DEBA

**Table 1: Railway rolling stock  
Breakdown by product line, 1992 and 1993**

(million ECU)	Year	Locomotives	Passenger coaches	Goods wagons
Belgique/België	1992	4.1	216.4	N/A
	1993 (2)	2.5	199.9	N/A
Danmark	1992 (2)	7.9	10.63	N/A
	1993 (2)	7.6	N/A	N/A
BR Deutschland	1992	323.3	840.6	375.2
	1993	355.7	636.1	268.0
España	1992 (3)	4.2	64.9	7.6
	1993	41.5	57.4	6.7
France	1992	427.2	347.4	90.4
	1993	532.7	376.5	181.4
Italia	1992	171.2	50.1	63.3
	1993	54.7	27.6	193.6
Portugal (1)	1992	N/A	N/A	7.4
	1993 (2)	9.1	39.9	10.5

(1) Data for passenger coaches includes bodies.

(2) Data for locomotives include only electric locomotives.

(3) Data for locomotives include only diesel shunting locomotive and diesel locomotive production.

Source: UNIFE

**Table 2: Railway rolling stock  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	3 069	3 447	3 752	4 606	4 079	5 756	6 364	6 743	7 200	7 600	7 970
Production	4 129	4 014	4 026	4 860	5 041	6 966	7 145	7 288	7 780	8 200	8 580
Extra-EU exports	1 187	723	410	445	1 341	1 568	1 145	1 116	1 220	1 290	1 370
Trade balance	1 060.2	567.1	274.2	254.2	961.8	1 209.3	781.4	544.5	580	600	610
Employment (thousands)	92.8	68.4	64.8	68.2	69.7	79.8	73.5	68.0	70.0	70.0	70.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DPI forecasts.

Source: DEBA

**Table 3: Railway rolling stock  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.99	11.46	5.52	13.35
Production	-3.74	12.43	3.14	4.27
Extra-EU exports	-22.86	21.99	-5.43	-33.77
Extra-EU imports	-6.11	18.00	3.93	-12.44

(1) Some country data for apparent consumption and production have been estimated.

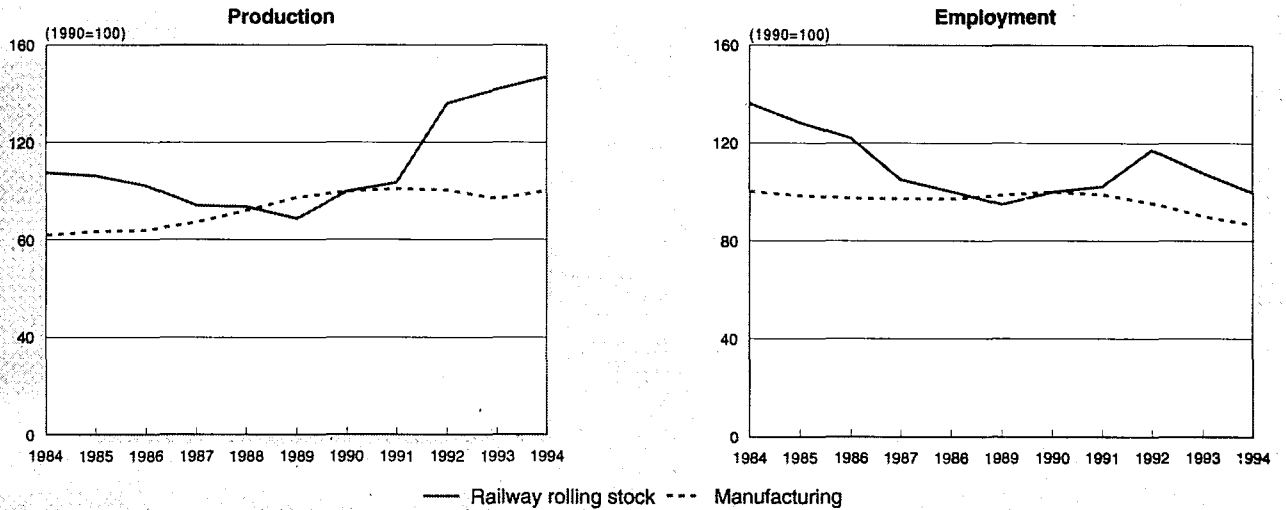
Source: DEBA

**Table 4: Railway rolling stock  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 187	965	856	840	723	410	445	1 341	1 568	1 145	1 116
Extra-EU imports	127	135	112	169	156	136	191	379	358	364	571
Trade balance	1 060	830	744	672	567	274	254	962	1 209	781	544
Ratio exports / imports	9.38	7.17	7.63	4.99	4.64	3.02	2.33	3.53	4.37	3.15	1.95
Terms of trade index	117.2	119.7	114.3	105.7	112.7	100.9	100.0	92.6	96.7	92.1	N/A

Source: DEBA

**Figure 3: Railway rolling stock  
Production and employment compared to EU total manufacturing Industry**



1994 are DEBA estimates.  
Source: DEBA

ductivity, employment fell back to its 1990 level despite an increase in production in 1993. The sector now employs approximately 70 000 people compared to 90 000 in the mid 1980s. It is interesting to note that in 1992 employment grew by about 10 000 units, as a consequence of the privatisation and subsequent restructuring of the industry in former East Germany. However, over the period 1984-93 employment in the railway rolling stock sector fell more than twice as fast as employment in all EU manufacturing.

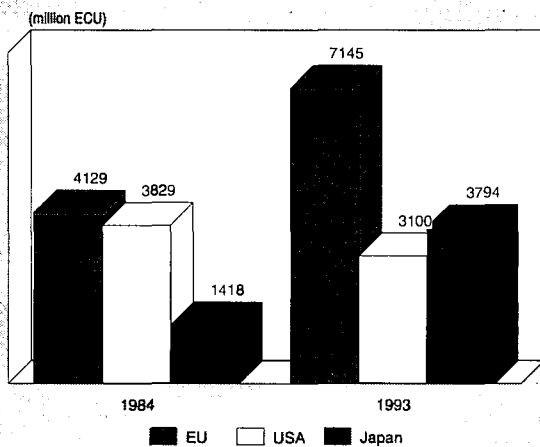
The trade balance in the sector remained positive but fell consistently between 1984 and 1990 and was less than a quarter of its 1984 level in 1990. This reflects a strong decline in exports and in the exports/imports ratio. The trade balance recovered from 1991 onwards and strong export growth in 1992 resulted in the trade balance surpassing its 1984 level. Despite a fall in 1993, the balance of trade remained higher than at any time between 1986 and 1990.

### International comparison

In 1993, the EU was the world leader in the production of railway rolling stock, outpacing Japanese production by nearly 90 % and producing 130 % more than the USA. Japan, previously not considered to be a major player in the high-speed rail market as its technology appeared to be less advanced than that of European countries, has become the largest rolling stock producer in the world in recent years.

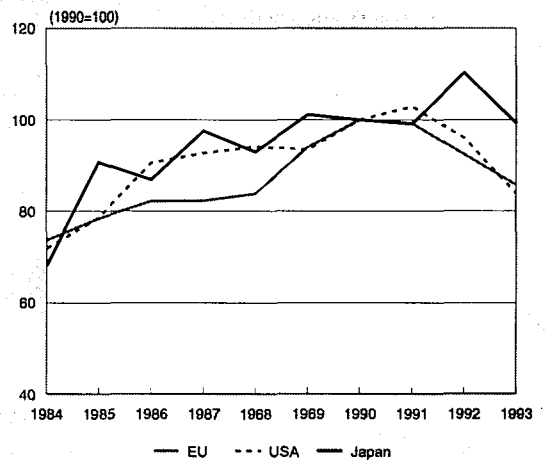
Real growth in the Japanese industry's output exceeded EU growth in the 1980s, whilst real growth in the EU in the 1990s has been 40 % higher than in Japan, reflecting the strength of the Yen. Overall, Japanese production in current prices grew more than three times faster than the EU between 1984 and 1993. Production in the USA has fallen in current prices and stagnated in real terms over the last decade, but the growing popularity of light rail transit systems in the USA has provided a potential export market for EU producers.

**Figure 4: Railway rolling stock  
International comparison of production in current prices**



Source: DEBA

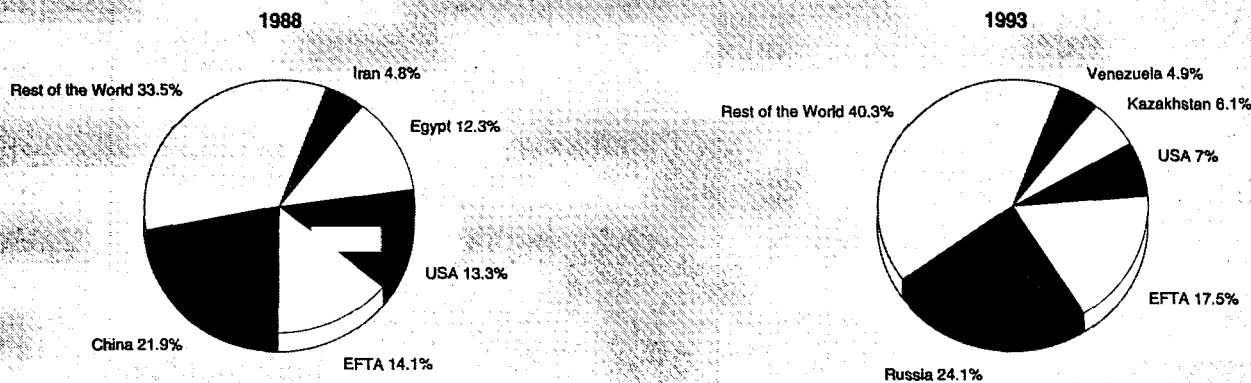
**Figure 5: Railway rolling stock  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Railway rolling stock  
Destination of EU exports**



Source: Eurostat

### Foreign trade

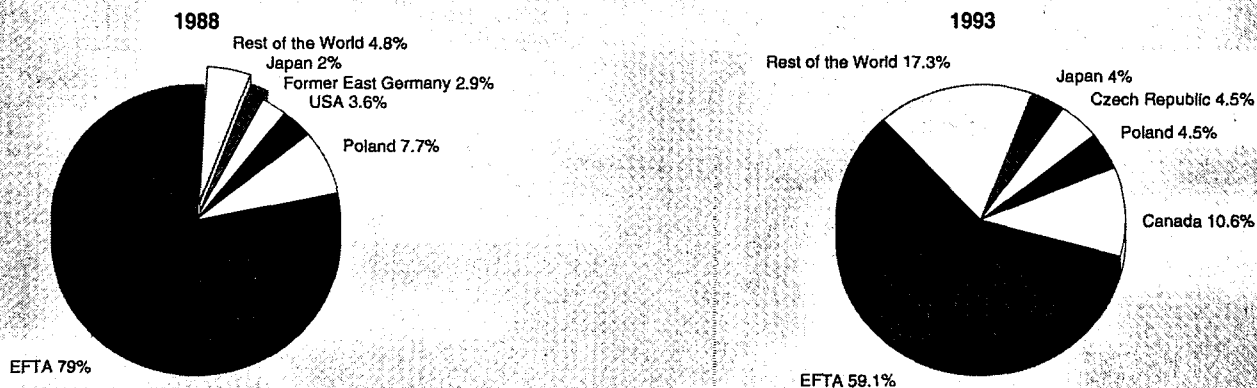
The value in current prices of extra-EU exports in 1993 was similar to that in 1984, although there was considerable fluctuation in the intervening years. In the second half of the 1980s, the value of extra-EU exports fell and by 1989 it was barely one third of its 1984 level. Following slight growth in 1990 and exceptional growth in 1991 (8.5 % and 201.5 %, respectively, in current prices), the value of extra-EU exports trebled compared to 1989, but declined sharply in 1993. The value in current prices of extra-EU exports in 1993 was equivalent to 16 % of EU production.

In 1985, nearly 80 % of extra-EU exports consisted of parts and passenger coaches. There was a marked decline in extra-EU exports of passenger coaches in the late 1980s whereby parts alone accounted for over 70 % of the exports by 1989. The very strong export growth in 1991 was due to a massive increase in the export of passenger coaches and a sharp increase in the export of goods wagons. There was continued strong growth in passenger coach exports in 1992, followed by a decline in 1993. Exports of goods wagons fell by over 40 % in 1992 and 1993. Reflecting the high value nature and irregular delivery of long term contracts, the destination of extra-EU exports changed significantly as EU exports increased by 58 % between 1988-93. Exports to China which

had accounted for over one fifth of extra-EU exports were replaced by exports to Russia which accounted for nearly a quarter of the exports in 1993. Exports to the USA decreased by 47 % during this period, whereas those to the EFTA countries increased by 24 %.

Over the last decade, extra-EU imports have achieved an average real annual growth of nearly 4 %, whilst exports have fallen by more than 5 % per year on average. The ratio of extra-EU imports over consumption rose to over 9 % in 1991 but fell in 1992 and 1993. In 1993, extra-EU imports accounted for less than 6 % of EU consumption. The source of extra-EU imports shifted as imports increased by 134 % between 1988 and 1993. EFTA countries remained the primary source of EU imports. However, their share fell from nearly 80 % to approximately 60 % during that period. Canada became the second largest exporter to the EU in 1993 and imports from the rest of the world increased by more than three times. The EU imports relatively few locomotives and passenger coaches, whereas parts and goods wagons represent the majority of extra-EU imports. The strong growth in extra-EU imports can be attributed to a rapid rise in imports in both of these sectors in 1991, and slight growth in 1992.

**Figure 7: Railway rolling stock  
Origin of EU imports**



Source: Eurostat

**Demand**

The industry has a relatively small number of customers: national and regional railway companies, urban transport companies, private rental and leasing companies and industries with their own railway rolling stock. The demand for railway rolling stock is dependent upon transport and infrastructure policies. The planning of new networks and increases in the provision of rail services tend to be on a long-term basis. Both the political and economic climates affect the railway companies' ability to generate short term investment funds and influences the phasing and size of orders.

The main factors affecting the supply of railway rolling stock are the development of a Trans-European High-Speed Rail Networks, growth in the use of rail-based public transport as a means to solving congestion and pollution in urban areas and the continued upgrading of conventional rail systems.

Increased demand for fast transportation led to the development of the high-speed rail technology and product innovation which has resulted in plans by many countries for new high-speed networks. France is increasing the network of its Train à Grande Vitesse (TGV), Germany is expanding its InterCity Express (ICE) network, Spain has invested in a new high-speed link between Madrid and Seville (in operation since 1992), and by the end of the century most Western European countries are expected to have high-speed rail connections.

The implementation of a Trans-European High-Speed Rail Network by 2010 will have a positive impact on the activities of rolling stock manufacturers, and currently there is considerable investment in the high-speed railway sector. To provide the proposed EU network it is estimated that an investment of 10 billion ECU in railway rolling stock will be required until 1999 with a further investment of 15 billion ECU over the period 2000-2010. However, the development of a high-speed network depends upon the availability of finance. At present, Europe's railways are reliant on government contributions to cover their operating costs. To make the large financial investment required to develop a European high-speed network, increased public investment is required, with funding from institutions such as the EIB and the World Bank, as well as private funding.

As each country's rail system evolved largely as a separate entity, there are technical incompatibilities throughout the EU. For European high-speed rail links to become a reality, trains must be able to deal with a host of electricity voltages, signalling systems and safety standards on different national rail systems. Technical specifications on interoperability, which will eventually be transformed into mandatory standards, are currently being prepared by industry and operators: the European Commission played an important role in initiating this process (via the draft Directive on inter-operability).

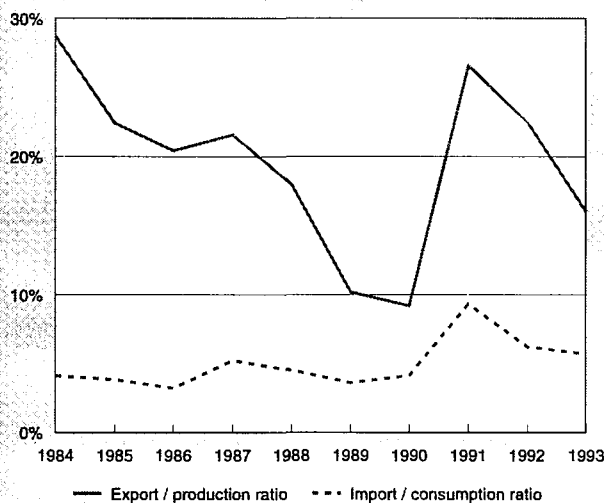
Whereas the high-speed rail links have a high profile, demand for rail links in urban and suburban areas are expected to account for a higher proportion of future railway equipment demand. Many cities in Europe, and in the rest of the world, encounter heavy road traffic congestion and pollution which may be solved by faster and more efficient rail-based public transport solutions. The demand for rail transit systems is expected to show continued growth as such systems provide improved mobility in expanding cities and urban areas.

Many European regions also wish to improve their connections with the high-speed networks and to modernise their conventional rail systems. The total conventional rail network in Europe covers approximately 123 000 km, with 33 000 km in France, 28 000 km in Germany and 17 000 km and 16 000 km, respectively, in the UK and Italy. Data indicate that the total number of rail passengers carried in the EU between 1981 and 1991 increased by 8 % to over 4 billion. This is a result of steady growth in urban and suburban traffic and a sharp increase in national intercity trains, counterbalancing losses in traditional medium distance services. In 1991, the four largest rail passenger markets in the EU were Germany (1 045 million passengers), France (822 million passengers), the UK (708 million passengers) and Italy (438 million passengers). Between them, these countries carried 72 % of European rail passengers. Other important markets are Spain and the Netherlands both of which showed strong growth in the early 1990s. As the demand for railway rolling stock is a derived demand, depending primarily upon rail transport usage, the larger EU countries will remain the main EU markets for railway rolling stock. However, future demand in these markets may be constrained by the availability of financial resources. Also, the globalisation of the rail market has seen the emergence of new markets in Asia, such as South Korea, Taiwan and China, and North America.

Combined transport offers another potential market for the future activity of the industry. Combined rail/road haulage offers an environmental and energy saving solution as goods can be transported by rail for long distances and dispatched to their final destinations by trucks. Quick loading and unloading systems are essential for the success of combined rail/road traffic. Currently Germany and France have a usage of the rail network for freight services that is higher than average. However, rail's share of the freight market within the EU has fallen, particularly since road freight was deregulated.

Traditionally, railway operators were responsible for the design of rolling stock equipment, with suppliers applying technical specifications prepared by railway engineers and providing an end product. As railway operators focus more on their primary role of service providers, the design function is transferring to rolling stock suppliers. Similarly, maintenance operations, the cost of which may represent half of the total life cycle cost of a train system, are being increasingly taken over by the suppliers. Hence, demand from railways is expanding beyond that of rolling stock equipment to include complete system supply i.e. rather than focusing solely on the initial capital cost of equipment the demand is for the overall package covering the total cost of the rolling stock over its life cycle. Whereas demand historically has been for railway rolling stock with a long life cycle, approximately

**Figure 8: Railway rolling stock Trade intensities**



Source: DEBA

**Table 5: Railway rolling stock  
EU trade by product in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>Extra-EU exports:</b>										
Locomotives	232	153	94	212	266	32	50	53	145	93
Passenger coaches	281	309	254	189	83	41	26	611	845	576
Goods wagons	166	61	141	76	75	63	100	357	221	123
Parts	598	527	422	423	348	343	358	412	453	409
<b>Extra-EU imports:</b>										
Locomotives	8	4	13	11	14	19	25	36	3	5
Passenger coaches	23	24	18	38	2	0	10	30	6	35
Goods wagons	25	30	27	45	68	50	80	153	162	125
Parts	76	81	61	80	78	77	87	193	222	223

Source: Eurostat

30-40 years, it is shifting towards equipment with a much shorter life cycle, 15-20 years.

### Supply and competition

Traditionally, national railways have displayed a great propensity to purchase from national suppliers. Apart from the Netherlands, Spain and more recently the UK, there have been few cross-border orders from countries with indigenous railway rolling stock manufacturers. Decades of cross-reliance between railways and suppliers has created a recognised excess capacity in supply resources which has only been partially offset by exports to non-EU countries. If warnings of over-capacity in the European industry are valid, some of the national suppliers may disappear.

While the prospects for demand appear healthy, the competition to supply rail contracts, and in particular high-speed rail contracts, remains fierce. This is largely the result of the nature of the industry. The market for railway rolling stock is comprised of a relatively small number of clients with large projects which arise infrequently and generally last several years. For railway rolling stock manufacturers this time lag makes each contract critical. The experience acquired on one puts the manufacturer in a stronger position for the next. Similarly the economies of scale obtained by winning several contracts allow cheaper pricing in future bids.

The French/UK company GEC-Alsthom leads the world high-speed train market with 570 high-speed trains having been manufactured or ordered from the company by the beginning of 1994. The comparable figure for the Siemens-AEG (D) consortium was 120 trains. GEC-Alsthom's strong market position also reflects the fact that the French TGV has a proven track record, having been in service for over a decade whereas the German ICE services have only been running since 1991.

As demand shifts, the major railway rolling stock manufacturers are increasingly becoming system suppliers or integrators. Railway operators thus tend to deal with companies that are able to take full responsibility for providing a train system rather than dealing with a large number of vendors. The pricing of individual components is being replaced by total life cycle costs. A pyramidal organisation is therefore emerging in the railway rolling stock industry. At the top end a few large system suppliers interfacing with the railway operators are taking over the design, procurement of subsystems and maintenance over the life cycle of the rolling stock. Subsystem suppliers are becoming more specialised. At the bottom of the pyramid is a competitive pure supply industry, making parts and components at the request of subsystem suppliers.

As employment in the railway rolling stock sector fell there was continued improvement in labour productivity over the period 1984-93 with the labour productivity index showing a 30 % improvement between 1990 and 1993. This trend should help restore the EU's competitiveness against countries with lower labour costs. Excluding 1988, unit labour costs rose steadily between 1984 and 1991 before falling by 6 % and 14 % respectively in 1992 and 1993. Total unit costs also rose over the 1980s, increasing by over a third between 1984 and 1992.

Depending upon the level of technological transfer, the long-term threat to the European rail industry is likely to come from countries with lower labour costs, such as Central European countries and other developing economies.

Competition between high-speed rail and air transport is increasing in Europe. It is generally accepted that rail will triumph over air travel in cases where trains can deliver passengers within a travel time of two and a half hours. There will be competition between them where the train takes up

**Table 6: Railway rolling stock  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.0	82.8	83.7	89.6	93.2	93.5	100.0	101.1	116.2	131.5
Unit labour costs index (3)	82.0	84.6	88.4	90.9	89.7	97.1	100.0	102.6	96.8	83.1
Total unit costs index (4)	75.6	78.8	84.0	84.8	87.0	93.1	100.0	99.7	102.7	96.5
Gross operating rate (%) (5)	7.56	8.83	4.85	2.58	5.26	4.86	3.73	2.97	5.51	10.73

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Table 7: Railway rolling stock  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	0.00
Danmark	N/A	N/A
BR Deutschland	0.50	0.57
Hellas	1.12	0.78
España	1.52	1.64
France	1.05	1.76
Ireland	0.00	0.00
Italia	1.63	0.93
Luxembourg	0.00	0.00
Nederland	0.00	0.00
Portugal	N/A	N/A
United Kingdom	1.55	1.38

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

to three hours, and air will have the competitive advantage where the journey by train exceeds three and a half hours. In the future, rail transport and railway rolling stock suppliers will face increased competition not only from road and aviation, in terms of alternative 'mobility' options, but also from improved telecommunications in terms of 'communication' opportunities. The development of telecommunications may result in potential customers choosing communication tools rather than rail transport solutions. Competition is also taking place beyond products and services, and increasingly includes financing. Leading industrial groups involved in the provision of rail systems may follow aircraft manufacturers and set up financial structures to assist operators in acquiring equipment.

### Production process

Since the industry has only a few clients, it works very closely with its customers and producers tend to develop new equipment in collaboration with clients. The Single European Market should make co-operation easier, as requirements will be harmonised through European standardisation.

Innovations have been numerous in the industry. For example, high-speed and tilting car body technology allow higher average speeds on curved tracks. Multi-micro processor control equipment and three phase drives have become standard in various countries. The use of new materials such as light alloys, composites, carbon fibres to replace traditional steel parts, and the use of new propulsion systems with low weight transformers have reduced vehicle weights significantly and lead to increased power efficiency.

Technological developments will also address: information and telecommunication technologies regarding signalling and safety systems allowing trains to cross national borders; advanced telematics that will allow e.g. identification and localisation of vehicles; and software applications, e.g. experts systems, aiming at total predictive maintenance.

Other significant technological innovations include bogies for locomotives and coaches with radial steering wheel sets to minimise lateral forces on track and wear of rail and wheel flange; satellite-oriented control and communication systems; integrated transport systems for passengers and freight; innovative aerodynamic and sound-proofed trains, and automotive train control systems for mass transit transport. Low-floor and advanced propulsion systems are also being used more widely in urban transport vehicles.

### Companies

Historically, the railway rolling stock industries throughout the EU have been shaped by their understanding of the specific requirements of their individual railways and have formed close working relationships with their customers. As a result of selective buying and technical incompatibility among different rail systems, the main industrial groups have developed their own systems and there has been a lack of standardisation. Access by an individual supplier to new national markets has tended to have been achieved through the process of acquisition, part ownership or via the medium of a consortium. In the late 1980s, the industry became much more concentrated with most of the mergers and acquisition occurring between suppliers of specialised rail technology.

Even though the railway rolling stock industry has become more concentrated, following the rationalisations which have occurred within a number of the supply industries, there remains a large number of suppliers within Europe. The industry comprises approximately 100 locomotive, coach, and wagon builders, and a similar number of railway equipment manufacturers.

Locomotives tend to be produced by divisions of large industrial groups engaged in other industrial activities, typically electrical engineering. Passenger coaches and goods wagons are usually the primary product of smaller firms. Some firms work in niche markets producing only one or two types of products. This range of producers results in the size of companies varying widely, from less than one hundred employees to several thousand workers.

The industry is characterised by a number of large companies that are divisions of multi-national groups which are very diversified (e.g. equipment for the production and distribution of energy, telecommunications and transportation materials) and produce in many fields other than transportation. These include GEC-Alsthom (F, UK), ABB (S, CH), Siemens (D) and AEG (D), Fiat Ferroviaria (I), Ansaldo (I) and Breda (I).

In 1988 ASEA (S) merged with Brown-Boveri (CH) to form ABB. Although transportation represents only a small sector of the group's total revenue, its transportation business comprises companies in Denmark, Germany, Italy, the Netherlands, Portugal, Spain and the UK, as well as in Norway, Sweden, Austria and Switzerland. ABB acquired a 40 % interest in BREL (UK) when it was privatised and separated from British Rail.

GEC-Alsthom Transport Division (F, UK) is another important European multinational. Alsthom (F), a large supplier of rolling stock and equipment to the SNCF, designed and built the range of high-speed TGV trains. Its parent company, CGE (F), merged its railway operations in 1989 with those of the GEC Power Systems Group (UK). The latter includes AEI, BT-H, Dick Kerr, English Electric, Metropolitan Vickers and the Vulcan Foundry. Metro Cammell Ltd was added later in 1989. The French companies include Brissoneau et Lotz, Franco-Belge, CIMT, CEM Oerlikon and Jeumont Schneider. Other European subsidiaries include ACEC Transport of Belgium, Ateinsa, Macosa and Maquinista of Spain and Kiepe Elektrik of Germany. GEC-Alsthom has also gained the majority shareholding of Linke-Hoffman-Bosch (D) which is a supplier to the ICE consortium.

Two major all-German groups have been formed since 1988. Siemens has a 60 % interest in rolling stock manufacturer Duewag and a 25 % stake in the Krauss-Maffei locomotive plant. Daimler-Benz joined the railway activities of AEG (D) with the US company Westinghouse and has merged the railway building activities of MBB with those of MAN.

Canadian railway supplier Bombardier Inc. of Montreal, having acquired ANF-Industrie (F) and a controlling interest in

BN (B), set up Bombardier Eurorail which had a strong involvement in manufacturing double and single deck wagons for the Channel Tunnel.

## Strategies

The primary strategies for the leading firms of the industry are increased innovation and technology and increased concentration. The major rolling stock suppliers have formed consortiums in order to develop and supply the new high-speed trains. GEC-Alsthom for the TGV (and its derivatives, the Trans Manche Supertrain, and Paris-Brussels-Cologne-Amsterdam); AEG-Siemens and ABB for the ICE; Ansaldo, Breda, ABB and Fiat for the ETR 500.

The commercial drive behind mergers of railway suppliers are derived from the expectations that the Single European Market will add impetus to investment in rail systems of all descriptions but particularly in light rail vehicles for urban transit and high-speed trains (mainly as an effect of Directive 93/38). It is also envisaged that there will be more open competition for contracts and that these new contracts will require the suppliers to provide comprehensive capabilities and the supply of complete systems.

Companies must also be large enough to withstand extra-EU competition. The specialised nature of products does not currently enable large economies of scale, but knowledge of different standards and requirements by different EU customers does give European firms an advantage over non-European firms. This advantage may be reduced as standardised European norms are introduced. Technical harmonisation at the European level may enable manufacturers to apply standardised specifications and increasingly benefit from improved economies of scale. This should also improve the overall competitiveness of rail transport through more effective and more economic production methods as costs associated with specialised and diversified production are removed.

The major European suppliers are increasingly marketing themselves on a world-wide basis. The two main European manufacturers of high-speed trains have both formed alliances with US partners in order to have access to the US market. GEC-Alsthom has linked up with Morrison-Knudsen, and Siemens-AEG with General Motors.

## Impact of the Single Market

In the past, the rail industry had the reputation of being every closed industry. The activities were mainly local, as the industry had few clients, mainly the national and regional railway companies. Moreover, the rail carriers did not do much to increase their attractiveness to the customers. However, the liberalisation of transport has contributed to large benefits to the modes of transport other than rail. To remain competitive, the rail transport sector must improve its competitiveness and become more customer-oriented. In that sense, the Internal Market programme has been a catalyst of change for the rail transport sector, and also for the railway rolling stock sector. The two measures of the Internal Market programme which had most impact so far have been the technical harmonisation at the European level, which has contributed to economies of scale, and the opening up of bidding procedures to all EU manufacturers which has contributed to increase the transparency of this market and therefore to reduce the cost associated to these transactions. However, the technical harmonisation procedures imply further large investments, as an interoperability between all the different national infrastructures of the rail transport and also between the rail and the urban transport become necessary.

The three priorities for the sector are

- an accelerated technical harmonisation procedure,
- the liberalisation of financial services and capital markets leading to a cheaper access to credit, and

- the establishment of a fairer fiscal policy between the different modes of transport. This third aspect will have to take into account a number of factors such as security, or the environmental damage from production and use of the equipment.

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## ENVIRONMENT

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Rail transport, both conventional and high-speed, offer a number of environmental benefits in comparison to road and air transport. In terms of land use a double track for a high-speed train occupies less land than a motorway and can carry more passengers. Similarly, increased use of high-speed trains on shorter journeys should reduce air traffic congestion at many major European airports and enable them to cope more efficiently with longer-haul services. Other environmental benefits of the high-speed trains are that they are more energy efficient and emit less pollutants than air and road transport. The development and upgrading of new and existing rail links and services, upon which the demand for railway rolling stock depends, would appear to be consistent with Europe's environmental policy.

Environmental concerns about noise and other environmental impacts of high-speed rail links have already slowed down development or altered the alignment of proposed routes in France, Germany and the UK. As environmental concerns in Europe grow, the EU railways will have to adapt to stricter measures. It will be increasingly important for manufacturers to develop and employ light weight-saving materials; become more energy efficient; increasingly design cooling system with recyclable components; and research technologies which minimise environmental impacts from noise, air pollution and vibration. In designing and constructing new rail links, particular attention will be paid to the environmental impact of such projects in terms of cutting longitudinal lines through the countryside, the effects on flora and fauna and possibly on water flow. There will also be a need to reduce the negative environmental impact of high-speed rail projects during construction.

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## REGULATIONS

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After years of restricted access to national markets, the implementation of the EU Directive 90/531 (recently replaced by Directive 93/38) on public procurement in previously excluded markets, including transport, has created new business opportunities for European suppliers. The so-called "Utilities Directive" imposes four requirements to the public contracting entities: information, non discriminative specifications, transparency and fairness. It is too early to assess the precise impact of this Directive but some basic changes have already occurred in procurement practices amongst European railway companies as purchasing departments have already enlarged their vendor lists. The impact will depend upon the ability of new entrants to provide competitively priced and higher quality products than incumbent, suppliers although it seems unlikely that the close relationships between the national supply industry and the national railways will change materially except for in the long run.

Under the Directive on the Development of the Community Railways (EEC 91/440), the financial structures of European railways have been reformed. This involves the separation of the management of railway infrastructure from the operation of rail transport services, with compulsory separation of accounts. The physical or institutional separation of the infrastructure and service provider is optional. Under this new structure the railway undertakings which provide the rail services will be charged a fee by the manager of the infrastructure in order to cover the cost of the railway infrastructure. The Directive also provides the right of access to each Member State's railway infrastructure for any authorised operator,

whether it is another national railway or a new private enterprise.

This separation of rail infrastructure and operators should enable private operators to enter the rail transport business and lead to railway services being provided on a more competitive and commercial basis. It is likely that the denser and more profitable routes will attract private operators and may increase demand for railway rolling stock. However, on the thinner routes, railway service providers may reduce services and delay fleet expansion. This Directive has already led to changes in the structures of several national railway companies and will be a major influence on the future development of the European railway industry. In Germany the Bundesbahn and the Reichsbahn have been transformed into a competitive commercial business (since January 1, 1994), and in the UK privatisation is being implemented.

The draft Directive on the Interoperability of the European High-speed Train Network proposes that a regulatory framework for high-speed trains be created in order to ensure the establishment of a cohesive and interoperable network: national regulations and technical specifications relating to rolling stock will be harmonised. Since the introduction of this draft directive, the European railway networks (represented by UIC and UITP), and the industry (represented by UNIFE) have founded a new legal body entitled "European Association for the Interoperability of High-speed Trains" (AEIF). Its Board of Directors comprises 12 members, one half of them appointed by the European operators and the other by the industry. AEIF will approve the technical specifications of interoperability under preparation in eight working groups, gathering around 80 experts appointed on an equal basis by operators and manufacturers. These specifications are being prepared under a mandate to be delivered to the EU. The harmonisation of rolling stock specifications will assist the Utilities Directive on the opening up of contracts in previously excluded sectors.

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## OUTLOOK

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It is difficult to forecast the future of the railway rolling stock industry as it is dependent upon external and often unforeseeable factors. For example, changes in a country's political climate or budgetary situation may lead to the cancellation of long-standing contracts. Future demand depends largely upon the railway operators ability to attract public and private financial support and the suppliers ability to produce less expensive equipment. Future demand is expected to come from growth in urban rail transit systems, resulting from concerns arising due to road congestion and motor vehicle pollution, and the increased focus on high-speed lines as an alternative to air travel. The outlook for the mid 1990s looks promising with continued consumption and production growth of approximately 7 % in the short term. In the medium term the rate of growth for both consumption and production is expected to decline between 1996 and 1997.

Employment growth will be very low as a result of productivity improvements, increased concentration within the industry and the elimination of overcapacity as competition increases. Marginal employment growth is forecast in the short term with employment stagnating in 1996 and 1997. An important factor affecting market development will be the reorganisation and restructuring of European railway operators into infrastructure and service providers. There may be a delay in infrastructure and rolling stock investments in several EU countries as this process continues. The opening of public procurement in previously excluded markets is likely to lead to increased competition in the medium term. The former Soviet Union offers EU manufacturers a potentially vast market assuming that funds are available. The primary risk facing the industry is the availability of finance and the ability of rail infrastructure projects to compete with other infrastructure projects, namely telecommunications and roads, for limited funds.

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The industry is represented at the EU level by: Union of European Railway Industries (UNIFE). Address: Rue de Stassart 93, B-1050 Brussels; tel: (32 2) 512 1080/512 1866; fax: (32 2) 512 2072.

# Aerospace equipment

## NACE 364

Activity in the aerospace equipment industry is traditionally characterised by its cyclical nature. Since the beginning of the nineties however, the European aerospace manufacturers have been experiencing their worst crisis, aggravated this time by worrying structural problems. The slump in civilian demand for aircraft could have merely generated a cyclical downturn in the aerospace industry, but in fact, it translated into the largest depression ever through its coincidence with the dramatic reduction of military orders. Now, the European aerospace industry is facing problems of structural adjustment. The EU aerospace industry is increasingly operating in a global market, and its future will depend on its ability to surmount the current problems, in particular by increasing its export market share in spite of the emergence of newcomers and increasingly determined US competition.

### INDUSTRY PROFILE

#### Description of the sector

Data available for the aerospace industry divides total turnover into four subsectors: complete systems (aircraft, missiles, etc.) engines, equipment, and space. Complete systems represent about 50 % of the sector's turnover. Equipment represents some 26 % of the turnover of EU aerospace industry, followed by engines with 18 % and space with 6 %. These products have both civilian and military applications. Civilian businesses cover several products: large commercial jets, regional aircraft (turboprops and small commercial jets), helicopters, space hardware (satellites and launchers).

Military operations comprise the manufacture of aircraft, missiles, helicopters and space hardware. The share of military activities in total aerospace manufacturing has been constantly decreasing since the early 1980s, as a result of political détente. In 1991, the sales of civilian equipment overtook sales of military equipment for the first time.

#### Recent trends

The European aerospace industry achieved spectacular growth during the 1980s. Demand for large commercial aircraft and for space equipment indeed expanded at a strong pace in the second half of the eighties, which somewhat counterbalanced the cutback in the production of military aircraft. Consequently, the aerospace industry produced at a substantial rate throughout the eighties, a rate which actually jumped in 1989 and 1990.

1990 turned out to be a dramatic turning point. Hit by a sharp recession in both military and civil activities, EU's apparent consumption of aerospace equipment fell by as much as 14 % (in current ECU) between 1990 and 1992.

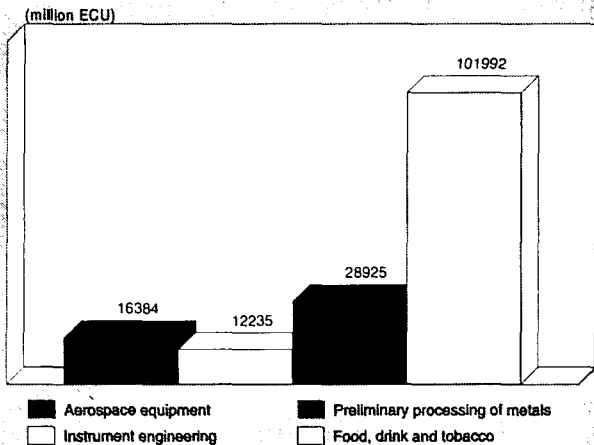
In 1993 the airline industry's overcapacity, along with the ongoing contraction in defence budgets continued to dampen activity in EU's aerospace industry. Production was down 7.4 % in value, on declining domestic demand and stagnating exports.

Employment, which had been regularly declining since 1988, shrank for the fourth year in a row, evidencing deep adjustments to the cyclical and structural turmoil.

#### International comparison

The EU emerged as a powerful competitor in the world's aerospace industry in the last decade. The founding of the Airbus Industrie consortium, composed of four companies: Aérospatiale (F), British Aerospace (UK), Deutsche Aerospace

Figure 1: Aerospace equipment Value added in comparison with related industries, 1993



Source: DEBA

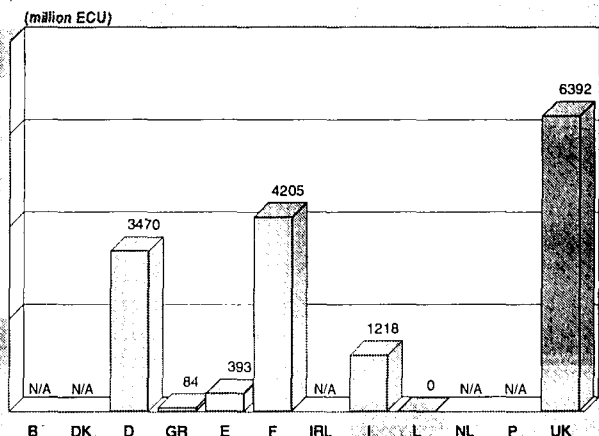
(D, to be renamed Daimler Benz Aerospace in 1995), also known as DASA, (D) and CASA (E) marked the return of Europe to the large civil aircraft market.

Competitive pressure to EU manufacturers still essentially stems from the US. The world aircraft industry has always been dominated by the United States, which posted 79.1 billion ECU of production value in 1993. As a matter of fact, the ten leading world companies include seven American firms for only three European. In addition, world leader Boeing has a turnover twice as large as DASA, Europe's largest contender, and nearly three times as large as British Aerospace, Europe's second largest aerospace manufacturer.

Japan is also a sizeable aerospace manufacturer, with production value averaging 6.1 billion ECU in 1992 (as such, Japanese turnover is nearly seven times smaller than EU's).

New players are emerging in other places. Far East Asian countries are endeavouring to build up an aerospace industry, often from scratch. To reach this objective, manufacturers in

Figure 2: Aerospace equipment Value added by Member State, 1993



Source: DEBA

**Table 1: Aerospace equipment**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	25 532	35 515	42 743	47 895	49 660	42 373	38 620	37 729	38 540	39 210	39 710
Production	27 585	35 804	42 367	46 515	47 872	45 383	42 037	41 164	42 740	44 210	45 710
Extra-EU exports	7 658	9 366	12 572	12 480	15 133	17 188	17 019	19 586	22 000	24 500	27 300
Trade balance	2 053	289	-376	-1 381	-1 788	3 010	3 418	3 435	4 200	5 000	6 000
Employment (thousands)	395.8	404.9	412.7	428.6	426.7	409.2	376.5	355.3	360.0	370.0	370.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Aerospace equipment**  
**Breakdown of aerospace turnover, 1993**

(million ECU)	F	D (1)	I	UK (2)	E	NL	EUR6	share (%)
Aircraft & missiles	7 794	4 823	2 622	5 675	686	1 412	23 012	46
Engines	3 619	1 246	778	3 347	131	0	9 120	18
Equipment	4 258	3 584	844	4 921	29	347	13 983	28
Space	1 874	1 213	769	262	69	36	4 223	8
Total	17 545	10 866	5 013	14 205	915	1 795	50 338	100

(1) Maintenance by Deutsche Lufthansa, ca. 1240 million ECU not included.

(2) Maintenance by Airlines, ca. 640 million ECU not included.

Source: DG III, National associations

**Table 3: Aerospace equipment**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.99	-1.95	1.84	-12.33
Production	5.01	-2.29	1.70	-7.29
Extra-EU exports	10.82	-2.24	4.81	3.86
Extra-EU imports	11.18	-1.11	5.54	-14.18

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

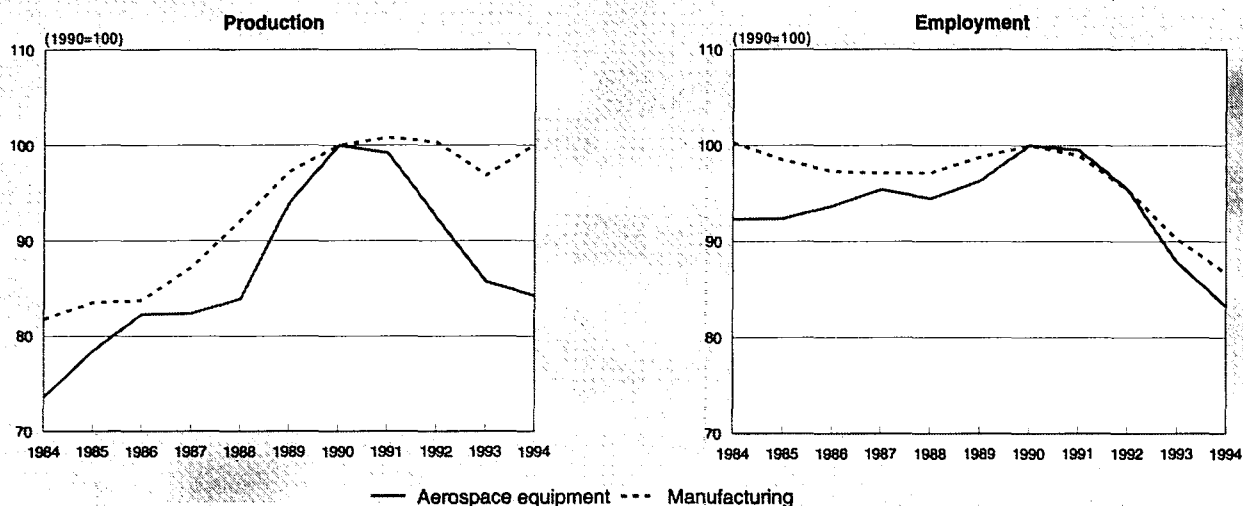
**Table 4: Aerospace equipment**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	7 658	7 401	5 884	5 686	9 366	12 572	12 480	15 133	17 188	17 019	19 586
Extra-EU imports	5 605	5 320	5 301	5 177	9 076	12 948	13 860	16 921	14 178	13 602	16 151
Trade balance	2 053	2 081	583	510	289	-376	-1 381	-1 788	3 010	3 418	3 435
Ratio exports / imports	1.37	1.39	1.11	1.10	1.03	0.97	0.90	0.89	1.21	1.25	1.21
Terms of trade index	126.2	110.8	97.3	88.2	89.9	91.1	100.0	126.3	144.3	123.0	N/A

Source: DEBA



**Figure 3: Aerospace equipment  
Production and employment compared to EU total manufacturing Industry**



1994 are DEBA estimates.  
Source: DEBA

these countries are engaged in negotiations aimed at setting up joint ventures or alliances with western companies. The Indonesian industry has actually emerged as an aerospace manufacturer, as this country managed to build up an industry in about one decade, which is now about to manufacture its own turboprop.

The former USSR is another potential entrant. The CIS, in particular, has one of the world's largest aerospace industries and holds an impressive technological know-how in aerospace manufacturing. This industry is nevertheless suffering from serious handicaps in terms of efficiency, organisation and over-manning. There is thus a long way before the east European aerospace industry becomes competitive and up-to-date. Meanwhile, principles of cooperation (in the space sector particularly) have already been agreed upon between the CIS and the EU.

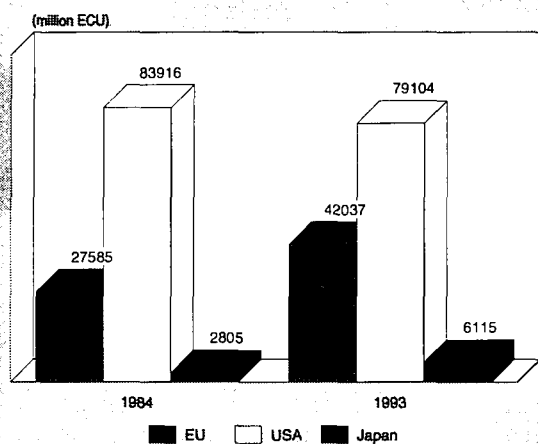
**Foreign trade**

It is no wonder, given the global nature of the aerospace industry, to find that aerospace equipment ranks among the most trade intensive sectors. As a matter of fact exports are the sector's largest outlet. More than 40 % of EU's production is exported, a share which exceeds 60 % in France. A large proportion of this trade reflects manufacturing specialisation within Europe. Within the European Union, trade takes the form of flows of semi-finished equipment to be processed or assembled in another Member State.

A large part of extra-EU flows are directed to North America, which represented 33.1 % of EU's exports and 55.7 % of total imports to the EU in 1993.

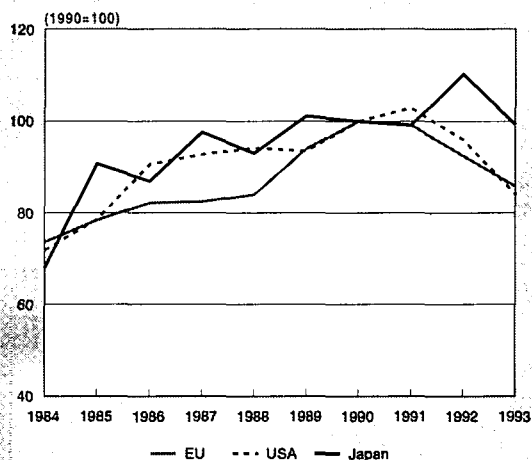
Exports and imports to/from the EU broadly balance in terms of size. The very large fluctuations of the American dollar compared to European currencies have largely influenced EU's trade balance during the 1980s. In particular, the weakness

**Figure 4: Aerospace equipment  
International comparison of production in current prices**



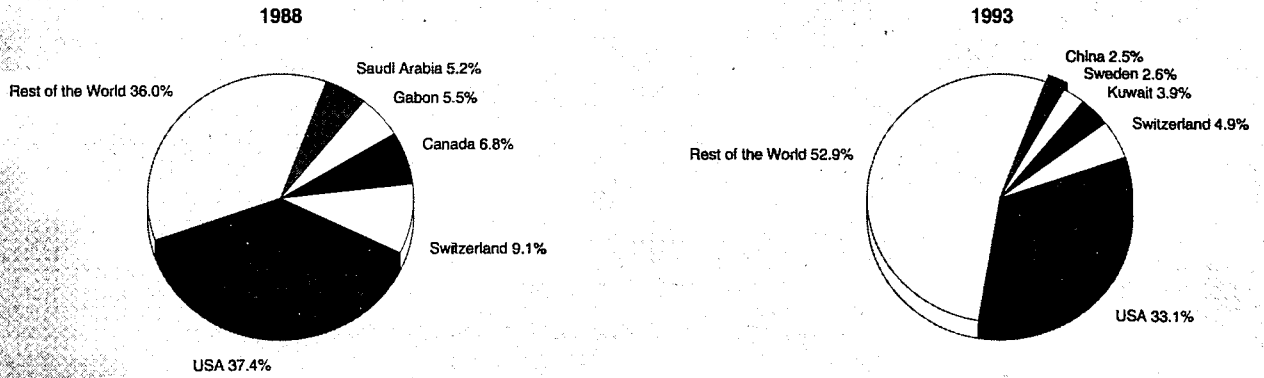
Source: DEBA

**Figure 5: Aerospace equipment  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Aerospace equipment  
Destination of EU exports**



Source: Eurostat

of the dollar since 1986 has dampened EU's export competitiveness, which coupled with increased purchases of American aircraft by EU airlines, led to a deterioration of Europe's trade balance. In 1991, EU's trade deficit amounted to 1.8 billion ECU. In 1992, the balance rebounded with the largest surplus in ten years (about 3 million ECU) but the improvement largely reflected plummeting imports due to declining domestic demand, rather than a surge in exports. In 1993, EU's trade balance continued to improve, with extra-EU imports falling by 4.1 % in value, while extra-EU exports fell only slightly (-1 %).

## MARKET FORCES

### Demand

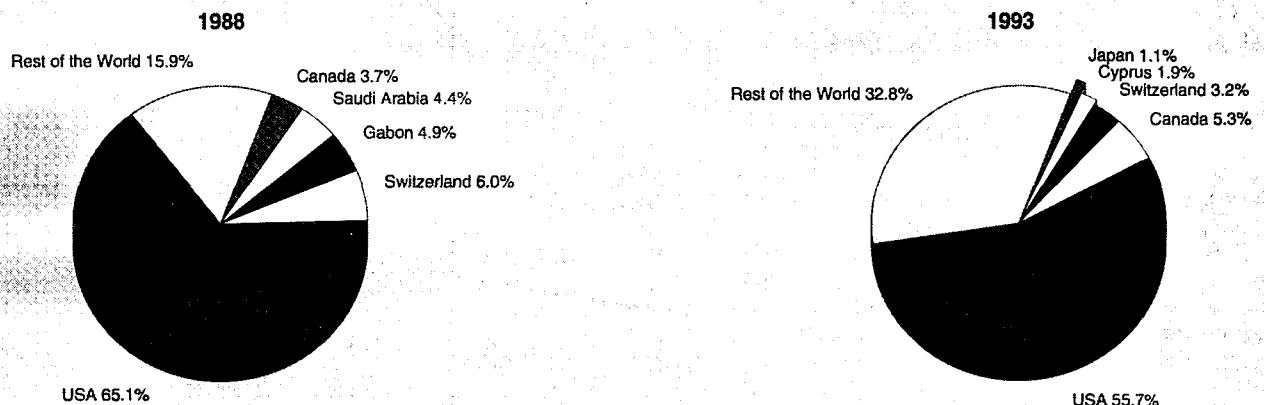
Apart from export markets, the largest outlet for aerospace equipment is the government sector, through its military orders. The government sector actually represents more than half of the sector's domestic sales. It is then easy to understand how severely governments' drastic cuts in defence budgets have affected the aerospace industry as a whole. Under strong budgetary constraints, governments started cutting defence budgets in the middle of the eighties, that is far before the fall of the Berlin Wall. This trend has nevertheless accelerated over the

recent past, in line with the end of the Cold War. The shrinking of the defence market revealed in cancellations or postponements of new or existing programmes.

Airline companies are the other major outlet for the aerospace industry, through their demand for new aircraft, replacement parts and maintenance services. Since 1990, airline companies have faced sluggish and, on occasion, negative traffic growth, fierce competition and rising costs, an occurrence of factors which translate into deep financial losses. Also enduring large over capacity due to the investment boom of the late eighties, most airline companies have severely revised their investment plans, often postponing or even cancelling orders for new aircraft. Regional airlines are suffering more from the recession than their larger counterparts, due to their difficult financial position, and their smaller market share. They have drastically cut orders.

Civilian and military activities have traditionally posted asynchronous cycles. But since 1991, the aerospace industry has been subject to one of its worst crisis since the second World War. This recession, which combines sharp falls in both civil and military activities, is a consequence of sharp cuts in defence spending and the airline business's financial turmoil.

**Figure 7: Aerospace equipment  
Origin of EU imports**



Source: Eurostat

**Table 5: Aerospace equipment  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.8	84.9	87.8	86.3	88.8	97.6	100.0	99.7	96.8	97.6
Unit labour costs index (3)	88.9	91.1	90.1	95.7	99.1	95.5	100.0	108.6	117.4	114.5
Total unit costs index (4)	79.4	85.1	83.9	87.1	91.3	95.4	100.0	106.2	112.8	111.3
Gross operating rate (%) (5)	12.4	10.8	12.1	10.1	11.5	12.7	11.2	9.3	3.7	6.8

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

This time, civil operations have not offset the dramatic decline of defence businesses for the aerospace industry.

### Supply and competition

As indicated earlier, the world's aerospace industry is clearly dominated by US firms, which enjoy the advantage of a large domestic market, and lead in production volume, range of models and rate of production. In addition to these competitive advantages, the low level of the US dollar with respect to European currencies further handicaps the EU industry.

The relationship between the EU and the US is an outstanding mix of cooperation and competition. Collaboration exists, particularly in the case of engine manufacturers where strong links have been built up between EU and American manufacturers. Competition is, nevertheless, harsh between the major producers, and takes place both in civilian and military businesses.

Such intense competition led the EU aerospace industry to implement changes in the production process, which brought about significant changes in the organisation of work. Forced to shorten production cycles and to cut costs to remain competitive, the industry shifted towards increased automation. Simultaneously, new forms of organisation and management are being introduced, which aim at producing faster, cheaper and more efficiently. In particular, the aerospace industry is introducing just-in-time management. Airbus is also imple-

menting simultaneous engineering, in order to efficiently manage the wide range of activities the group traditionally coordinates.

The development of such new forms of production (inherited from the Japanese automotive industry), is pushing the industry to a substantial reduction in the number of component suppliers, and contributing to the restructuring and consolidation of the aerospace supply sectors.

### Production process

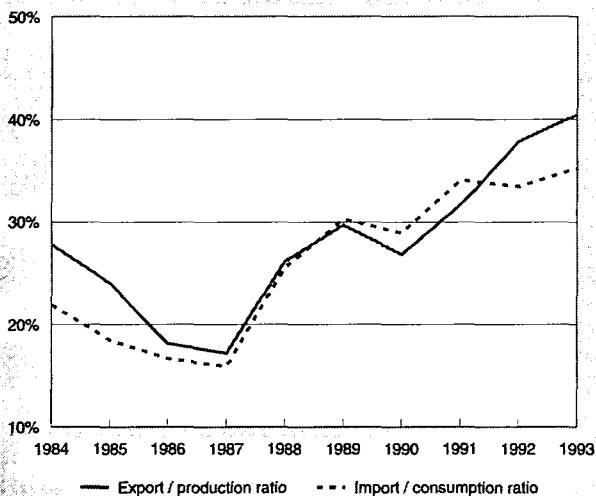
One of the most salient features of EU's aerospace industry has been its spectacular growth in productivity reported throughout the 1980s. The sector achieved gains of above 5 % on an early average between 1985 and 1990. Space appears to be the segment which has reported the largest productivity gains among aerospace divisions. As a more labour-intensive sector, equipment posts a lower output per employee.

The aerospace industry is also characterised by important synergies between the military and civilian segments of the market. Most of the synergies take place at the research and development stage. Generally, new technologies are first developed for military applications, and are in a second stage adapted for civil purposes, mainly in engines and avionics.

Another important feature of the aerospace industry is the importance of economies of scale in the production process. Research and development costs are the most important sources of economies of scale, although some scale economies may also be achieved at the production stage. The initial cost in R&D that is necessary to develop a new model is one of the largest of all industries. For example, the development of a large commercial aircraft requires between 4 and 8 billion USD spread over four or five years, and the length of the product cycle is characterised by very long periods of time before reaching break-even. Economies of scale can also be achieved on the demand side, by enabling the costs of maintenance and training to be held in check.

Along with these economies of scale, the aerospace manufacturers can also benefit from "family economies". The existence of a learning curve and production overheads indeed provide manufacturers with a cost advantage when developing and producing new models. This actually gives manufacturers a strong incentive to produce a full range of models.

**Figure 8: Aerospace equipment  
Trade intensities**



Source: DEBA

## INDUSTRY STRUCTURE

### Companies

Unlike its American competitor, the European aerospace industry is largely segmented. This feature stems from the fact that the aerospace industry has largely developed on a national basis, in order to guarantee national independence for its defence activities. Moreover, the main European aerospace manufacturers are smaller than their American competitors,

**Table 6: Aerospace equipment**  
**The ten largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Employment
DASA	D	9 029	73 800
British Aerospace	UK	7 636(1)	68 220(1)
Aérospatiale	F	5 832	31 400
Rolls-Royce	UK	2 765	26 500
Alenia	I	2 656	26 260
SNECMA	F	1 834	12 542
Fokker Aircraft B.V.	NL	1 795(1)	10 350
Dassault Aviation	F	1 653	9 000
Matra	F	1 609(1)	9 000(1)
Eurocopter Intl	EU	1 535	10 500

(1) 1992

Source: Companies (DGill survey - annual reports - press)

which constitutes a serious competitive disadvantage in an industry bound to have high and increasing R&D spending.

Of the world's ten leading aerospace manufacturers in 1992, only three were European: DASA, British Aerospace and Aérospatiale. On a segment by segment basis, the aeroengine industry is dominated by four main players: Rolls Royce (UK), SNECMA (F), General Electric (USA) and Pratt & Whitney (USA). Boeing, McDonnell Douglas (USA) and Airbus are the only contenders in the large jet aircraft industry.

Over the past decade, EU's Airbus has managed to more than double its share of the world market for large commercial jets, reaching about 30 % of outstanding orders in 1993. In the turbo prop segment, Europe is the leading producer, but is handicapped by the segmentation of its production base: six manufacturers co-exist in the market, all proposing models which are sometimes direct competitors. These are British Aerospace, Fokker, ATR (a joint venture between Aérospatiale and Alenia), DASA, Saab and CASA. In the regional jet segment, BAe and Fokker share the market.

Apart from the leading European producers, a substantial number of small and medium sized firms account for a significant share of the production. An aircraft is a complex system, so its production and design can be divided into parts and sub-contracted. Sub-contracting activities are organised, like in the automotive assembly industry, in a hierarchical structure. The prime contractor, i.e. the aircraft manufacturer itself, delegates the production and sometimes even the conception, of complete systems to large suppliers which in turn out-source parts of the operation to a third level of sub-contractors. Overall, France's Aérospatiale estimates that sub-contracting represents over 25 % of the production of an aircraft.

In Germany and in the United Kingdom, the production is very concentrated under the wing of a single national company, respectively DASA and British Aerospace.

### Strategies

After two years of a continuing shake up in both civil and military businesses, the aerospace industry has had to adapt to new market conditions. Defence contractors have forced the trend towards greater consolidation and rationalisation in the industry. In the last two years, the number of transnational mergers and acquisitions has increased significantly in the EU. A number of companies are currently involved in talks aimed at collaborating or merging operations. For example, France's Matra and British Aerospace's space systems division are currently considering a joint venture, as are the two companies' missile divisions.

In civil operations too, partnerships, collaborative agreements and joint ventures are more than ever on the agenda. The

European aerospace industry has always suffered from a double competitive disadvantage compared to its US competitor: a lower production base - and therefore lower economies of scale; and difficulties in funding the development of new aircraft - coupled with increasingly long investment pay-back lead times. In this climate, cooperation is now considered as the only way forward. Further steps are taken in the consolidation of the European regional aircraft industry: after the acquisition, last year, of Fokker by Deutsche Aerospace, British Aerospace is currently in talks with ATR to merge their respective regional jet and turbo propellers activities. Boeing and Airbus are also discussing various risk-sharing collaborative agreements that Boeing and Airbus have been envisaging recently. Boeing and EU's consortium have been discussing during the past two years means of a collaboration on a future very large aircraft with 600 to 800 seats. The two leading producers are also in talks with McDonnell Douglas about risk sharing collaboration on the development of a successor to Concorde, given the size of the necessary initial outlay.

By contrast, forging cross-border mergers in the strategic defence segment remains a harsh process within the EU. There are discussions under way, like Aérospatiale's talks with DASA to combine their missile and space operations in joint companies, matching the merger of their helicopter operations into Eurocopter. Further steps have recently been taken within the EU, with the announced project designed to integrate the European future large military transport aircraft programme (FLA) into the Airbus manufacturing and development system. These signs are very encouraging, but considerable political and institutional obstacles still remain to the necessary consolidation of EU's military aerospace industry.

### Impact of the Single Market

The completion of the Single Market has had a beneficial though relatively modest impact on the aerospace equipment sector. This sector is highly internationalised, both in terms of trade flows and in terms of cross-border M&As and joint-ventures. Consequently, European companies have benefited from measures aiming at facilitating cross-border operations, increasing labour mobility or reducing the costs of cross-border payments. However, the impact of these measures on the sector's performance has remained modest because changes in activity and in industry structure are essentially dictated by worldwide developments falling outside the scope of the Internal Market. Further progress could nevertheless be made in a number of areas. A statute for a European company would be particularly welcome in an industry characterised by numerous cross-border M&As or joint-ventures. Similarly, though the removal of cross-border controls has eased intra-EU trade, paperwork linked to trade still remains cumbersome. Another area where further integration would be beneficial

is the opening up of defence procurement. Military equipment have been so far excluded from the Internal Market but the necessary rationalisation of the European defence industry would be greatly facilitated if a European procurement policy could replace the largely nationalistic approach still practised in several Member States.

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## REGIONAL DISTRIBUTION

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In spite of efforts from both national and EU levels, the manufacture of aerospace equipment remains divided between numerous highly specialised production sites situated in different Member States. France and the United Kingdom account for close to two thirds of total European production. The two countries have traditionally jostled for European leadership, but the United Kingdom lost ground in recent years.

Recent trends in production and employment by country confirm the growing importance of Germany and Italy in aerospace manufacturing. Germany stepped up its share of the European turnover from 15 % in the early 1980s to 22 % a decade later. Together the three major European manufacturers account for close to 85 % of European production. Italy has also increased its share of European turnover to close to 10 %. The Netherlands, Belgium and Spain provide the remainder of EU aerospace production.

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## ENVIRONMENT

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Aircraft and engine manufacturers have long integrated environmental concerns in their production processes. Environmental performance has actually become an important criterion in an airline's aircraft and engine selection process. The oldest and least efficient aircraft have already been withdrawn pursuant to a number of international agreements, with major financial impact on the airline companies.

The aerospace industry is concerned with three different types of pollution. Noise created both on take-off and landing is one such problem. The aerospace industry has been dealing with this issue for a long time. However, the actual growth of air traffic, combined with the increased size of the aircraft, threatens to reduce the benefit derived from the regulations that have come into force during the last decade. Unless aircraft noise is reduced still further, current international standards may face increasing challenges as individual airports seek to impose tougher controls.

Pollutant emissions, and in particular gaseous emissions in the high atmosphere, are another crucial environmental concern. The industry has been handling this issue through several technical programmes, particularly through developments in advanced jet propulsion. The current environmental standards regarding gaseous emissions nevertheless appear to be inadequate in so far as they do not take into account the whole flight envelope: current standards do not cover emissions at cruise altitudes which can account for more than 90 % of the gaseous emissions during a long distance flight.

Lastly, aerospace manufacturers are particularly concerned with the problem of energy conservation. This issue is all the more crucial as the industry is bound to produce increasingly powerful civil engines to match the growing size of aircraft. The engines of the future will have to be increasingly efficient in order to meet such requirements as energy conservation. Further research is required into all these environmental issues, to ensure that the European industry retains its competitive position.

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## REGULATIONS

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Owing to the intensification of international competition, all firms are operating under similar competitive conditions. In the context of progressive globalisation of the aerospace mar-

ket, this principle applies just as much to competition within the EU as it does to external competitors. All the factors that could affect competition must be taken into account, and this includes both direct and indirect public subsidies.

When EU rules on competition, particularly Articles 85 and 86, are applied to the aerospace industry, the specific conditions such as the high level of investment needed, the necessary degree of cooperation, the long time to break even, and the comparatively small number of producers, are taken into account. Some sectors are confronted by difficult challenges of size and depth inherent in the industry: the worldwide dimension of the market, often national markets are too restricted to nourish the development of enterprises strong enough to be internationally competitive; industrial operations of such a size that no existing European enterprise can master all the technologies and acquire the production equipment needed to manage a complex programme in industrial and economic terms; financial requirements that have reached a level beyond the ability of any individual operator to accumulate; and the high degree of integration of the main competitors of the European aerospace industry.

Mergers are subject to Council Regulation (EEC) No. 4064/89 dated 21 December 1989. Their impact is generally evaluated on the world market. Consequently a merger bringing together most of the supply capacity of the EU in certain sectors of the aerospace industry does not necessarily amount to the creation of a dominant position incompatible with the Single Market.

Government subsidies for the aerospace industry are subject to articles 92-94 of the EEC Treaty. At the present time there is no sectoral aid framework laying down special directives for Member States in granting assistance to the aerospace industry. The distorting effects of subsidies on other competitors are also taken into account.

There are general regulations governing state assistance for R&D, but the special features of the sector are taken into account: the advanced technology content of the products, the fierce international competition and lastly the cooperative nature of research.

At an international level, the aircraft industry is subject to specific rules inside the WTO agreement on subsidies and countervailing measures covering matters such as R&D subsidies, ad valorem subsidisation and royalty-based loans. Negotiations on updating the 1979 GATT Civil Aircraft Code are continuing.

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## OUTLOOK

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Given the reduction in the share of military work, which is likely to continue, the outlook of the EU aerospace equipment sector appears closely linked to the prospects for the airline industry. Short term prospects for EU's aerospace industry remain rather gloomy. Growth in production will progressively accelerate in 1995 and 1996, but will remain largely under the rates that were achieved during the past decade.

The outlook is particularly bleak for defence aerospace. Western countries will continue to squeeze their defence budgets, with EU defence procurement declining by above 2 % per year between 1993 and 2000. Sales of military aircraft will therefore continue to fall as programmes are either cancelled or postponed.

Turning to civilian aerospace, a number of positive signs indicate that demand will start to pick up again in 1995. In 1994, reduced overcapacity and improved load factors have translated into spectacular improvement of many airlines' financial situation. After 1995, the growth in air traffic will be fully reflected in the world commercial aviation industry, translating into increased delivery rates. Economic recovery in the world and the need to replace old aircraft will keep

**Table 7: Aerospace equipment  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	0.00
Danmark	N/A	N/A
BR Deutschland	0.47	0.58
Hellas	N/A	0.42
España	0.11	0.23
France	2.06	1.85
Ireland	N/A	N/A
Italia	0.56	0.53
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	0.00	N/A
United Kingdom	2.05	2.22

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates

Source: DEBA

activity going in business aircraft and helicopters, while the market for regional aircraft will grow more slowly. The space market will continue to grow apace, particularly in the commercial segment.

Further concentration, along with an enhanced and more co-ordinated R&D effort appear necessary to enable the EU aerospace manufacturers to compete more effectively against their US competitors. In particular, with size becoming a critical factor if the EU manufacturers are to match their US competitors, the European aerospace industry will continue to restructure. Much of it will take the form of alliances, rather than straightforward mergers, as sensitivity to national defence interests, along with nationalist behaviour are acting as a brake to a real concentration process.

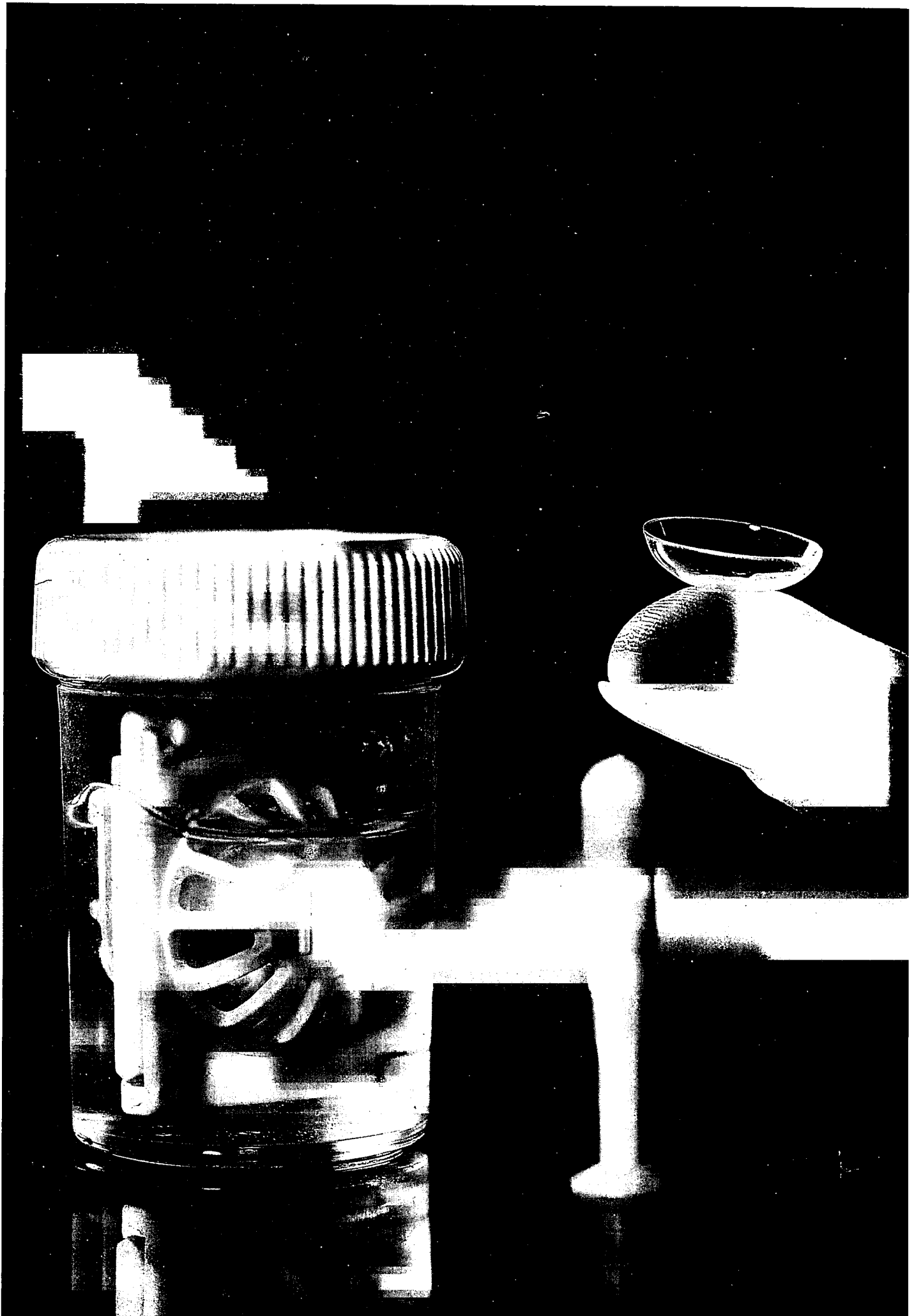
Consolidation is particularly needed in the regional jet and commuter turbo prop market, where manufacturers must rationalise activities in order to avoid duplication. In military activities too, consolidation will be key to survival for the EU industry. The US is now well ahead in the restructuring of its defence activities. The process, which started with the unbundling of those defence activities for which contractors did not think they had a competitive advantage, is now translating into mega mergers: the recent one between Martin Marietta and Lockheed, and the acquisition by Northrop of Grumman. The new Northrop conglomerate now posts a turnover in aerospace activities close to that of British Aerospace, while the new Lockheed-Martin Marietta group is comparable in total size to Boeing. Given such competition, the challenge for EU manufacturers is simple: strengthen or disappear. The necessary consolidation process will translate into considerable changes in the level and structure of employment in the aerospace sector. The number of employed persons will continue to shrink significantly - albeit at slower pace than in the past couple of years to adjust to production rationalisation. As a number of employees are bound to shift from defence to civil activities to answer the reduction in the share of military work, the nature of employment will change dramatically, generating a need for vocational training. In particular, training programmes aimed to make workers who are used to government work familiar to market rules, are seen as essential. Other training programmes including those in languages will be all the more necessary as the workforce will have to be increasingly mobile, i.e. able to work in plants located in different EU Member States, and with foreign partners in the framework of international partnerships.

The growth in air transport in the medium and long term will necessitate the development of higher capacity, more efficient aircraft, and the improvement of airport infrastructure. Research into environmental technologies to meet increasingly stringent standards will be essential to ensure that this predicted growth is sustainable.

Written by: DRI Europe

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## Overview NACE 37

The demand for products within the instrument engineering sector is closely linked to the health of the overall economy. As such, it was not surprising that this sector experienced a particularly difficult period during the recent recession. Despite this temporary downturn, this sector has enjoyed strong production growth over the past decade at an average annual rate of 3.1 %. Such growth is even more impressive given that it occurred at a time in which employment levels remained essentially unchanged.

Still, the driver of sector growth has increasingly assumed the form of trade. Between 1984 and 1993, both extra-EU imports and exports have grown more than twice as fast as EU sector apparent consumption and production, respectively. More generally, sector trade intensities have increased to a point where nearly half of all 1993 EU sector consumption was satisfied by foreign suppliers of which the overwhelming majority were American, Swiss, and Japanese. By the same token, 43 % of 1993 EU sector production was used to satisfy non-EU demand. It seems that the internationalisation of this sector will continue unabated. As such, the long-term prospects of EU producers depend on their ability to compete on the world stage: against the Americans, Japanese, and Swiss at the high end of the technology spectrum and against the Pacific Rim/ASEAN producers at the lower end. Product differentiation, asset migration, automation, and increased R&D expenditure will all be critical in this regard.

### INDUSTRY PROFILE

#### Description of the sector

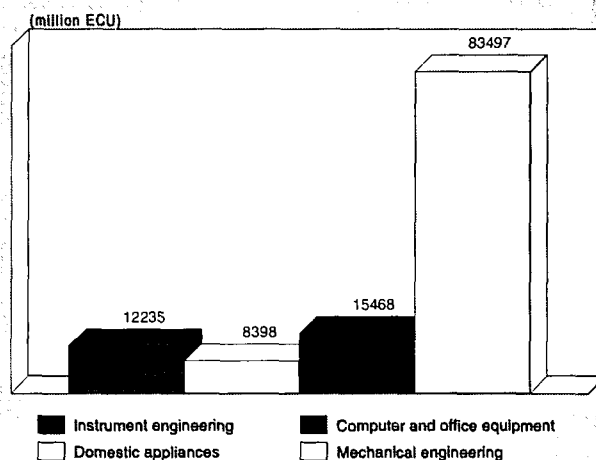
The instrument engineering industry comprises the following sectors:

- measuring, checking and precision instruments and apparatus (NACE 371);
- medical and surgical equipment, and orthopaedic appliances (NACE 372);
- optical instruments and photographic equipment (NACE 373); and
- clocks, watches and parts thereof (NACE 374).

As Table 2 shows, there is relative parity among the subsectors of medical and surgical equipment, optical instruments and photographic equipment, and precision instruments and apparatus as measured in terms of the three listed indicators of economic activity: consumption, production, and extra-EU exports. To underscore the degree of equivalency among the three principal subsectors, each subsector leads one of these indicators. Also in all economic categories, the subsector of clocks and watches lags a distant fourth. Still, it is interesting to observe that 1993 EU consumption of clocks and watches is proportionately twice as large as 1993 EU production. This contrasts markedly with the leading three subsectors, where there is proportional constancy across the three economic measurements.

Figure 2 indicates that Germany is by far the largest producer within the sector, contributing 43.6 % of the sector's value-added in 1993. Germany was followed by the United Kingdom with 19.8 % and France with 13.9 %. Indeed, these three countries, in combination, contributed nearly four-fifths of

**Figure 1: Instrument engineering  
Value added in comparison with related industries, 1993**



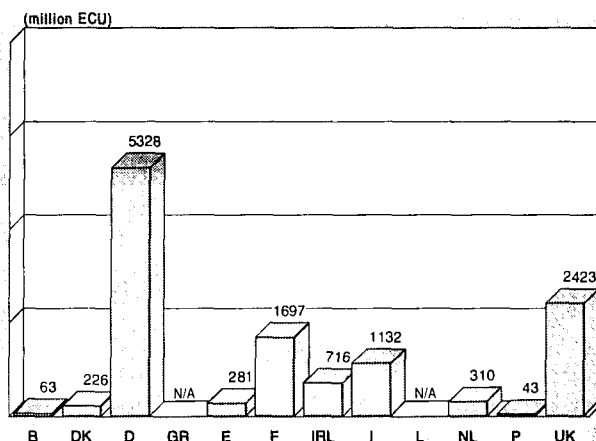
Source: DEBA

the sector's value-added in 1993. Other significant EU producer-states within the subsector include Italy (9.3 %) and Ireland (5.9 %).

#### Recent trends

Despite a decline of 3.3 % between 1992 and 1993, EU production within this sector has grown at a strong average annual nominal rate of 8.1 % over the entire period, 1984 through 1993, as Table 1 shows. The decline in EU production between 1992 and 1993 would have been far steeper, however, were it not for a significant rise in extra-EU exports of 27.5 %, fuelled largely by a rise in extra-EU exports of precision instruments. At the same time, EU apparent consumption experienced an even steeper decline between 1992 and 1993 of 6.2 %. Still, EU apparent consumption grew at an average

**Figure 2: Instrument engineering  
Value added by Member State, 1993**



Source: DEBA



**Table 1: Instrument engineering**  
**Main Indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	15 008	21 793	24 059	25 497	27 878	29 047	27 260	28 162	28 900	27 100	28 100
Production	14 583	20 208	21 916	23 277	24 775	26 004	25 147	26 124	26 000	25 100	26 100
Extra-EU exports	5 776	6 906	7 714	7 851	8 167	8 486	10 815	11 909	8 600	10 900	11 800
Trade balance	-425	-1585	-2143	-2220	-3102	-3044	-2113	-2037	-2900	-2000	-2000
Employment (thousands)	306.7	325.8	333.2	334.7	333.5	329.4	314.0	308.1	299.0	297.0	294.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Instrument engineering**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Clocks and watches	2 880	1 189	1 073
Medical and surgical equipment	8 365	8 234	2 829
Optical instruments and photographic equipment	7 821	6 704	3 460
Precision instruments and apparatus	8 224	9 020	3 435

(1) Apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Instrument engineering**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.55	0.57	3.85	-6.18
Production	5.19	0.63	3.14	-4.13
Extra-EU exports	5.96	8.82	7.22	27.45
Extra-EU imports	9.71	7.02	8.51	12.13

(1) Some country data for apparent consumption and production have been estimated.

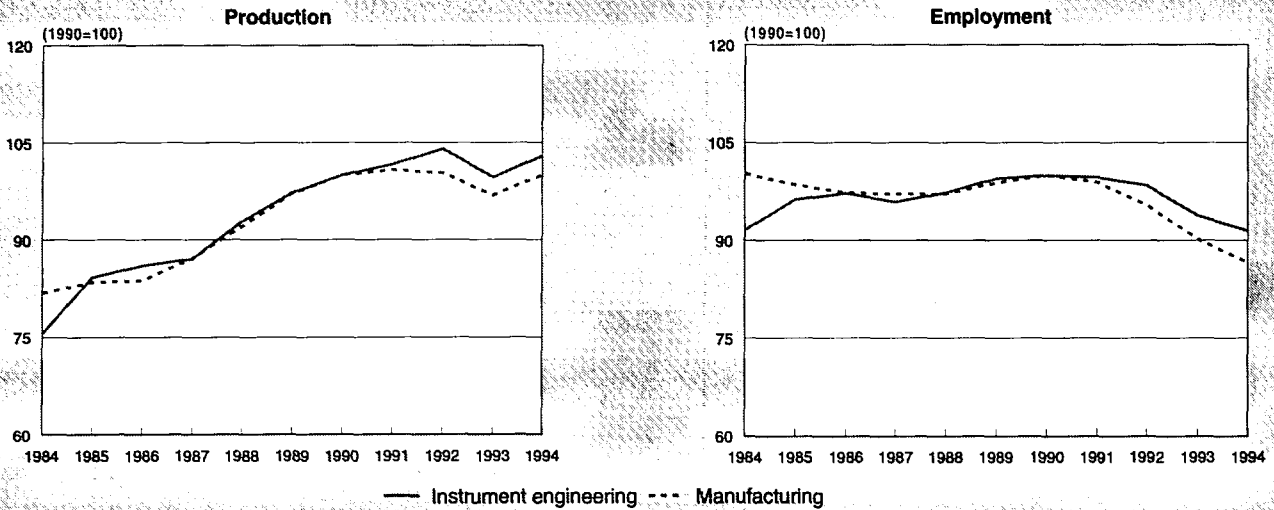
Source: DEBA

**Table 4: Instrument engineering**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	5 776	6 694	6 605	6 341	6 906	7 714	7 851	8 167	8 486	10 815	11 909
Extra-EU imports	6 200	6 834	7 044	7 236	8 491	9 856	10 071	11 269	11 530	12 928	13 946
Trade balance	-425	-140	-438	-894	-1 585	-2 143	-2 220	-3 102	-3 044	-2 113	-2 037
Ratio exports / imports	0.93	0.98	0.94	0.88	0.81	0.78	0.78	0.72	0.74	0.84	0.85
Terms of trade index	118.7	125.3	120.4	111.8	106.5	102.7	100.0	92.7	94.2	103.8	N/A

Source: DEBA

**Figure 3: Instrument engineering  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

annual nominal rate of a healthy 9.1 % between 1984 and 1993, fuelled by increasing extra-EU imports.

Table 3 suggests that, within the context of apparent consumption and production, real growth was much stronger in the 1984-89 period than in the 1989-93 period. This disparity is owed in part to the recessionary effects of the 1992-93 although it is not clear how such effects can account for a significant real rise in extra-EU imports between 1992 and 1993. What Table 3 ultimately suggests is that, between 1992 and 1993, there was a sharp decline in domestic deliveries, i.e. those products made in the EU for EU consumption.

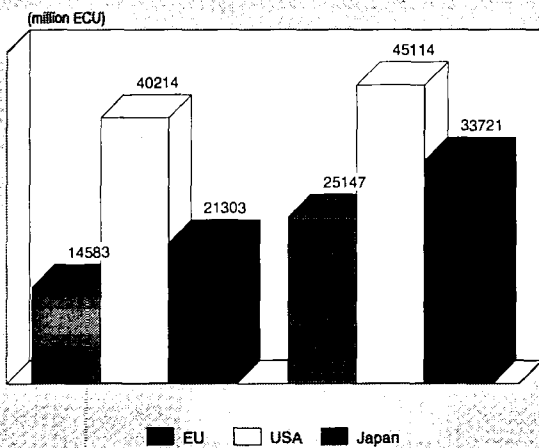
Figure 3 provides a comparison of how production and employment levels changed for the sector and manufacturing generally over the period 1984 through 1993. On this relative basis, the sector fared rather well as production outpaced that of overall manufacturing and sector employment levels remained essentially stable while employment in the larger manufacturing realm declined by about 10 %.

### International comparison

In comparing Triad nominal output between 1984 and 1993, Figure 4 shows that the United States maintained its leadership position. However, while overall Triad output increased by 36.6 %, US output increased by only 12.2 % causing a decline in US Triad production share from 52.8 % to 43.4 %. Over the same period, EU Triad production share increased from 19.2 % to 24.2 % and Japanese Triad production share increased from 28.0 % to 32.4 %.

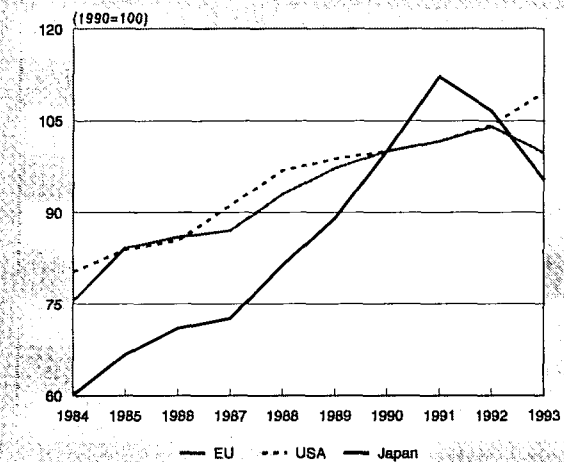
Figure 5 indicates real growth in production for the three legs of the Triad on an annual basis between 1984 and 1993. It is interesting to observe that, in contrast with producers in the EU and Japan, American producers enjoyed an increase in real production between 1992 and 1993, fuelled partly by a general devaluation of the US currency.

**Figure 4: Instrument engineering  
International comparison of production in current prices**



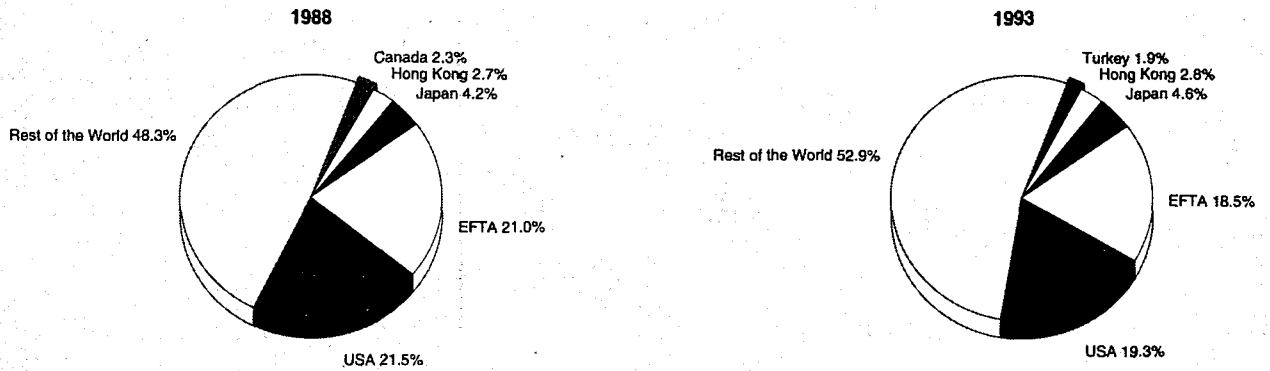
Source: DEBA

**Figure 5: Instrument engineering  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Instrument engineering  
Destination of EU exports**



Source: Eurostat

### Foreign trade

As Table 3 illustrated, international trade has played an important role within this sector, particularly in recent years. Indeed, both extra-EU exports and imports have grown at rates more than twice those of production and apparent consumption, respectively. Overall, the EU trade balance showed a growing deficit over the past decade: the entry of the new Member States will improve the situation only in a marginal way.

The United States has remained by far the largest single country market for EU exporters within this sector as Figure 6 shows. Together, the former EFTA states and the United States comprised nearly 38 % of EU exports within the sector in 1993, down from 42.5 % in 1988. This decline stems in part from the burgeoning importance of emerging markets within the Pacific Rim/ASEAN region.

Figure 7 depicts a situation in which EU imports overwhelmingly emanate from three sources: the United States, Switzerland, and Japan. In 1993, producers from these countries provided 71.5 % of all EU imports within the sector, down slightly from 75.5 % in 1988. More interestingly, combined imports from only the United States and Switzerland increased over this period from 41.4 % in 1988 to 47.7 % in 1993.

Such an increased has occurred as the percentage of total EU imports originating in Japan declined from 34.1 % to 23.8 %.

Figure 8 provides the trade intensities within the sector over the period 1984 through 1993. Both the export/production ratio and the import/consumption ratio jump sharply in 1993.

### MARKET FORCES

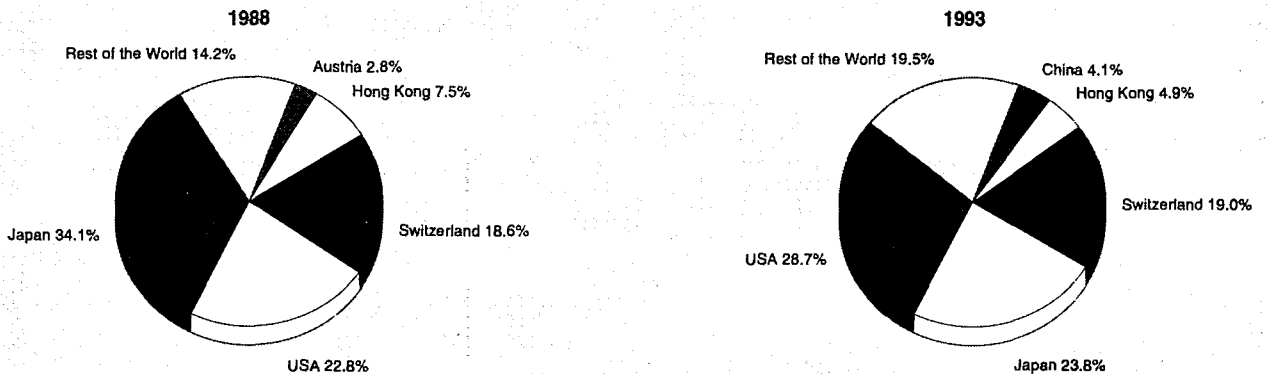
#### Demand

The sector is comprised of a diverse array of products used in virtually every industrial and many consumer applications. A more useful understanding of the sector's demand drivers is offered on an elemental, sub-sector basis.

#### Optical instruments and photographic equipment

- Growth in demand for eyeglassware stems from broad demographic changes within the overall EU population. Specifically, both the increase in the overall EU population and its gradual ageing have sparked demand for spectacles, lenses, frames and mountings between 1984 and 1993. In addition, technological development and a heightened fashion sense have, in combination, induced a product differentiation to a point where consumers may choose from a

**Figure 7: Instrument engineering  
Origin of EU imports**



Source: Eurostat

**Table 5: Instrument engineering**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.4	87.5	88.5	90.9	95.4	97.7	100.0	102.0	105.7	106.3
Unit labour costs index (3)	87.4	87.9	92.2	94.8	94.2	96.6	100.0	105.1	107.8	110.5
Total unit costs index (4)	83.0	85.7	89.0	90.6	92.0	97.5	100.0	104.0	106.6	108.5
Gross operating rate (%) (5)	12.1	12.4	11.0	11.2	12.8	10.6	11.1	12.1	11.6	11.4

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

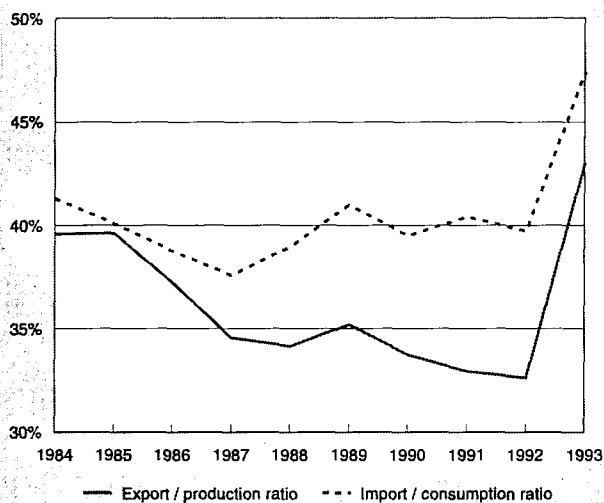
menu of features and products. Such has also served to fuel demand.

- Demand for precision optical instrumentation has flowed from the effort to modernise older manufacturing entities as this kind of technology is commonly used in production processes. This, in turn, has induced increased research investment activity, particularly in the area of laser technology. Another driver of demand in this area resides in increasing acceptance within environmental management applications.
- Demand for photographic equipment has been impelled by private consumption (particularly within the hand-held camera area), product innovation (more user-friendly technology and increased film quality per unit cost), and new product application (largely through the marriage of electronics and photography).

#### Medical and surgical equipment and orthopaedic appliances

- Demand in this area has been pushed both by a general ageing of the population as well as heightened awareness of health-related matters.
- This sub-sector is highly research-intensive. In this regard, expenditures of R&D funds have induced an array of technological innovation that has had direct impact on demand.

**Figure 8: Instrument engineering**  
**Trade intensities**



Source: DEBA

#### Measuring, precision and control instruments

- While demand within this subsector is largely linked to overall economic health, there tends to be a correlation between demand for a particular instrumentation and the health of particular industries such as gyroscopic/inertial navigation instrumentation and the aircraft and shipbuilding industries.
- As electronic technology has developed generally, it has permeated the sub-sector to the point where over 90 % of all instrumentation is electronically controlled. This has provided the sub-sector with a value-added content that has served to bolster demand.

#### Clocks and watches

- Private household discretion impels much demand in this area as technological innovation is least important within this subsector relative to the sector's other three product groupings. Thus, demand for clocks and watches is closely linked to a general level of disposable income.
- Still, technological innovation plays some role in influencing demand, particularly in the higher-end industrial applications.

It should be emphasised that each sub-sector is vulnerable to the vagaries of economic circumstance. Those areas with high income elasticities of demand are particularly vulnerable during periods of economic sluggishness.

#### Supply and competition

Between 1984 and 1989, extra-EU imports grew at about the same rate as apparent consumption within the sector on an average annual basis. Between 1989 and 1993, however, extra-EU imports grew much faster than apparent consumption. Such a trend has induced a burgeoning dependency on imports to the point where nearly half of all sector demand is satisfied by foreign instrumentation. That non-EU producers have achieved such success in this area is owed to several factors. First, the Americans and, to a lesser extent, the Japanese have enjoyed both the advantages of technological competitive advantage as well as a general depreciation of their respective currencies relative to EU currencies. second, the ASEAN/Pacific Rim producers are successfully competing on a cost basis at the lower end of the technological spectrum. Most recently, these producers have begun to compete at a higher level of technological sophistication as they develop certain manufacturing proficiencies. What follows is a characterisation of the supply and competition picture among the sub-sectors:

#### Optical instruments and photographic equipment

- The Japanese and the Americans have had a significant, although declining, presence within the EU market overall. Such is especially true within the area of photographic equipment where fierce price wars have ravaged the land-

**Table 6: Instrument engineering  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	31 874	90.1	26.1	17.9
20-99 employees	2 797	7.9	20.8	21.9
100 or more employees	703	2.0	53.1	60.1

(1) Estimates.

Source: Eurostat "Enterprises in Europe"

scape of EU production. Also, the combination of EU regulatory liberalisation and the NAFTA agreement has rounded to the benefit of American exportation.

- In contrast to the situation within photographic equipment, EU producers are performing well within the area of optical precision instrumentation where the local market is characterised by relative self-sufficiency.
- In eyeglassware, EU firms are strong producers internationally and locally although they have begun to face competitive pressures from Asian producers.

#### *Medical and surgical equipment and orthopaedic appliances*

- Over one-half of EU imports within this sub-sector are US made, an amount that satisfies almost 20 % of total EU demand. To this end, US producers have benefited from a depreciation of the US dollar relative to EU currencies as well as the relative absence of regulatory burden within the EU. Such serves as a sharp contrast to the labyrinth of US import regulation in this area that some consider a non-tariff trade barrier.
- The Pacific Rim producers also compete within the EU market at the lower end of the product spectrum, mostly on the basis of price.

#### *Measuring, precision and control instruments*

- American producers have enjoyed much success within the EU market in recent years because of both a clear technological competitive advantage as well as a general devaluation of the US dollar relative to European currencies.
- Japanese producers, in contrast, have not been able to penetrate the EU market beyond a 10-13 % level of total extra-EU imports. Still, the Japanese have enjoyed somewhat of a currency devaluation relative to EU currencies as well as the synergies that accompany a large research infra-

structure. They also have niche competencies in such areas as weighing instrumentation. The Japanese have begun to invest directly in such EU markets as the United Kingdom in order to compete more effectively.

#### *Clocks and watches*

- EU manufacturers face formidable price competition from the Pacific Rim/ASEAN countries in the area of less expensive electronic watches.
- At the higher end of the timepiece market, Switzerland is rapidly becoming a major player not only because of historical competencies, but also because of a significant research capability.

#### **Production process**

Within the sector of instrument engineering, the production process has experienced a movement toward greater automation and system integration. In this regard, larger manufacturers - those with the capacity to absorb significant changes in production technology - have automated certain production processes as a means to lower labour costs and achieve higher economies of scale; such is particularly true at the higher end of the product technology spectrum. Also, the impracticality or expense which attends the manufacture of certain components has compelled some producers to become designers and system integrators, subcontracting the production of components and lower-level technologies to specialty houses. Another development has been the migration of certain production assets to relatively low-wage markets such as those within the Pacific Rim/ASEAN region. This not only enables EU producers to reduce costs but also enables them to compete more effectively in the growing markets of the Asian NICs.

As showed in Table 1, sector employment levels rose by 9.1 % as production levels rose by 59.6 % between 1984 and 1990. This would suggest a significant increase in productivity as, indeed, Table 5 bears out. Between 1990 and 1992, production

**Table 7: Instrument engineering  
The ten largest companies in Europe, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Thomson - CSF	F	5 179	547	48.9
Rank Xerox	UK	4 018	290	24.4
Carl Zeiss Stiftung	D	2 440	43	33.6
Siebe	UK	2 437	418	29.9
Cardo Investment	S	1 833	266	16.4
Fisons	UK	1 620	102	12.1
Océ - van der Grinten	NL	1 207	189	11.7
Smith & Nephew	UK	1 195	244	13.1
Gambro	S	996	203	8.9
Smiths Industries	UK	926	167	11.5

Source: DABLE

**Table 8: Instrument engineering  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.29	0.17
Danmark	1.09	1.07
BR Deutschland	1.44	1.29
Hellas	0.10	0.14
España	0.28	0.32
France	0.79	0.83
Ireland	3.89	3.42
Italia	0.81	0.85
Luxembourg	N/A	N/A
Nederland	0.42	0.59
Portugal	0.28	0.29
United Kingdom	1.21	1.30

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

rose by 11.7 % while employment fell by 1.6 % increasing further levels of productivity. The period 1992-93 marked a period of production retrenchment (-3.3 %), as productivity increased further because of an even sharper decline in levels of sector employment of 4.7 %. Table 5 also shows that sector profit margin rates have remained essentially constant over the period.

## INDUSTRY STRUCTURE

### Companies

As Table 6 depicts, the overwhelming majority of firms within this sector had fewer than 20 employees in 1990. Such a fact points to a sector comprised mostly of family-run, niche players. Table 6 also shows, however, that notwithstanding its small sector representation as a percentage of the total number of firms, it is the large firm - those with more than 99 employees - that provides the majority of employment within the sector. Perhaps more telling, as Table 6 suggests, is the fact that the large firm generates an even greater percentage of the sector's turnover.

In essence then, only 2 % of the sector's firms generated more than 60 % of the sector's revenue while over 90 % generated less than 18 % of the sector's revenue in 1990. This suggests an oligarchic structure whereby a relative few companies control the economic dynamic of the entire industrial sector. In this regard, Table 7 provides the ten largest EU firms within the instrument engineering sector.

Unlike the small and medium sized firms which tend to specialise in one product area or one particular competency, the larger firms tend to offer a broad array of products across sub-sectors. For some large companies, instrument engineering does not even represent the main source of revenue even though the instrument engineering revenue they do generate places them near the top of sector turnover.

### Strategies

Basically, there are two sources of competition for EU producers. In the high value-added end of the product spectrum, EU manufacturers face competition from American, Japanese, and Swiss producers. At the low value-added, labour intensive end, the competition emanates mostly from the relatively un-industrialized regions of Pacific Rim/ASEAN. The competitive strategies that EU producers will need to follow delineate along these two lines.

Within the area of technologically sophisticated products, EU manufacturers have achieved success largely through intensive

research efforts. Such efforts have enabled them to remain reasonably competitive with the Americans, Japanese and Swiss in most product areas. Still, the significant budgetary burdens that accompany such research requirements have proven problematic for the marginal player in the sector. To this end, there may be a further bifurcation within the sector between a relatively few major producers and a panoply of smaller supporting producers. The marginal EU producer that wants to pursue the more sophisticated product technology may choose to form or join cooperative efforts that bring together the resources of many such producers in performing conceptual, basic research.

In order to compete against mainly Asian producers at the low end of the product spectrum, EU producers may choose to invest directly in such markets as the Pacific Rim. As stated earlier, such a strategy would accomplish two basic objectives. First, it would allow EU producers to compete more effectively on a cost basis. Second, it would give EU companies a foothold in the growing markets of Asia. Such asset migration has already been occurring within the sector, particularly in the area of clocks and watches. There is also palpable evidence that EU producers are competing at the low end of the technology spectrum through the general reduction of costs vis-à-vis the automation of production processes and concomitant achievement of economies of scale.

### Impact of the Single Market

In the EU, the industry of instrument engineering is mainly composed of small and medium-sized firms. During the last few years, the industry has benefited from the strength of investment activity, induced by high capacity utilisation levels in a healthy economic climate. Investment activity was also inspired by preparations for the establishment of the Single Market in 1993 and by the need to compete in global markets.

Another element of these recent years was the increasing competition from producers outside the EU. International competition is expected to heighten. In the fields of highly sophisticated products, EU producers face fast paced technological innovation, imposed mainly by Japan and the United States. So expenditures in research and development have to increase considerably. However, this high-cost strategy can hardly be financed by small and medium-sized companies, so that a higher degree of concentration is needed. In the field of the less technologically advanced products, standard instruments in particular, increased competition come from the East Asian New Industrialised Countries who are very price competitive. So the EU firms have to invest in modernisation and automation of the production process to improve production efficiency and reduce costs.

Thus, for these EU companies the most relevant measures of the European integration have been the harmonisation of technical standards and the removal of non-tariff trade barriers. The other positive measures are the opening up of public procurement, the legislation on consumer protection (especially for the industry of medical and surgical equipment) and the support policy to small and medium-sized firms. Moreover, the industry should also benefit in the nineties from the tighter controls required to meet growing environmental concerns. In this context, beyond the initial source of demand for identification and monitoring apparatus, demand for instruments to regulate and reduce environmental damage will also develop.

## REGIONAL DISTRIBUTION

Table 8 depicts how product specialisation values have changed between 1984 and 1993. Surprisingly, the country most specialised in this sector among the EU producers was Ireland, both in 1984 and 1993. This is even more surprising given the fact that Ireland contributed only 5.9 % of the sector's total EU value-added in 1993 as Figure 2 shows. This suggests

that while Ireland is not an important contributor to total value-added within the sector, the sector is relatively important to the Irish economy. Germany, the largest contributor, was only modestly above EU average in terms of the degree to which it is specialised in the sector.

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## ENVIRONMENT

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The production processes of this sector are perceived to impose relatively few environmental hazards. To the extent that such hazards exist, they generally fall along the following lines:

- Photographic equipment - The disposal of chemicals used in film production and development is believed to cause some damage to natural waterways.
- Clocks and watches - In this otherwise benign sub-sector, potential risks lie in the use of small nickel-cadmium batteries whose disposal is thought to pollute the ground water.
- Medical devices - Environmental problems, here, are mostly related to the disposal of syringes and other sterilised instruments. To this end, an EU Directive provides that a certain percentage of packaging materials must be recycled or recovered by the year 2000.

Indeed, not only are there relatively few environmental concerns associated with the sector, but this sector may be in the peculiarly enviable position of benefiting from a heightened world concern over environmental matters. As the need for analysing and monitoring air, soil and water pollutants increases, there will be a growing demand for products within the sector of instrument engineering, particularly within the area of measuring, precision and control instrumentation.

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## REGULATIONS

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The directive on machinery which recently came into force covers all four subsectors. Because such harmonisation will make it easier for foreign producers to penetrate the EU market, the EU Commission has taken the further measure to protect against the dumping of products from abroad. In the field of electronic weighing machines, for example, anti-dumping duties have been imposed on a number of Japanese firms. Recent legislation affecting the medical device area include one which requires any device sold within the EU must meet harmonised requirements and procedures and bear a CE-mark, a token of compliance with essential safety requirements, in order for it to enjoy unencumbered movement within the EEA.

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## OUTLOOK

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While it is likely that sector producers have turned the corner on the recession which struck them so seriously in the past two years, the short term outlook is somewhat uncertain. Prospects remain largely a function of the extent to which corporate capital budget planners feel sufficiently confident that the worst of economic times is behind them. What is more certain, however, is that for the short and long-terms, this is transforming into an increasingly globalized industry. The budding export and import trade intensities highlight the sobering reality that indigenous product loyalty has now become subservient to international product value. Thus, the long-term survival of the EU instrument engineering sector depends largely on its ability to adapt to this reality and compete accordingly.

Written by: DRI Europe



# Measuring, precision and control instruments

NACE 371

The year 1993 was certainly a year of contrasts for EU producers. On the one hand, the subsector suffered precipitous declines in both production and apparent consumption. On the other hand, extra-EU exports and imports enjoyed a remarkable jump. Indeed, it was the rise in exports that mitigated against an even sharper decline in production. Still, this subsector has enjoyed fairly robust growth over the 1984-93 period notwithstanding the poor results in 1993.

The United States has lost considerable Triad production share over the past decade such that there is near-parity among the outputs of the Triad's three legs. Despite this reduction, the American producers still possess a tremendous technological competitive advantage. It is not surprising, therefore, that the United States has enjoyed an mounting presence within the EU market as the leading source of imports. At the same time, EU producers face increasing pressures from such low-wage regions as the Pacific Rim/ASEAN.

The demand for products within this subsector is tied to the health of the overall economy. Still, factors peculiar to the subsector may ultimately rebound to the benefit of production in the medium term. Such factors include dynamic technological development, greater dependence on environmental instrumentation, and increased EU access to the developing markets within Asia, Eastern Europe and South America.

## INDUSTRY PROFILE

### Description of the sector

The industry of measuring, precision and control instruments covers the manufacture of:

- gas meters, water meters and other liquid supply meters including petrol pump meters;
- measuring, checking or automatic control instruments and apparatus;
- equipment for navigation, hydrology, geophysics and metrology;
- drawing and mathematical calculating instruments;
- precision measuring instruments;
- precision balances, laboratory equipment and teaching equipment; and
- other precision equipment and apparatus.

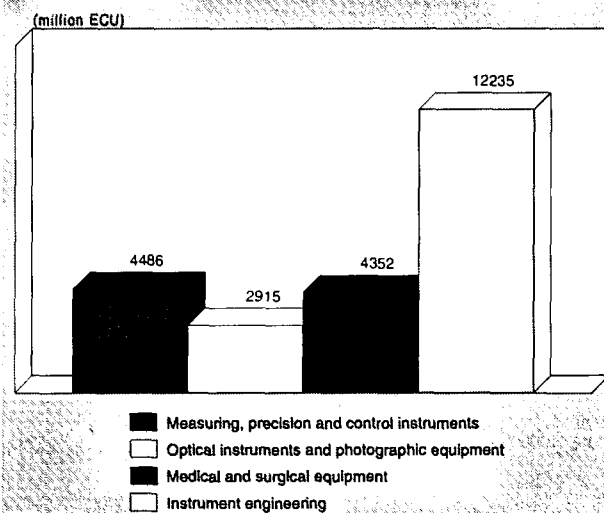
The sector does not include electrical counters, or measuring, testing, regulating and control instruments, all of which are classified under NACE 344. As Figure 1 shows, this subsector slightly edges out that of medical and surgical equipment for prominence within the larger instrument engineering sector.

The measuring, precision and control instruments sector is the largest subsector within instrument engineering, accounting for about 37 % of total value added. Two countries, Germany and the United Kingdom, provide the lion's share (over 80 %) of value added within this subsector (see Figure 2). Among the second tier of EU producers within this subsector are Italy, France and Spain.

### Recent trends

The effects of the recession hit this subsector especially hard, and 1993 marked a disastrous year for EU producers. Between 1984 and 1992, this subsector saw production rise at an average

Figure 1: Measuring, precision and control instruments Value added in comparison with related industries, 1993



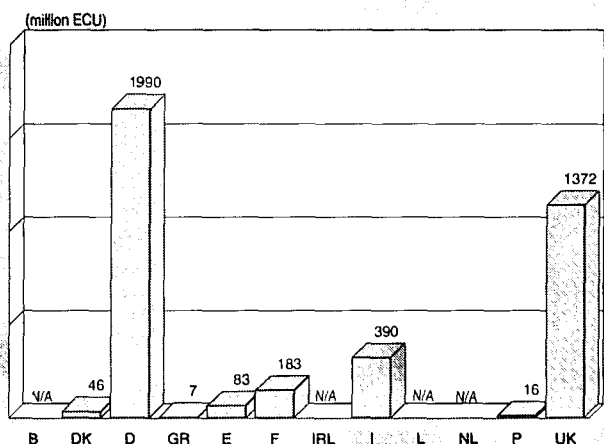
Source: DEBA

annual rate of a robust 8 % (see Table 1). In sharp contrast, 1993 production fell by 7.0 % over the previous year resulting in a nominal average annual growth rate of 5.8 % over the entire 1984 to 1993 period. Indeed, the 1993 decline would have been far more precarious were it not for a nominal increase in extra-EU exports of an astounding 75.3 % relative to 1992.

An even sharper change is observed in the apparent consumption of measuring, precision and control instruments. Between 1984 and 1992, apparent consumption grew at a nominal average annual rate of 9.5 %. Between 1992 and 1993, apparent consumption fell by 11.2 % resulting in a nominal average annual growth rate of 6.3 % over the decade up to 1993.

Table 2 shows how apparent consumption, production and extra-EU trade has changed in real terms. Again, note the contrast between the period of 1992 through 1993 and the entire period 1984-93.

Figure 2: Measuring, precision and control instruments Value added by Member State, 1993



Source: DEBA



**Table 1: Measuring, precision and control instruments**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	5 242	7 244	8 348	8 490	8 740	9 228	8 193	8 593	8 700	9 100	9 500
Production	5 917	7 839	8 836	9 082	9 340	9 697	9 020	9 411	9 600	10 000	10 400
Extra-EU exports	1 471	1 700	1 813	1 927	2 039	1 970	3 453	3 647	4 000	4 400	4 900
Trade balance	675.0	594.3	488.1	592.4	599.7	468.5	827.0	817.6	900.0	900.0	900.0
Employment (thousands)	118.4	128.1	130.2	128.9	124.0	120.2	111.5	107.4	104.0	103.0	102.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Measuring, precision and control instruments**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	5.63	-3.10	1.66	-11.14
Production	4.91	-2.03	1.77	-6.97
Extra-EU exports	6.01	16.63	10.61	71.16
Extra-EU imports	12.58	17.80	14.87	70.80

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Measuring, precision and control instruments**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 471	1 673	1 568	1 516	1 700	1 813	1 927	2 039	1 970	3 453	3 647
Extra-EU imports	796	904	852	811	1 106	1 325	1 335	1 439	1 501	2 626	2 829
Trade balance	675	769	716	705	594	488	592	600	469	827	818
Ratio exports / imports	1.85	1.85	1.84	1.87	1.54	1.37	1.44	1.42	1.31	1.31	1.29
Terms of trade index	89.0	85.7	92.2	97.6	93.3	96.7	100.0	96.5	96.2	93.9	N/A

Source: DEBA

**Table 4: Measuring, precision and control instruments**  
Labour productivity, unit costs and gross operating rate (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	86.0	90.8	92.4	92.8	94.0	99.3	100.0	101.7	106.6	106.9
Unit labour costs index (3)	83.0	83.3	86.8	90.0	93.1	94.0	100.0	105.5	106.6	109.1
Total unit costs index (4)	81.6	84.4	86.1	87.3	90.7	96.8	100.0	104.8	106.5	108.2
Gross operating rate (%) (5)	13.0	13.2	11.8	12.0	12.5	11.0	10.9	11.5	11.9	11.8

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

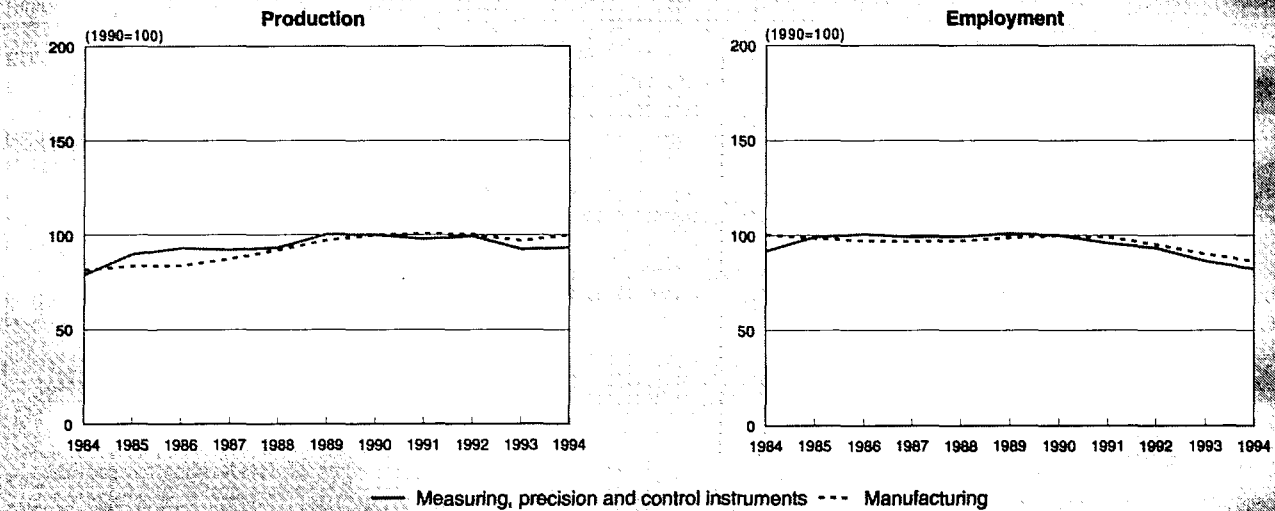
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Measuring, precision and control instruments  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

Figure 3 suggests that both production in volume terms and employment did not kept pace with EU manufacturing overall over the period 1990 through 1993.

**International comparison**

As Figure 4 shows, nominal Triad production has risen by over 37 % between 1984 and 1993. More interestingly, the Triad's three regions have achieved relative production parity over the period. In 1984, the United States produced over 50 % of the Triad's output in nominal terms. Between 1984 and 1993, the American nominal output increased by only 4.3 % compared to 52.4 % for the EU and 89.4 % for Japan. Such a disparity in growth rates has resulted in a redistribution in nominal production share such that the EU and Japanese producers now have over 60 % of output as measured in 1993 ECU compared to 38.5 % for the United States.

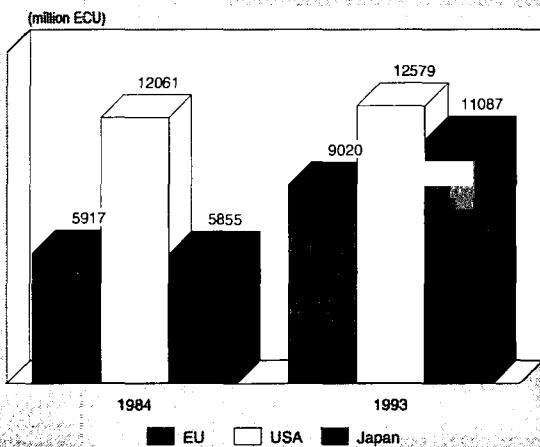
Figure 5 shows how subsector production from each member of the Triad has evolved in constant prices. Note that, in

recent years, Japanese and EU output has lessened notwithstanding their success over the entire period.

**Foreign trade**

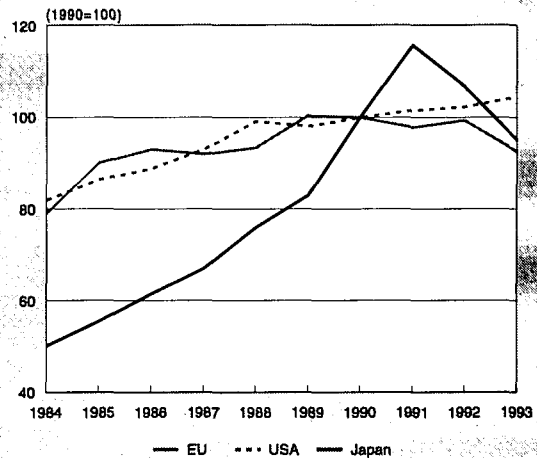
Nominal average annual growth in extra-EU exports was a healthy 15.0 % during the years between 1984 and 1993. That value, however, is deceiving. Between 1984 and 1992, nominal average annual growth was only 4.2 %. Between 1992 and 1993, extra-EU exports achieved a remarkable 75.3 % increase as mentioned earlier. Similarly, extra-EU imports of measuring, precision and control instruments enjoyed a remarkable spike in 1993. Between 1984 and 1992, nominal extra-EU imports rose by an average annual rate of 11.1 %. Between 1992 and 1993, extra-EU imports nominally rose by 75.0 %, rendering average annual growth at 25.5 % over the entire period. Although extra-EU imports have risen faster than corresponding exports, the EU trade balance grew by 22.5 % between 1984 and 1993 (see Table 3). Of course, the

**Figure 4: Measuring, precision and control instruments  
International comparison of production in current prices**



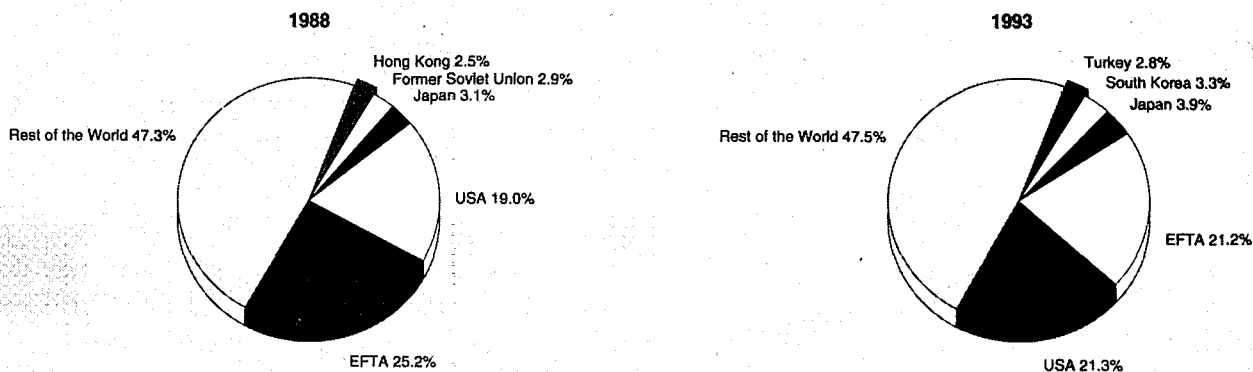
Source: DEBA

**Figure 5: Measuring, precision and control instruments  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Measuring, precision and control instruments  
Destination of EU exports**



Source: Eurostat

EU trade balance did not ascend on a continual basis between 1984 and 1993.

Figure 8 shows that trade intensities were fairly stable between 1984 and 1992 (in the 20-25 % range for exports and in the 12-16 % for imports). An enormous jump in exports and imports in a year of sharply declining production and consumption caused export and import trade intensities essentially to double in 1993.

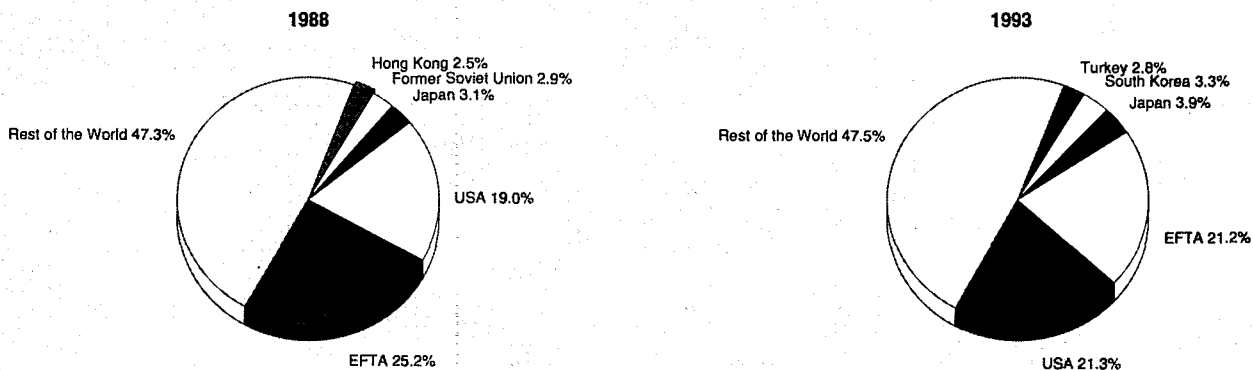
The United States has become the main source of competition for EU producers within the EU market. In 1993, 43.6 % of all EU imports emanated from the United States, up from 39.9 % in 1988. It is thought that the pre-eminence of American instrumentation within the EU market is owed both to the economies of scale which US producers enjoy, as well as a general depreciation of the USD against EU currencies in recent years. Meanwhile, there has been a deterioration in the shares of Japanese and EFTA producers such as Sweden and Switzerland (see Figure 7).

## MARKET FORCES

### Demand

In a broad sense, demand for measuring, precision, and control instrumentation is influenced by the health of the general economic activity, as such instrumentation is found in virtually every industrialised sector. Other fundamental drivers of demand include investment in technological development including automated industrial processes. Still, this is a relatively specialised subsector, and is aligned by industry end-user. Thus, demand for a particular class of instrumentation is distinctively sensitive to improvements in economic activity within certain industrial sectors. Thus, demand for measuring, checking and controlling instruments - used to regulate production processes - is sensitive to activity within the vehicle production, machinery construction, environmental protection, chemical, pharmaceutical and food sectors. Demand for navigational, hydrological, and meteorological instruments is sensitive to trends in the aircraft and shipbuilding industries. Weighing instruments are in demand by a number of industrial end-users as well as wholesale and resale traders.

**Figure 7: Measuring, precision and control instruments  
Origin of EU imports**



Source: Eurostat

It should also be noted that as electronic technology has developed, it has permeated the sector to the point where over 90 % of all instrumentation is electronically controlled. This has provided the sector with a value-added content that has served to bolster demand.

### Supply and competition

Despite world trends which show a levelling off of American production, US producers have increased their presence on the EU market in recent years. The Americans have enjoyed this success because of both a clear technological competitive advantage and a general devaluation of the US dollar relative to European currencies.

In contrast, the Japanese have not enjoyed success in the EU market beyond a level of 10-13 % import penetration (see Figure 7). Still, the Japanese are successful within certain areas (e.g. weighing instrumentation). In this regard, Japanese exporters have been assisted by a general devaluation of the Yen relative to European currencies, albeit to a lesser extent than the American exporters. Also, Japanese companies within this subsector tend to be extremely large relative to the small and medium-sized European enterprises. As such, Japanese producers enjoy a more significant research infrastructure as well as the synergies and economies of scales that usually accompany larger operations. Japanese companies also have begun to invest directly in European markets, e.g. the United Kingdom, in order to compete more effectively.

Competition from the relatively low-cost ASEAN/Pacific Rim producers has increased in recent years. This pattern should continue as producers from more industrialised nations will become less competitive, particularly at the low end of the technology spectrum.

### Production process

In the past, manufacturers within the measuring, precision and control instruments industry looked to upstream suppliers for relatively raw, unprocessed materials. The manufacturers would, in effect, supply the vast bulk of the product's value-added. To the extent that electronics and other sophisticated modularity has changed the production process, the relationship between manufacturer and supplier too has changed. Now, producers are far more inclined to sub-contract - either because producers are not able to manufacture the technology themselves or because they view the role of system integrator as

more cost-effective. As a result, knowledge of the manufacturing process has shifted generally from manufacturer to supplier. This trend shows no sign of abating.

In recent years there has been an increased integration of data processing system technology in the sector, particularly within the area of precision mechanics. Data processing system technology also has been integrated into products within the area of analytical equipment, process control systems, transducers, measuring devices, etc.

Between 1989 and 1993, employment within the subsector declined by approximately 14 %. Thus, it is not surprising that productivity has increased (see Table 4). Still, the rise in productivity is modest relative to other subsectors within instrument engineering. In fact, combined with a similar rise in unit labour costs, the rise in productivity did not result in any meaningful change in the gross operating rate.

## INDUSTRY STRUCTURE

### Companies

In general, the composition of this subsector is mostly characterised by an array of small and medium-sized enterprises, although a few large companies produce a broad range of products in various fields of instrument engineering. Some companies are active producers of instrumentation for both this sector and other fields of manufacturing, such as consumer electronics, computers and motor vehicles.

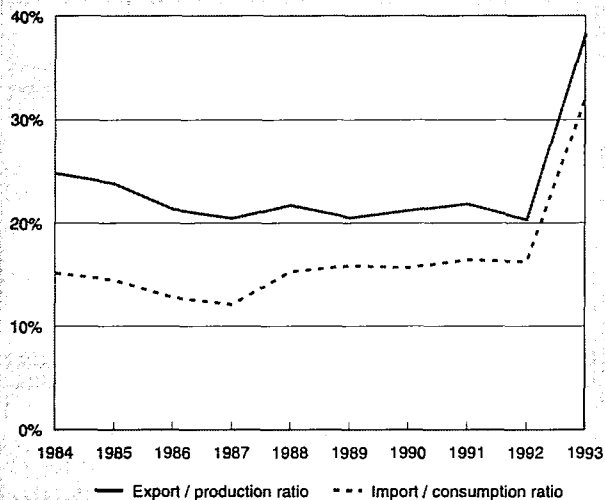
More specifically, the structure of this sector is largely product-dependent. Enterprises within the weighing industry, for example, range in size from those employing under a dozen to the few that employ several thousand, including such important manufacturers as Sartorius (D) and GEC Avery (UK). Other product areas, such as the counting instruments and checking and controlling machines sectors, consist mainly of medium-sized to large manufacturing firms. The primary EU producers in these areas include Zeiss (D), Renault Automation (F) and Dea (I). In measurement and automation technology, the majority of the firms are small to medium-sized, typically with fewer than 200 employees, although a few large companies boast more than 1 000 employees on their staff. Significant manufacturers in this area include Hartmann & Braun (D), Hottinger Baldwin (D), Krohne (D), Endress & Hauser (D) and Foxboro (UK), which was recently taken over by Siebe (UK). Conversely, the make-up of the automation technology sector comprises a few multinationals such as Siemens AG (D), Asea Brown Boveri (D) and Philips (NL).

### Strategies

Within this sector, EU producers are confronted with a two-part challenge. At the high end of the technology spectrum, EU producers are challenged by the significant technological developments driven largely by manufacturers in Japan and the United States. At the same time, manufacturers (mainly in the Pacific Rim/ASEAN region) leverage their significant cost advantage through fierce price competition within the lower end of the technology spectrum. The strategies which manufacturers should employ to counteract these competitive pressures depends on the product area. In such areas as standard instrumentation, EU manufacturers need to invest heavily in automation and other cost-reducing production technology in order to seize the advantage of economies of scales. This will mitigate the cost advantages that the Asians enjoy. In this same regard, EU producers must consider the relocation of production assets to such relatively low-cost areas as Spain, Portugal, Hungary, the Czech Republic and, perhaps, even certain countries within the Pacific Rim/ASEAN region.

Within the context of the more sophisticated portion of the technology spectrum, EU manufacturers will need to invest heavily in R&D. However, as this step is largely limited to the multinational corporations and their relatively flush cof-

**Figure 8: Measuring, precision and control instruments Trade Intensities**



Source: DEBA

fers, small and medium-sized entities will need to join forces in order to achieve the levels of investment necessary. Indeed, the subsector is already characterised by a series of mergers involving small and medium-sized enterprises. In the weighing industry, for example, Toledo (F) was taken over by Mettler (CH); GEC Avery (UK) took over Berkel; Testut (F) has purchased Trayvou (F) and Lutrana (F); and Precia (F) took over Molen (NL) and Yernaux Pesage (F). In industrial process controls, Siebe's (UK) takeover of Foxboro formed the second largest producer of such instruments in the world, behind the American firm Honeywell. Other recent takeovers in this area include the Italian company Elsag's takeover of the Sereg division of Schlumberger (D); and CGE-Alsthom's (F) takeover of the industrial control operations of the British GEC.

Another potential strategy - particularly for the smaller, niche market players - includes restricting internal activities to those of design and assembly. As mentioned, this practice already has been established with the burgeoning role of sophisticated technology and the inability or unwillingness of some firms to develop the appropriate level of expertise in this regard. Moreover, the increasing globalisation of the subsector has imposed an international marketing requirement, which will impose a wedge between the larger multinational firms that can accommodate the marketing and after-sales support required on the world market and the smaller firms that cannot. A potential solution to this problem resides in the cooperative marketing and after-sales support of smaller companies in such markets as the Pacific Rim/ASEAN regions.

### Impact of the Single Market

During the last decade, the production growth of the industry was due to increased investment activities of manufacturing and services businesses and the growing spread of electronic components in their products.

For EU companies the most relevant measures of the European Internal Market programme have been the technical standardisation of machinery and the removal of non-tariff trade barriers, which eased the development of trade between EU firms. This has also resulted in increased competition in the sector, both from other EU producers and from non-EU producers. In the nineties, the industry should benefit from the tighter controls required to meet growing environmental concerns, which will raise demand for measuring and control instruments. In fact, beyond the initial source of demand for identification and monitoring apparatus, demand for instruments to regulate and reduce environmental damage will also develop. Other relevant measures have been those to support SMEs, and the encouragement of R&D.

### ENVIRONMENT

There is relatively little concern that manufacturing within the subsector causes deleterious effects on the environment. Indeed, the larger world concern over environmental issues has proved to be a boon for EU manufacturers. To this end, there are growing needs for measuring and analytical equipment for gas, vapour, dust and noxious substances in air and water, as well as for apparatus to investigate harmful effects on humans, animals, plants, soil and food. In addition, instrumentation designed to regulate and reduce environmental damage (e.g. gas desulphurisation systems) have been in greater demand.

### REGULATIONS

The recent harmonisation of regulations affecting the technical standards of machinery within the EU should make it easier for producers such as the United States to penetrate this market. At the same time, the EU has taken measures to protect against the dumping of foreign-made instrumentation. In the field of electronic weighing machines, for example, anti-dumping du-

**Table 5: Measuring, precision and control instruments Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.66	N/A
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España	0.32	0.31
France	0.22	0.29
Ireland	N/A	N/A
Italia	0.78	0.83
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.21	0.30
United Kingdom	1.83	2.02

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

ties have been imposed on a number of Japanese firms and others have been considered regarding certain firms from South Korea and Singapore.

### OUTLOOK

Indications suggest that this subsector is emerging from the recessionary downturn of 1993. Still, short-term prospects are modest at best. Downstream consumers of measuring, precision and control instrumentation also have been affected by the recent recession and, therefore it would seem likely that they will exercise caution in increasing capital expenditures.

Yet, there is reason for optimism for the medium term. The export market will serve as an important source of revenue, particularly if the 1993 upturn proves to be more than a one-year aberration. To this extent, the United States will continue to be a critical market for EU producers, although the development of new markets in the Pacific Rim/ASEAN regions and increasing demand from China, South America and Eastern Europe will help diversify the export portfolio. Improved demand will also stem from the increasing international importance of environmental regulation as well as dynamic technological developments. The extent to which EU producers can successfully capture this new demand will depend on the extent to which they can transcend the barriers accompanying global competition in the twenty-first century: international marketing, R&D expenditure and production efficiency. To conclude, it would seem likely that this subsector will continue to evolve down the path of consolidation and asset migration that has characterised many such subsectors within the EU.

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# Medical and surgical equipment and orthopaedic appliances

## NACE 372

The past ten years have proven remarkably strong for EU producers within this sector despite a relatively weak 1992-93 period. To this end, the ageing of the population, technological innovation, EU regulatory harmonisation, and a heightened sense of health awareness have been important factors in spurring demand.

The USA dominates the sector although their share among the Triad has declined somewhat in recent years. Still, they represent the clear competitive presence within the EU market. Although exports have grown robustly, EU penetration into the American market has been inhibited by layers of regulation that some regard as a non-tariff trade barrier.

The outlook looks promising as health care expenditures will likely rise notwithstanding efforts to control costs. The extent to which EU producers can compete with the USA will in large measure depend on their willingness to engage in product differentiation, increased R&D expenditures, as well as a co-ordinated R&D policy with the governing EU authority.

### INDUSTRY PROFILE

#### Description of the sector

The sector of medical and surgical equipment and orthopaedic appliances includes the following activities:

- manufacture of medical apparatus for diagnostic work
- manufacture of medical, surgical and veterinary equipment and instruments
- manufacture of dental instruments and apparatus, and
- manufacture of orthopaedic appliances, artificial limbs, eyes, teeth, etc.

Orthopaedic footwear is not included within this sector as it is found in NACE 452. X-ray apparatus and electro-medical instruments, including electro-medical diagnostic equipment, electro-medical treatment, electro-dental instruments, electrical hearing aids and pacemakers are also excluded as they are found in NACE 344.

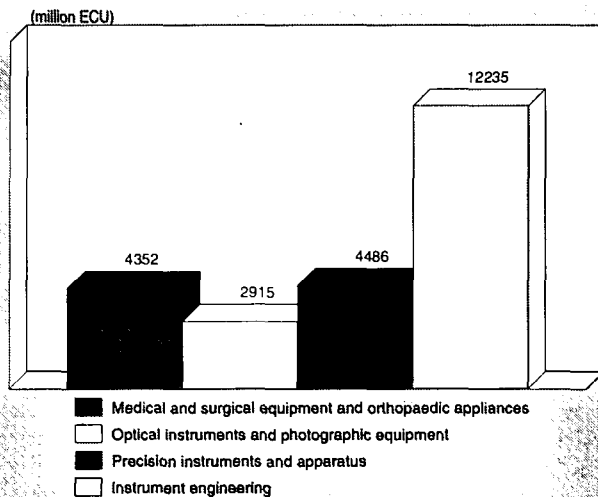
Within the larger sector of instrument engineering, this sub-sector represents about 36 % of total value-added in 1993, as Figure 1 shows.

Germany is unambiguously the leading producer, with more contribution to total value-added than all the other countries combined. At more than 54 %, Germany is followed by France with 18 %, the United Kingdom with 16 %, Italy with 7 %, and Denmark with approximately 3 %. Figure 2 provides a country-by-country breakdown in terms of value-added.

#### Recent trends

In current prices, both apparent consumption and production have had strong growth records. Between 1984 and 1992, apparent consumption and production grew at a rate of 15.9 % and 13.6 %, respectively. Between 1992 and 1993, however, that growth fell sharply to 1.5 % for apparent consumption and 3.1 % for production. Extra-EU exports grew at an average rate of 12.5 % between 1984 and 1992. Yet, in contrast with apparent consumption and production, extra-EU exports grew at a robust 15 % between 1992 and 1993. Such suggests that the extent to which production grew at all in 1993 may be

**Figure 1: Medical and surgical equipment and orthopaedic appliances**  
Value added in comparison with related industries, 1993



Source: DEBA

owed, in part, to the export markets. Still, given the general recessionary environment during this period, any growth between 1992 and 1993 contrasts with other sectors and bespeaks a certain inelasticity with respect to economic fluctuations. Table 1 provides an overview of this sector's main indicators in current prices.

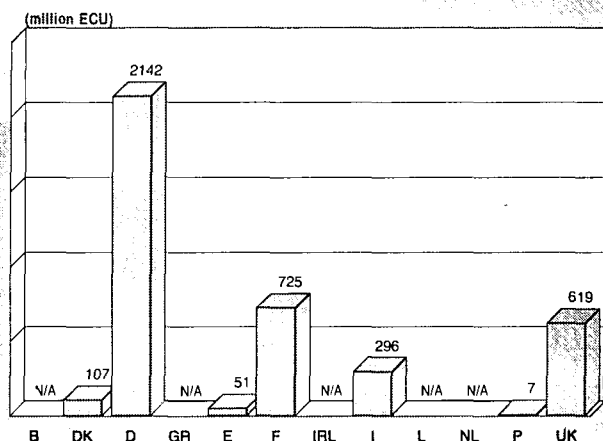
As Figure 3 shows, both production and employment within the sector outpaced those of manufacturing generally.

#### International comparison

As Triad total production increased by approximately 77 % (8.6 % per annum average), there has been somewhat of a shift among the respective shares. While the USA is still the clear leader, its share has declined from 66 % in 1984 to 58 % in 1993. In contrast, both the EU's and the Japanese shares have increased by 4 % individually.

Figure 5 shows that in constant terms, however, Japan has enjoyed the fastest growing rate of production between 1984

**Figure 2: Medical and surgical equipment and orthopaedic appliances**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Medical and surgical equipment and orthopaedic appliances**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	3 630	5 453	5 888	6 491	7 617	8 243	8 365	8 874	9 360	10 080	10 830
Production	3 831	5 628	5 898	6 576	7 408	7 987	8 234	8 747	9 200	9 900	10 600
Extra-EU exports	1 236	1 781	1 954	2 151	2 335	2 460	2 829	1 887	2 100	2 400	2 700
Trade balance	200.4	174.9	10.5	85.3	-209.1	-255.7	-131.4	-126.9	-160.0	-180.0	-230.0
Employment (thousands)	88.0	95.5	98.5	101.3	106.5	109.2	109.0	109.5	108.0	111.0	112.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Medical and surgical equipment and orthopaedic appliances**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	7.20	5.59	6.48	-1.89
Production	5.94	5.32	5.66	1.08
Extra-EU exports	5.33	5.43	5.37	7.06
Extra-EU imports	9.52	6.27	8.06	-2.72

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Medical and surgical equipment and orthopaedic appliances**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 236	1 657	1 775	1 686	1 781	1 954	2 151	2 335	2 460	2 829	1 887
Extra-EU imports	1 036	1 199	1 230	1 332	1 606	1 943	2 065	2 544	2 715	2 960	2 014
Trade balance	200	458	545	353	175	11	85	-209	-256	-131	-127
Ratio exports / imports	1.19	1.38	1.44	1.27	1.11	1.01	1.04	0.92	0.91	0.96	0.94
Terms of trade index	97.1	94.4	97.3	102.5	109.4	99.4	100.0	101.3	101.7	97.5	N/A

Source: DEBA

**Table 4: Medical and surgical equipment and orthopaedic appliances**  
Labour productivity, unit costs and gross operating rate (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.8	83.8	84.8	86.8	96.2	95.2	100.0	102.2	104.6	105.8
Unit labour costs index (3)	90.5	93.0	97.6	100.5	95.7	99.1	100.0	105.3	110.2	114.4
Total unit costs index (4)	85.5	88.3	92.6	96.1	94.0	98.7	100.0	105.6	109.1	112.2
Gross operating rate (%) (5)	13.5	13.5	12.2	11.3	14.7	12.6	13.8	13.8	13.5	12.7

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

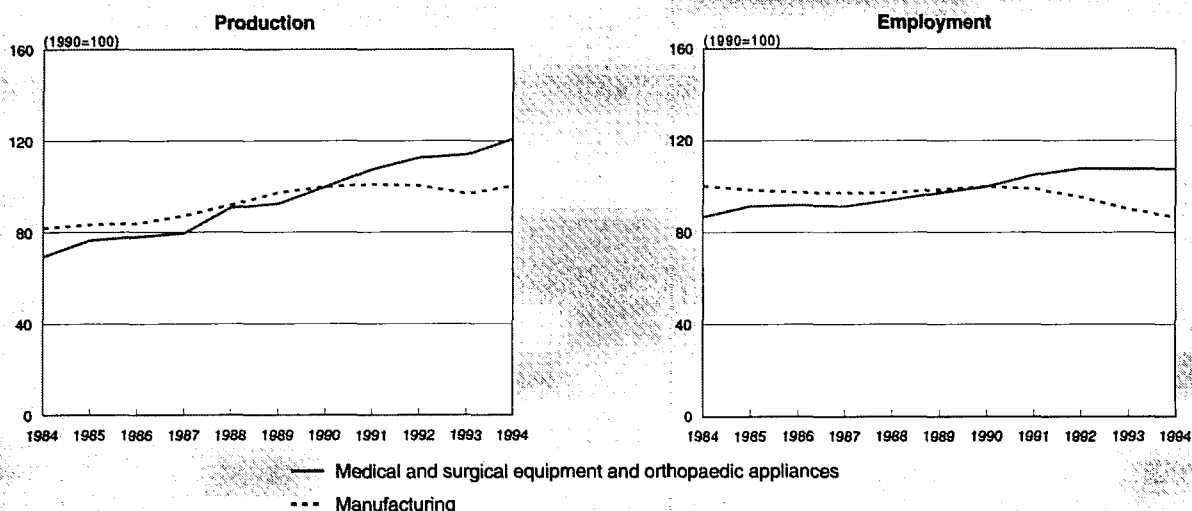
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3: Medical and surgical equipment and orthopaedic appliances  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

and 1993 at 14.0 %. Indeed, between 1984 and 1992, the Japanese rate of growth was 19.0 %.

**Foreign trade**

As both Tables 1 and 2 showed, the rate of apparent consumption was greater than the rate of production. This, in turn, caused extra-EU imports to grow faster than extra-EU exports. To this end, the EU trade balance within this sector significantly deteriorated between 1986 and 1992. The period 1992-93 marked a reversal of the general trend. Table 3 provides a summary of trade data for the EU within this sector. Note how precipitously the ratio of exports to imports has declined.

Clearly, the USA increased what was already an overwhelming presence in the EU market from just under 48 % in 1988 to just under 53 % in 1993. Much of this growth was owed to price competitiveness and technological advances. In contrast, the Japanese and Swiss both lost significant market share.

While both the American and EFTA states were still the biggest export markets for EU producers in 1993 as they were in 1988, their combined share declined from 47.6 % to 41.0 %. Interestingly, Russia has emerged as one of the largest single country markets for EU exports within this sector, no doubt a result of its new willingness to seek superior foreign made instrumentation.

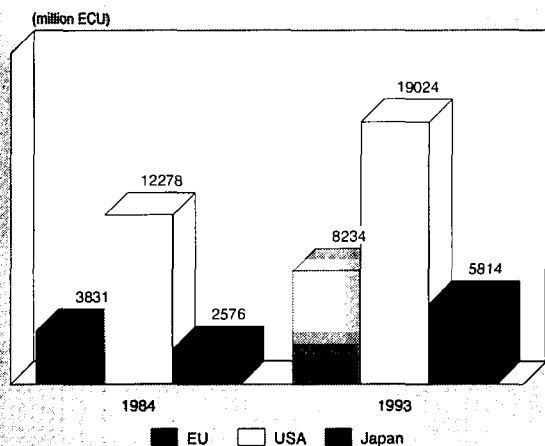
Figure 8 shows a relative balance between exports and imports as percentages of production and consumption, respectively, within the 30-35 % range over the period 1984 through 1993.

**MARKET FORCES**

**Demand**

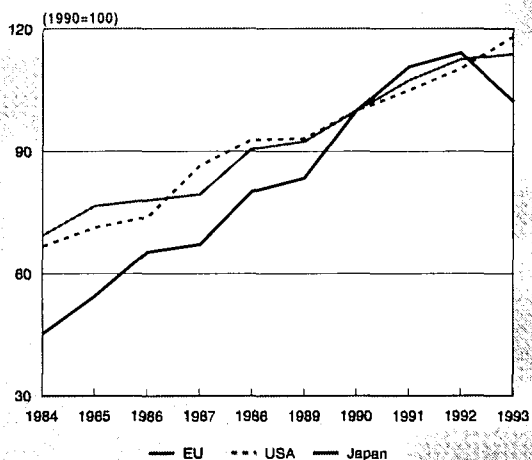
Notwithstanding the real decline in apparent consumption within the 1992-93 period, EU demand for medical and surgical equipment and orthopaedic appliances has been strong since 1984. An important part of this strength emanates both from

**Figure 4: Medical and surgical equipment and orthopaedic appliances  
International comparison of production in current prices**



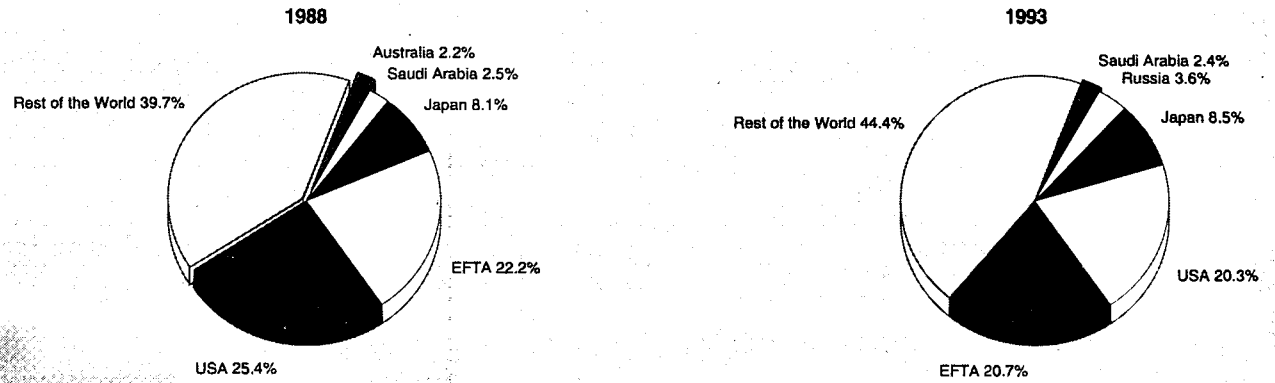
Source: DEBA

**Figure 5: Medical and surgical equipment and orthopaedic appliances  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Medical and surgical equipment and orthopaedic appliances  
Destination of EU exports**



Source: Eurostat

a general ageing of the population within industrialised countries as well as a more acute awareness of health-related matters including the spread of infectious disease such as AIDS.

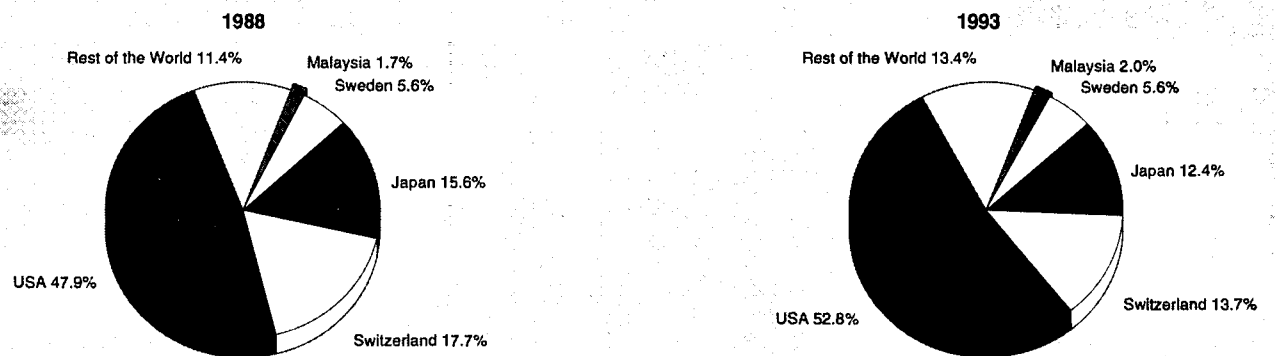
This sector is highly research-intensive. In this regard, expenditures of R&D funds have induced an array of technological innovation that has had direct impact on demand. Such innovation includes improvement in diagnostic instrumentation. Particular efforts have involved the development of endoscopic procedures, minimally invasive surgical treatments that often include benign ultrasound or laser applications. In recent years, there have been developments in multi-functional endoscopes which allow for complete treatment without the need to change instruments. There have also been developments in the marriage of endoscopic and optical system technology.

Other technological advances allow for better video diagnostic methodology including improvements in data transmission and picture storage. In this regard, an area of particular importance is laparoscopic technology which is regarded by some as the fastest growing segment of the sector. It is thought, for example, that the vast majority of gall bladder operations will be performed laparoscopically. Also, advances in the accuracy of corneal-measurement methods have spawned an array of

surgical techniques for the correction of eyesight. The precision of such measurement is important because this information is used by the surgeon prior to radial keratotomy or excimer laser photorefractive keratectomy. Improvements in data processing systems, generally, have transformed many applications including anaesthetic processes; there, data-based technology now operates in areas that had been the exclusive domain of unaided observation. Improvements in materials technology have redounded to the benefit of prosthetic and orthopaedic devices. Also, biomedical engineering advances have greatly improved the ambulatory benefits of particular devices including improved myo-electronic regulation of artificial legs.

Generally, medical instrumentation has become both more disposable and consumer-friendly in recent years. Such has fuelled a trend toward greater medical self-administration and out-patient therapy. This, in turn, has likely resulted in a more efficient allocation of economic resources. Yet, at the same time, greater medical self-reliance has caused hospitals in some areas to trim budgets for medical and surgical instrumentation. It is not clear whether disposability and personal convenience have benefited or dampened this sector. It is clear, however, that while past demand almost exclusively emanated from hospitals and traditional care-givers, today it

**Figure 7: Medical and surgical equipment and orthopaedic appliances  
Origin of EU imports**



Source: Eurostat

stems to a much greater extent from the private consumer. This trend seems likely to continue.

### Supply and competition

As Figure 4 depicted, the United States is by far the largest producer within the sector and, clearly, the greatest competitive threat to EU manufacturers. Indeed, over one-half of EU imports within this sector are American made, an amount that satisfies almost 20 % of total EU demand. Such represents a marked increase from 1988 where the United States satisfied about 14 % of total EU demand. At the same time, the United States represents only about 20 % of the EU's total exports, down from over 25 % in 1988. Given America's relative self-sufficiency in this area (14.3 % import intensity in 1993). That this gap is widening is owed largely to the difficult regulatory environment which characterises the American market. In recent years, legislation has been enacted which has required manufacturers of certain medical devices to establish a tracking system to contact patients in the event of product recall, maintain and regularly publish safety and effectiveness data, and perform post-market surveillance protocols for implants. These and other American regulations have impelled American producers - already endowed with strong technological advantage - to pursue the EU market. Such may also explain the lessening percentage represented by EU exports destined for the United States. Other important, albeit less systemic, bases for this imbalance include a depreciation of the American dollar as well as the trade alliance between Canada, the United States, and Mexico which was promulgated by the NAFTA accord.

After the United States, Japan is the single largest country manufacturer within this sector with approximately 17 % of the Triad output. Still, Japan maintains a relatively small presence within the EU market at about 12.4 % of EU imports in 1993, or about 4.5 % of total EU demand. This contrasts with 1988's figure of 15.6 % of EU imports, or about 5.1 % of total EU demand. Japan has particular strength in such areas as flexible endoscopic instruments in which the Japanese company Olympus overwhelmingly dominates the world market. Japan also has strength in the manufacture of blood pressure instruments.

Beyond the United States and Japan, competition resides in such less industrialised countries as Indonesia, Malaysia, and the entire Pacific Rim. Indeed, it seems likely that much of

the EU's share of lower-end product will be captured by these markets as Malaysia already represents 2 % of EU imports. Pakistan also provides competition, particularly in the field of standard instruments.

### Production process

About 30 years ago, this sector was characterised by relatively unsophisticated production processes. Much of the orthopaedic area did not involve electronic functionality at all. Today, the heightened complexities of the technologies within this sector require an array of expertise. Such has resulted in a great deal of subcontracting and product specialisation. It is likely that this trend will continue in the future, particularly with the burgeoning role of system integration.

As Table 4 shows, productivity has improved markedly over the period. Such is even more remarkable when one considers from Figure 3 that employment grew by about 23 % between 1984 and 1993. Table 4 also provides an index of labour costs and gross operating rates. The strength of the latter reflects the relative profitability of the sector.

## INDUSTRY STRUCTURE

### Companies

As mentioned, this sector is comprised of many subcontractors and only a few large organisations. The subcontractors often specialise in narrow niches of activity and may be more than one level removed from the final system integrator. Indeed, major players in medical and surgical instrumentation and equipment may, in fact, be better known for other areas of endeavour such as electronics (GEC, Siemens) or industrial adhesives (3M).

There are, however, identifiable leaders within particular product applications. Important manufacturers of fixed endoscopic devices include Karl Storz (D) and Richard Wolf (D), each with about 35 % of the world market, and Olympus (Japan), with most of the rest. Draeger Werke (D), l'Air Liquide (F), Ohmeda (UK) and British Oxygen (UK) are all major producers within the area of anaesthetic apparatus and equipment. About half of the world's output of small medical instrumentation is performed by a host of small German companies, most with fewer than 100 employees each. Aesculab (D) represents one of the few large companies in this regard. Within orthopaedic appliances, important EU countries include Smith & Nephew (UK), Dow Corning (F), Otto Bock (D), Aesculab (D), Waldemar Link (D) and the Gebr. Martin (D).

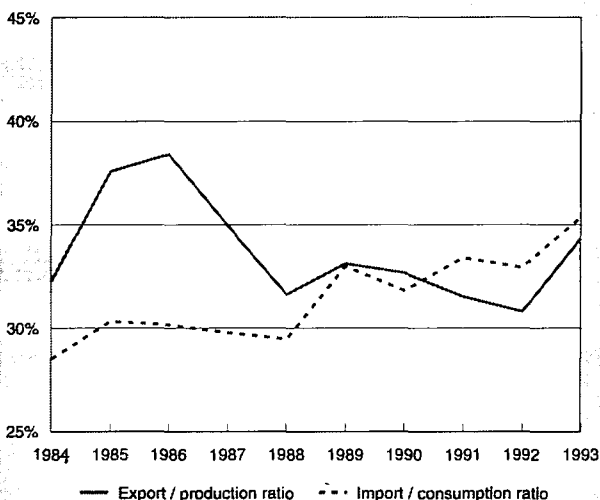
The United States has some of the largest and most important companies within the sector. Baxter, for example, is the world's largest producer of health care products, producing in virtually all areas of medical equipment including blood bags, diagnostic tools, dressings, and surgical gloves. Other important American producers include 3M, Johnson and Johnson, and Abbott whose products, collectively, include infusion sets and catheters, medical dressings, implants, dental materials and diagnostic devices.

### Strategies

Changes in the regulatory landscape have affected both indigenous and foreign producers that wish to operate within the EU. Specifically, producers who wish to sell to any EU country must ensure that the product conforms to a uniform technological standard. Such contrasts with past practice in which producers merely had to satisfy the purchaser-country's standard. The inception of a harmonised EU standard particularly benefits the major foreign producers in that they will no longer have to contend with varying and potentially conflicting regulatory standards.

Generally, the USA and, to a lesser extent, the Japanese will maintain material technological advantages. Thus, they will continue to represent formidable competition for EU produc-

**Figure 8: Medical and surgical equipment and orthopaedic appliances  
Trade intensities**



Source: DEBA

**Table 5: Medical and surgical equipment and orthopaedic appliances**

**Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.14	N/A
Danmark	1.61	1.31
BR Deutschland	1.61	1.51
Hellas	N/A	N/A
España	0.18	0.16
France	0.76	1.00
Ireland	N/A	N/A
Italia	0.86	0.61
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.29	0.18
United Kingdom	0.90	0.88

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

ers. EU producers, for their part, will likely follow a two-track approach: upgrading and modernisation of plant capability for higher-end product and asset migration to low-cost, developing economies for production of lower-end product. Beyond outright asset migration to such countries as Malaysia and Thailand, some of the larger EU companies may prefer to engage in joint ventures. Such is already occurring with companies in South East Asia and China. More generally, research and development expenditure will be key to any effort to achieve technological parity with the USA. Unlike the Japanese and, to some extent, the USA, the EU producers have yet to reap the benefit of a coordinated governmental R&D policy which was hoped to have accompanied the establishment of a unified Europe.

Small niche players within the EU, without significant financial resources, will likely pursue the course they have charted through product specialisation. Another, although less likely, alternative for the smaller player includes a merging with larger EU manufacturers.

### Impact of the Single Market

In past years the ageing of the population, increasing health consciousness and product innovation have been the driving forces for the development of this sector. The completion of the Single Market in this sector has heightened competition between EU and non-EU producers. The technical standardisation which is underway within the EU is expected to strengthen competition from abroad, since the American and the Japanese competitors will no longer be forced to adapt their products to differing requirements in the various EU countries. On the other hand, this will also enhance the capability of EU producers to increase their share of the other EU markets. Due to its technological edge, however, the United States will remain the chief competitor in the medical equipment sector, while in the field of standard instrumentation, competition stems mainly from Japan and the East Asian Newly Industrialised Countries. Support to R&D and access to finance by SMEs are other important parts of the Internal Market programme, from the point of view of medical and surgical equipment producers.

## REGULATIONS

As mentioned, EU regulations are changing the competitive and environmental standards within the sector. In recent years, at least three important EU directives have emerged and directly affect the movement of medical and surgical devices within the EU. The Active Implantable Medical Devices directive, which became effective in 1993, concerns the manufacture and sale of pacemakers and other implantables. The Medical Devices Directive is likely to become effective in 1995 and covers medical devices generally. The In Vitro Diagnostics Directive concerns such areas as endoscopic technology. An important aspect of these legislations is the requirement that any device sold within the EU must meet a uniform standard and bear a stamp of approval to that effect in order for it to enjoy free movement within the EU.

## OUTLOOK

If past is prologue, the medical and surgical equipment and orthopaedic appliances sector should continue to enjoy strong growth in apparent consumption and production, notwithstanding a soft year in 1993. The ageing of both the EU and world populations will only strengthen demand in this area. Recent technological advances will also spur demand. Markets in China and the ASEAN/Pacific Rim regions - only marginally exploited - promise great potential in maintaining what has been a strong track record in EU exports.

Still, the horizon is not without clouds. The USA will likely remain the world leaders as they will continue to enjoy a substantial competitive advantage, particularly within the higher-end product areas. Such makes the American presence within the EU all the more problematic. Moreover, regulatory burdens within the United States render the American market relatively unattractive. Efforts to restructure health-care in certain industrialised countries will likely retard demand as well.

It would seem that the success of the next 5-10 years will, in large measure, depend on the extent to which the EU producers achieve technological equivalence with the American producers in high-end areas and transfer production of low-end applications to low-cost, less-developed markets. Regulatory parity between the United States and the EU, too, would improve future prospects. All of this, in turn, will require a sense of strategy and, perhaps, a greater government-industry coordinated effort.

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# Optical instruments and photographic equipment

## NACE 373

While it is true that this sector has enjoyed general growth since 1984, that growth stumbled in 1993 as both apparent consumption and production fell. Still, the trade balance has been improving since 1991 and, in fact, it was a sharp increase in exports that helped mitigate an even more significant decline in production.

Most feel certain that recent declines in production and consumption are temporary manifestations of a recessionary environment. What is less certain, however, is whether a volatile world economy will enable the longer-term outlook to reflect the kind of growth this sector has known in the past.

### INDUSTRY PROFILE

#### Description of the sector

This sector comprises an array of instrumentation which can be thought to divide neatly into three general groupings:

- spectacles, lenses, frames and mountings and equipment for use by opticians;
- optical precision instruments (other than optician items);
- photographic and cinematography equipment.

At 24 % of total value added in 1993, the optical instruments and photographic equipment market represents the smallest component of the larger instrument engineering sector as Figure 1 shows.

On a per country basis, Germany clearly leads the EU with over one-third of total value added, followed by France (20.6 %), Italy (14.8 %), and the United Kingdom (13.0 %)-a concentration ratio of about 83 % for these countries. Figure 2 depicts value added on a per country basis for 1993.

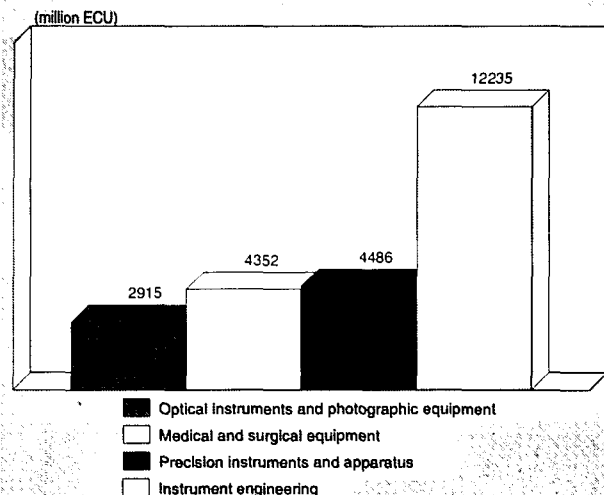
Notwithstanding the high concentration ratio among these four countries, the sub-sector is marked by a great deal of product specialisation in which German manufacturers concentrate on high-end optical, precision and photo instruments, while French and Italian producers concentrate on relatively low-end ocular optics, primarily spectacle frames.

#### Recent trends

Between the years 1984 and 1992, the optical instruments and photographic equipment sub-sector was marked by strong growth in both apparent consumption (13.1 % per annum) and production (11.5 %). Growth in production was abetted to an extent by a corresponding increase in extra-EU exports of 3.4 % per year over the period. The year 1993, however, saw a marked decline in apparent consumption of 7.4 % compared to 1992 and a smaller decline in production of 2.6 % over the same period despite a sharp increase in extra-EU exports of 13 %. Such implies that, in the absence of this increase in extra-EU exports, the decline in production would have been considerably sharper. Still, this increase in exports has helped lessen the negative trade balance since 1991 as Table 1 indicates.

As Figure 3 shows, production and employment have both outpaced comparable levels within EU manufacturing generally. It is particularly noteworthy that as production levels within the sector are more than 9 % higher than they were

Figure 1: Optical instruments and photographic equipment Value added in comparison with related industries, 1993



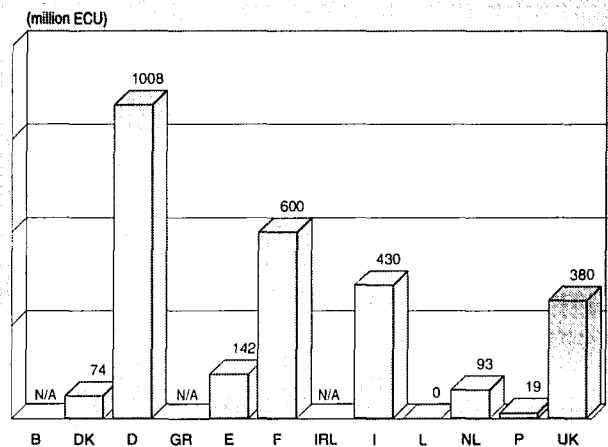
Source: DEBA

in 1990, production levels within EU manufacturing generally are essentially unchanged.

#### International comparison

Although it is true that the United States is still the leading manufacturer of optical instruments and photographic equipment, its market share within the Triad has been in steady decline at least since 1984 and likely before that. Much of the decline in American market share has been seized by manufacturers within the EU and to a lesser extent by Japanese manufacturers. Specifically, in 1984 the American manufacturers held over 55 % of Triad output compared to 14 % and roughly 31 % for manufacturers within the EU and Japan, respectively. As total Triad output increased by approximately 11 % between 1984 and 1993, American output declined by 15 %. American output share within the Triad declined from 56 % in 1984 to 43 % in 1993. Over the same span of time, Japanese share increased from 31 % to 34 % and EU output increased from 14 % to 23 %.

Figure 2: Optical instruments and photographic equipment Value added by Member State, 1993



Source: DEBA

**Table 1: Optical instruments and photographic equipment**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	4 118	6 456	6 994	7 406	8 338	8 449	7 821	7 833	8 100	8 500	8 900
Production	3 581	5 288	5 683	5 966	6 529	6 886	6 704	6 824	7 100	7 500	7 900
Extra-EU exports	2 399	2 548	2 989	2 801	2 852	3 061	3 460	5 176	5 600	6 000	6 500
Trade balance	-537	-1168	-1310	-1440	-1809	-1563	-1117	-1010	-1000	-1000	-1000
Employment (thousands)	74.6	79.8	82.4	83.2	83.7	81.9	77.8	76.2	75.0	76.0	76.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Optical instruments and photographic equipment**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.59	-0.66	3.30	-12.71
Production	6.16	1.36	4.00	-3.14
Extra-EU exports	4.81	3.57	4.26	9.90
Extra-EU imports	5.83	-0.36	3.03	-10.52

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Optical instruments and photographic equipment**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 399	2 610	2 509	2 406	2 548	2 989	2 801	2 852	3 061	3 460	5 176
Extra-EU imports	2 935	3 229	3 249	3 374	3 716	4 300	4 241	4 661	4 624	4 578	6 186
Trade balance	-537	-618	-741	-967	-1 168	-1 310	-1 440	-1 809	-1 563	-1 117	-1 010
Ratio exports / imports	0.82	0.81	0.77	0.71	0.69	0.70	0.66	0.61	0.66	0.76	0.84
Terms of trade index	102.6	101.3	101.4	102.0	97.3	91.6	100.0	96.4	91.8	85.4	N/A

Source: DEBA

**Table 4: Optical instruments and photographic equipment**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	81.7	88.7	87.9	93.8	98.9	99.7	100.0	104.3	109.4	111.5
Unit labour costs index (3)	89.6	88.2	94.0	93.6	92.4	96.2	100.0	103.1	103.8	102.6
Total unit costs index (4)	81.8	84.0	88.9	88.9	91.1	97.3	100.0	102.2	105.4	106.0
Gross operating rate (%) (5)	10.8	11.5	9.8	11.5	12.2	9.1	9.3	11.9	9.8	10.2

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

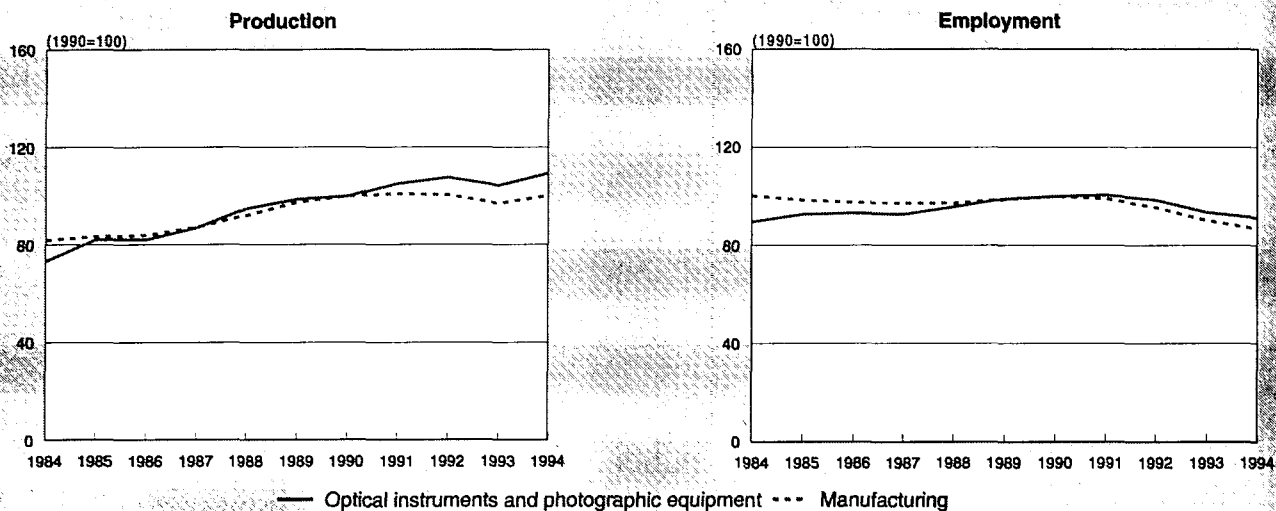
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Optical instruments and photographic equipment  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

Still, notwithstanding the relative gains by the EU and Japanese manufacturers between 1984 and 1993, all of that growth occurred prior to 1991. Indeed, since 1991, real output has remained essentially unchanged within the EU and has declined by more than 20 % in Japan. During this period, real output has increased by over 7 % in the United States. Figure 5 depicts how real output has changed over the period within the Triad.

**Foreign trade**

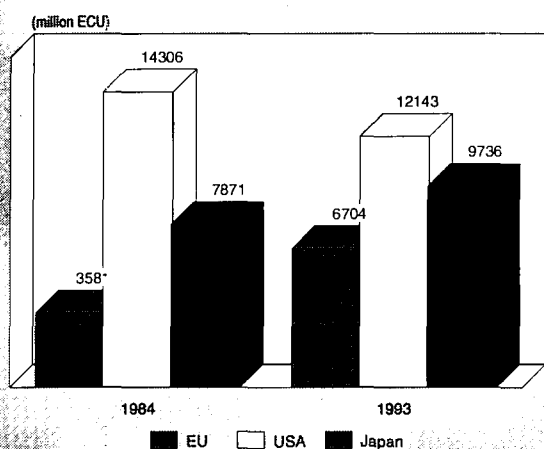
As Table 1 showed, growth in extra-EU exports coupled with near-constant extra-EU imports since 1991 have caused a decline in the EU trade balance as measured in current ECU. Table 2 depicts vividly how, in real terms, extra-EU exports have helped offset a precipitous decline in apparent consumption. Table 2 also shows that while real extra-EU exports

have outpaced real extra-EU imports over the period 1989-1993, that disparity was striking between 1992 and 1993.

As Table 3 shows, extra-EU imports increased by 23.2 % over the period 1988 and 1993, or 4.6 % compounded annually. Over this period, Japan has served as the EU's greatest source of imports. Still, as Figure 7 indicates, Japan's grasp on the EU import market has weakened somewhat since 1988. Indeed, 1993 represented the first time in many years that Japan did not provide the majority of the EU's import requirements. In contrast, the United States provided over 21 % of EU imports in 1993 compared to just under 19 % in 1988 and about 17 % in 1987.

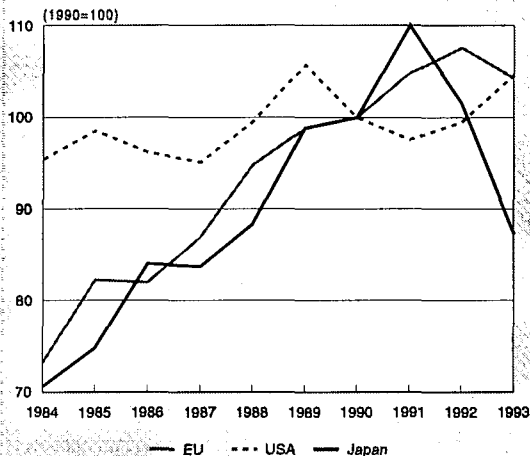
While, historically, the American market has been a strong buyer of extra-EU exports, that strength has tempered in recent years. In 1988, over 36 % of extra-EU exports were targeted for the USA as compared to 31.5 % in 1993. In fact, the

**Figure 4: Optical instruments and photographic equipment  
International comparison of production In current prices**



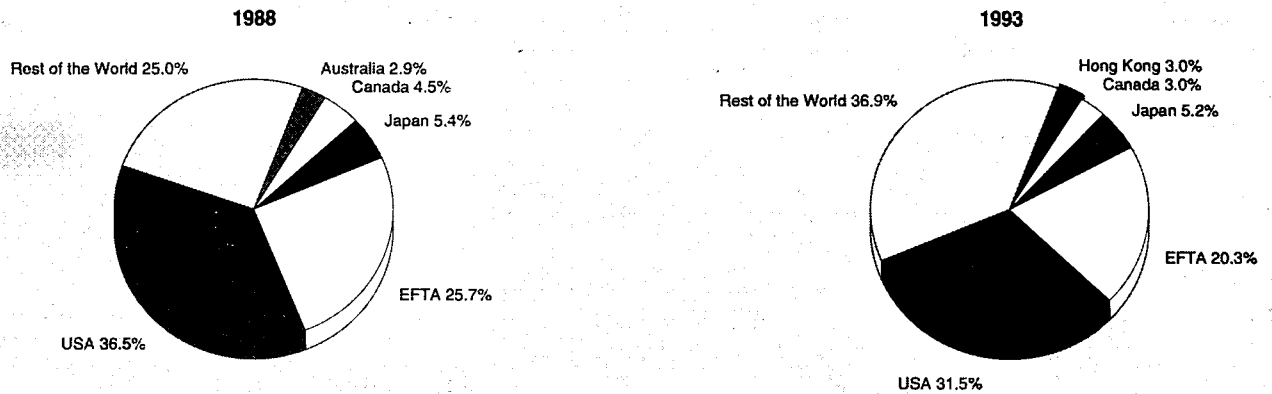
Source: DEBA

**Figure 5: Optical Instruments and photographic equipment  
International comparison of production In constant prices**



Source: DEBA

**Figure 6: Optical instruments and photographic equipment  
Destination of EU exports**



Source: Eurostat

combined purchases of the United States and the EFTA states as a percentage of total extra-EU exports declined from over 62 % in 1988 to under 52 % in 1993. The NICs of Asia helped compensate for this decline.

Figure 8 shows that 1993 marked a sharp departure from a downward trend in trade intensities. The jump in export to production ratio is particularly noteworthy and consistent with the earlier comment that the rise in exports has served to offset a decline in EU production.

## MARKET FORCES

### Demand

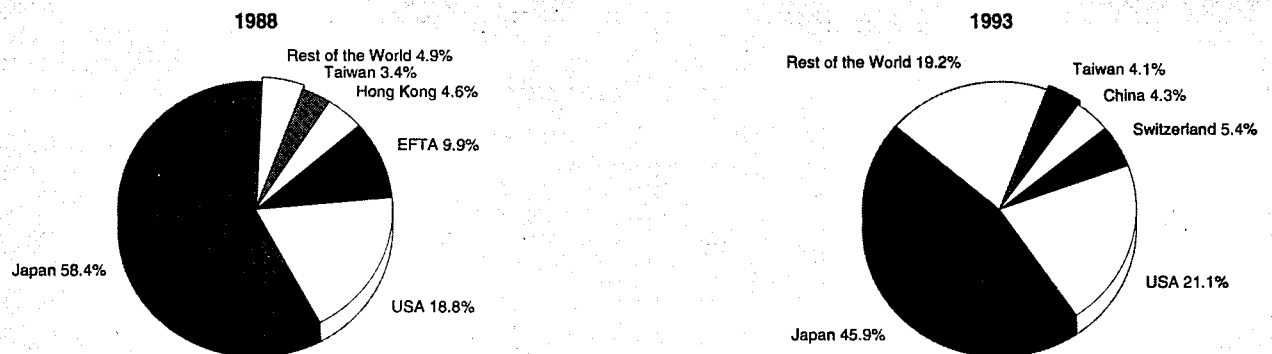
Notwithstanding a 7.4 % decline between 1992 and 1993, demand for optical instruments and photographic equipment as a whole has nearly doubled since 1984, achieving an average annual growth rate of nearly 10 % over the period. Yet, this sector consists of an array of products, each with differing demand characteristics. As such, it would be useful to assess demand within this sector on a relatively elemental basis.

Natural demographic changes have helped induce a general increase in demand for spectacles, lenses, frames and mountings over the past decade. Clearly, as the population of the

EU has increased in general number, so, too, has demand for eyeglassware. More significantly, the gradual ageing of the EU population has induced a particular increase in demand for spectacles. Indeed, in some countries, the percentage of the population that wears some form of eyeglassware is approaching or even exceeding 50 %.

Beyond consideration of population, demand for eyeglassware has been enhanced by considerations of fashion and technological innovation as well. A greater fashion sense about eyeglassware, particularly frames, has served to differentiate these products in a way that appeals to varying tastes and needs. In this regard, EU consumers have evinced a willingness to own several pairs of glasses across a range of aesthetic and utilitarian appeal. Moreover, in recent years, technological innovation has heightened this product differentiation to a point where consumers may choose from a menu of features and products. Such technological innovation includes gas permeable contact lenses, continuously variable lens strength, and special designs to safeguard against the deleterious effects of computer and television monitors. Still, demand for eyeglassware has been adversely affected by a number of recent developments. Since 1989, revisions in social security systems have rendered guidelines for prescription eyeglass refunds more restrictive. The general recessionary environ-

**Figure 7: Optical instruments and photographic equipment  
Origin of EU Imports**



Source: Eurostat



ment has also increased the time between purchases, thus dampening demand, particularly in the low end of the price spectrum.

The precision optical instrument market is another important element of this sector. This area consists mainly of instrumentation designed to improve industrial measurement and testing methodologies. An important advantage to optical technology resides in the fact that measurement and testing can be accomplished through light sensing mechanisms, often without physical contact. A burgeoning demand for this kind of instrumentation has emanated largely from expanding manufacturing entities and older ones which wish to modernise. This demand, in turn, has fuelled technological innovations and increased investment activity particularly in the area of laser technology for a wide array of applications in such industries as aerospace, automotive, and medical instrumentation. Precision optical instrumentation is also gaining wide acceptance within environmental management applications.

While demand for precision optical instrumentation has increased over the past decade, demand in recent years has been hurt by the EU's general recessionary environment. Additionally, recent cutbacks in military expenditures have only exacerbated this situation. German manufacturers have been particularly hard-hit as production of precision optical instrumentation has fallen in excess of 12 % since 1990.

The photographic industry can be divided into broad product segments: still and motion picture equipment; sensitised photographic film, chemical, paper and plates; and photocopying and micrographics equipment. While demand in this sector largely flows from private households, it has also been induced by certain forms of product innovations including more user-friendly technology and increased film quality per unit cost. Demand has also been impelled by new product application. Specifically, photocopying and micrographics equipment and supplies have become critical components in the electronic imaging industry. Recent demand for still picture equipment has been stimulated by continual integration of cutting-edge technologies and product enhancements resulting in improved automation and convenience. Moreover, the marriage of electronics and photography, generally, has long infused this sector with energetic demand. Increasing lens and camera applications within the fields of space and aerial photography, security and traffic monitoring, medicine, and studio and press equipment have all contributed to demand within the past decade.

Still, notwithstanding the demand inspired by product development and differentiation, there has recently been a move toward simpler, more disposable technology, particularly within the consumer photographic segment. Some believe that this phenomenon manifests a kind of consumer "innovation fatigue." The recessionary climate within the EU-reducing both research investment and consumer spending-has served to retard demand as well.

### Supply and competition

Figure 8 suggested that the EU dependency on imports has been declining, despite 1993's reversal in this trend. Indigenous production levels within this sector have never been higher as shown in Table 1. Still, the picture varies from product area to product area.

Within the overall optical instruments and photographic equipment sector, the Japanese and American products have had a significant, albeit declining, EU presence as shown in Figure 7. The competitive forces that stem from Japanese and American products are particularly striking within the area of photographic equipment where recent price wars have increased not just the Japanese and American presence, but that of the East Asian NICs as well. The few surviving EU manufacturers have had difficulty fending off foreign competition - particularly from the Japanese who are extremely efficient in satisfying the variability of consumer demand. Moreover, Europe

generally is the United States' largest export market within photographic equipment and continued regulatory liberalisation will likely redound to the Americans' benefit. Also, the NAFTA agreement, which increases the flow of goods between Canada, the United States, and Mexico should diminish the relative EU presence within these three countries.

EU firms are performing well within the area of optical precision instrumentation where the local market is characterised by relative self-sufficiency. EU exports are also strong in this regard where the American market provides the greatest source of demand.

In eyeglassware, EU firms are premier manufacturers not just locally, but throughout the world as well. Notably, French and Italian manufacturers-known for fashion design-are strong exporters as are the German spectacle manufacturers who are best known for sturdy functionality. Still, foreign competition-primarily from Asian producers-have recently penetrated the EU market. Japanese manufacturers have been particularly successful in this regard as they have benefited from concerted governmental efforts in areas of ophthalmic research.

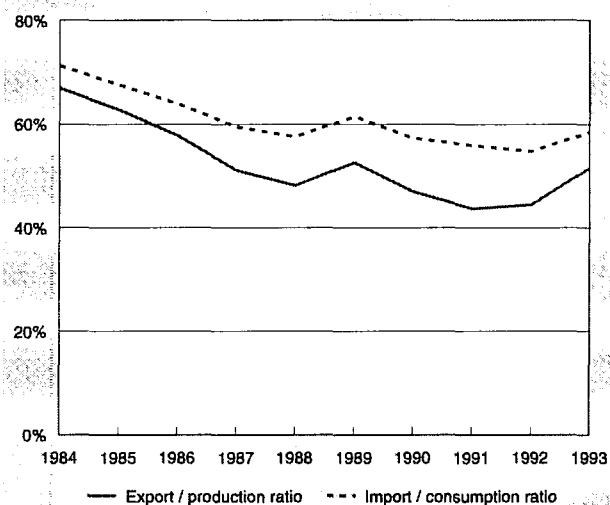
### Production process

Certain estimates place 1994 employment within the sector of optical instruments and photographic equipment at its lowest level since 1984, continuing a downward trend since 1991 as Table 1 shows. Certainly, 1993 employment levels are the lowest they have been since 1987. In contrast, 1993 production levels (as measured in current ECU) were nearly twice what they were in 1984 with only slightly higher levels of employment.

In real terms, production grew at 4.0 % per year between 1984 and 1993 compared to only a 0.5 % annual average increase in employment level. Such would suggest an increasing level of productivity as Table 4 indicates.

In a more general sense, the manufacturing process within this sector involves highly specialised techniques that require thousands of very small components. It has been a common practice throughout the EU to subcontract the manufacture of these components as well as ultimate assemblage to smaller specialty houses as the primary manufacturers concentrate on design, research and development.

**Figure 8: Optical Instruments and photographic equipment Trade Intensities**



Source: DEBA

**Table 5: Optical instruments and photographic equipment  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.00	0.00
Danmark	1.79	1.62
BR Deutschland	1.23	1.02
Hellas	N/A	N/A
España	0.34	0.55
France	1.34	1.10
Ireland	N/A	N/A
Italia	0.90	1.29
Luxembourg	0.00	0.00
Nederland	0.53	0.65
Portugal	0.48	0.42
United Kingdom	0.79	0.99

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

## INDUSTRY STRUCTURE

### Companies

Relatively few EU manufacturers concentrate on just one sub-sector within the larger sector of instrument engineering. Rather, they usually participate in several subsectors of which optical instruments and photographic equipment is just one.

Within the EU, most participants in the manufacture of eyeglassware are small to medium-sized firms, with generally fewer than 500 employees each. Typically, no firm manufactures the entire eyeglass; like larger manufacturers within the sector generally, prime eyeglassware manufacturers usually subcontract the work to frame manufacturers, lens manufacturers, etc. Still, these smaller manufacturer are not exclusively dependent on EU prime manufacturers as they have a thriving export business mainly to the United States. Among the relatively few larger eyeglassware manufacturers within the EU include Rodenstock (D), Bausch & Lomb (D), Carl Zeiss (D), Essilor (F), Luxottica (I), Safilo (I), De Rigo (I), Indo (E) and Pilkington (UK).

Important EU manufacturers of precision optical instrumentation include Carl Zeiss (D), Schott (D) and Philips (NL). A company of dual origin, Leica (CH/UK), has become a world leader in the manufacture of precision instrumentation. Nikon (JPN) is the world leader in this area.

The photographic segment consists of several prime manufacturers as well as specialty manufacturers. Larger prime manufacturers-almost all German-include Agfa Gevaert AG (D), Carl Zeiss (D), Rollei (D), Minox (D), Linhof (D), Durst (I), and Bosch (D). Angenieux is a French manufacturer of camera lenses.

An overview of product specialisation is seen in Table 5 which shows the relative extent to which each country concentrates on optical instruments and photographic equipment.

### Strategies

While this sector may benefit from a lessening in recessionary pressures, it is clear that longer term considerations are important. This sector, particularly within the context of photographic equipment, is a mature industry within the EU. Manufacturers face burgeoning pressures from low wage, developing nations, especially within the Pacific Rim region. As such, EU manufacturers should follow the lead of Japanese photographic manufacturers in seeking various forms of product differentiation, particularly the kind that will provide enhanced value added. It also seems likely that EU manufacturers

will transfer low-end production assets to developing economies where they can be utilised more efficiently.

Clearly, continued research and development expenditure is part of the equation - not just in photographic equipment, but in all elements of the sector. Such will permit EU manufacturers to preserve and perhaps widen their edge in areas where they have competitive advantage such as precision optical instrumentation.

### Impact of the Single Market

As a result of enhanced intra-EU trade, competition between EU Member States is on the rise. In the field of precision optical instruments, the high degree of specialisation of each firm forces producers to search for additional markets abroad since national markets are too small to permit them to reach economies of scale in production. Intra-EU competition is likely to heighten particularly after the remaining impediments to trade are eliminated. The industry may, however, benefit from new opportunities on the demand-side as increased emphasis is put on environmental protection. Thus, enhanced environmental monitoring and measuring requirements for instance will likely boost demand for measurement and control instruments, which the precision optical instrument sub-sector depends up.

## ENVIRONMENT

This sector enjoys relatively trouble-free environmental impact. While certain potential environmental concerns reside in a few areas - such as the disposal of chemicals used in the development and production of film as well as the waste processing of disposable cameras - this sector does among the least damage to the water and air supply. At the same time, manufacturers within this sector likely benefit from environmental matters more than most other manufacturers. Precision optical instrument technology satisfies increased standards of environmental monitoring. Moreover, there will be increased demand for certain instrumentation that performs chemical and other ecological analyses. Photographic equipment manufacturers will also benefit as the demand for atmospheric photographic analysis is bound to increase.

## OUTLOOK

It is clear that the recession hit hard in 1993 and it was only in late 1994 that the earliest signs of recovery emerged. Indeed, conditions would have been far worse had it not been for relatively healthy export markets. The extent to which the next few years bring prosperity or mere survival to this sector will, in large measure, depend on the extent to which manufacturers are willing to acknowledge the competitive pressures from abroad. It seems clear that, in certain markets, the EU manufacturers cannot compete adequately with manufacturers from relatively low-wage developing nations. Such is particularly true within the photographic equipment context where an insidious price war inflicted significant harm on the EU manufacturing scheme. Asset migration, product differentiation, and enhanced levels of research and development will all be key to the EU's future within the sector of optical instruments and photographic equipment. Moreover, opportunities within developing economies in such areas as the Pacific Rim and South America will not only provide EU manufacturers with cheaper labour, but also new export markets as well.

Written by: DRI Europe

The industry is represented at the EU level by: European Federation of Precision, Mechanical and Optical Industries, Ophthalmic Optics (EUROM I), Optics, Laser and Laboratory Instrumentation (EUROM II) and Photographic and Video Technology (EUROM III). Address: Kirchweg 2, D-50858 Köln; tel: (49 221) 94 86 280; fax: (49 221) 48 34 28.

# Clocks and watches

## NACE 374

The clocks and watches industry has experienced difficult times since the early 1980s. Competition from non-EU producers has increased rapidly, causing a deteriorating trade balance. In addition, the sector was recently hit by a severe drop in demand, linked to the general economic downturn. Prospects in the medium term are more favourable and the industry will return to a modest, but positive growth path, with the upturn in general economic activity. EU manufacturers will also benefit from increased demand from developing countries such as China. The industry will, nevertheless, continue to face intensifying competition, which will not only hamper trade performance, but will also reduce manufacturers' profit margins.

### INDUSTRY PROFILE

#### Description of the sector

The clocks and watches industry includes watches, instrument panel clocks, clocks, control apparatus and timing devices using clock-work or synchronous motors and time switches, as well as clock and watch movements. The sector includes mechanical, electrical and electronic watches. The industry addresses demand from final consumers through domestic applications and investment demand through technical applications.

The sub-sector of clocks and watches is the smallest among the EU's instrument engineering industry. In 1993, it represented only 5 % of the sector's output and 6 % of its total workforce.

#### Recent trends

During the 1980s the clocks and watches industry expanded significantly slower than the manufacturing industry as a whole. However, since 1990, hit by the simultaneous occurrence of increasing competition and the economic recession that hit the sector's customers, production in current prices has decreased by 28 % to 1.2 billion ECU in 1993. This downturn is also reflected in employment trends. The workforce in the clocks and watches sector has fallen, on average, by 5.1 % per annum from 1984 to 1993. Other important reasons for the fall in employment levels are the de-localisation of manpower towards low-wage countries, and the technological progress which has considerably automated the production process in the sector.

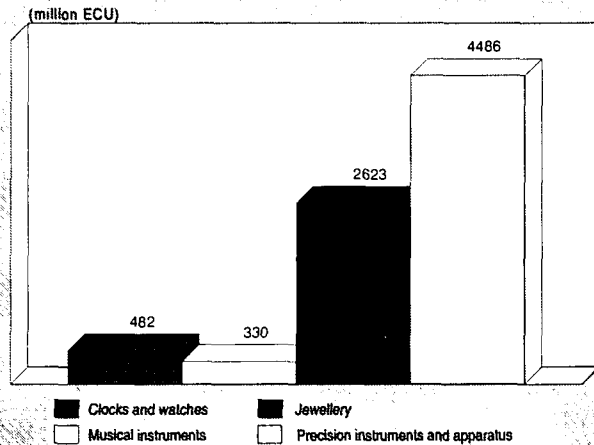
In 1993, consumption fell by 8 % in real terms, and output was down 17 % from 1992. As a result, employment in the sector shrank significantly to 15 700 employees, a 13.7 % drop from the year before.

Production has not followed the same pattern as consumption because an increasing share of production is outsourced. Extra-EU imports have grown by 93 % from 1984 to 1993, especially from East and South East Asia, as low labour costs attracted assembly of clocks and watches in these countries. A deteriorating EU trade deficit, 1.6 billion ECU in 1993 compared to 764 million ECU in 1984, reflects the significant outsourcing activity and the increasing penetration of products originating in South East Asia.

#### International comparison

An examination of the geographical breakdown of clocks and watches production shows an overwhelming dominance by Japan. The Japanese industry posts a production value of about six times that of the EU, and five times that of the USA.

Figure 1: Clocks and watches  
Value added in comparison with related industries, 1993

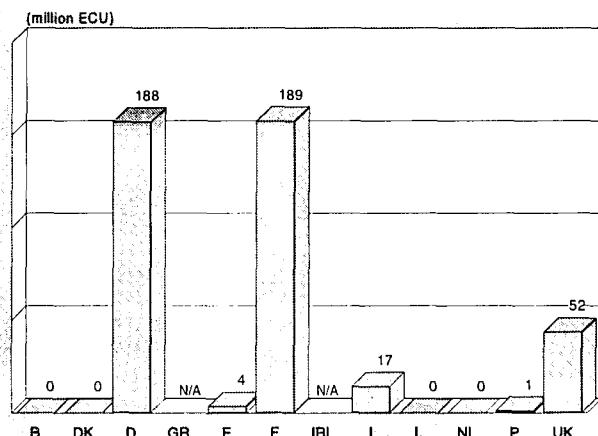


Source: DEBA

Japan has managed a 41 % increase in production value since 1984, while both the EU and USA have seen their share of world production drop. In 1993 Japan had a 73 % share of the Triad's output compared to a 64 % share in 1984. However, if we consider the whole European clocks and watches industry (i.e. including Switzerland), the dominance of Japan at world level is considerably reduced.

At the world level, Japan remains the leading producer of clocks and watches (in volume terms) with 41 % of the world's output, while Hong Kong ranks second followed by Switzerland. In value terms, however, the world ranking of top clocks and watches producers differs significantly, reflecting important differences in country specialisation. Indeed, Switzerland produces by far the largest share of the world's production value, with a 55 % share. Japan only has a 22 % share, while Hong Kong has 9 % of the world's value of production. This evidences the specialisation of Switzerland in high quality mechanical watches. In contrast, Japan and Hong-Kong are important producers of electronic watches in the low price

Figure 2: Clocks and watches  
Value added by Member State, 1993



Source: DEBA

**Table 1: Clocks and watches**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	2 029	2 640	2 842	3 109	3 181	3 128	2 880	2 864	2 900	2 900	2 900
Production	1 265	1 454	1 512	1 651	1 498	1 434	1 189	1 146	1 100	1 000	1 000
Extra-EU exports	670	876	958	972	941	996	1 073	1 199	1 300	1 400	1 500
Trade balance	-764	-1 187	-1 331	-1 457	-1 684	-1 694	-1 691	-1 718	-1 800	-1 900	-1 900
Employment (thousands)	25.7	22.4	22.0	21.2	19.4	18.2	15.7	15.1	14.0	12.0	11.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Clocks and watches**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.76	1.42	3.26	-14.01
Production	0.90	-7.92	-3.12	-18.23
Extra-EU exports	13.87	6.92	10.72	11.29
Extra-EU imports	11.99	8.76	10.55	-3.99

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Clocks and watches**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	670	754	754	733	876	958	972	941	996	1 073	1 199
Extra-EU imports	1 433	1 502	1 712	1 719	2 062	2 289	2 429	2 624	2 690	2 765	2 917
Trade balance	-764	-749	-958	-986	-1 187	-1 331	-1 457	-1 684	-1 694	-1 691	-1 718
Ratio exports / imports	0.47	0.50	0.44	0.43	0.42	0.42	0.40	0.36	0.37	0.39	0.41
Terms of trade index	126.1	132.1	129.9	145.3	131.7	104.0	100.0	104.7	114.2	103.3	N/A

Source: DEBA

**Table 4: Clocks and watches**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	73.8	77.2	81.1	84.0	87.6	90.1	100.0	97.0	95.9	91.0
Unit labour costs index (3)	97.3	98.4	101.2	109.8	103.0	104.1	100.0	108.5	116.1	127.9
Total unit costs index (4)	85.2	89.8	93.0	95.6	95.5	97.8	100.0	103.4	104.7	109.1
Gross operating rate (%) (5)	8.28	7.74	6.76	5.63	8.97	7.31	7.11	7.10	7.74	5.64

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

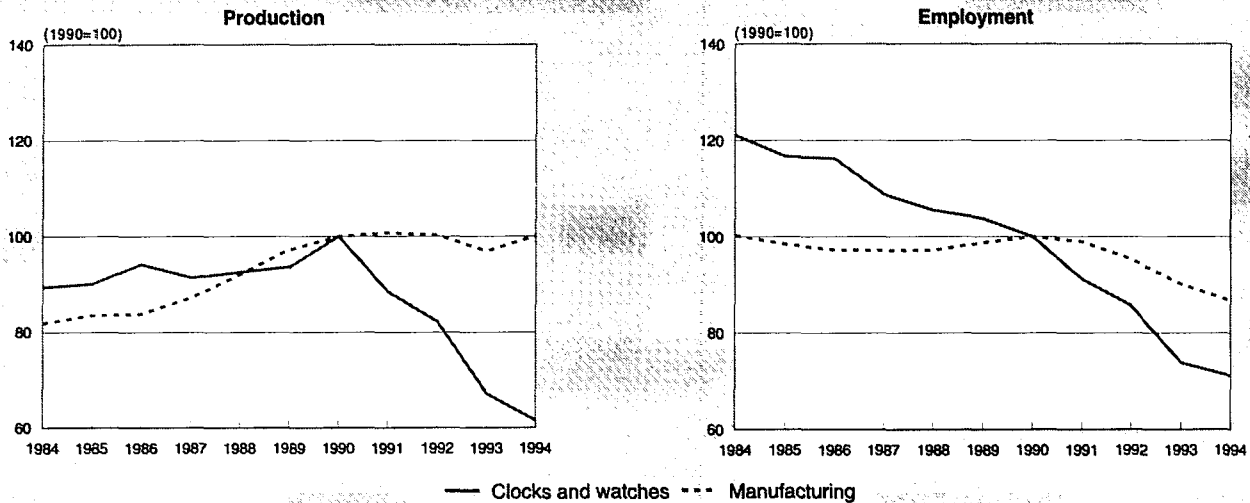
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Clocks and watches**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

segment. EU producers are well positioned in the traditional field of mid-range watches.

**Foreign trade**

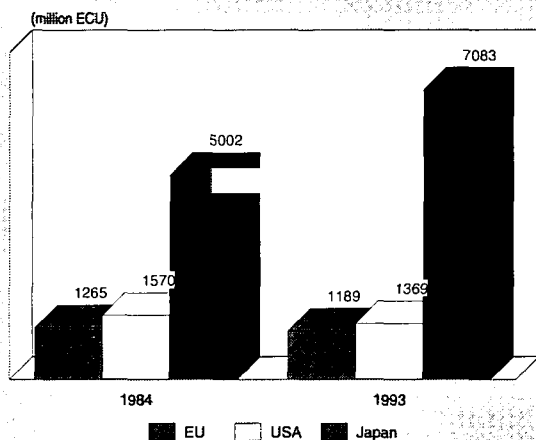
The EU clocks and watches industry is very open to trade. EU manufacturers exported as much as 90 % of their production in 1993, while imports accounted for 96 % of consumption. This important trade orientation is the result of two factors. First, it results from the relocation strategy implemented by the major clocks and watches producers aimed at outsourcing part of the production process to lower cost countries. This often translates into outward processing trade, which consists of exporting pieces of EU origin to the far East, to be assembled and re-imported as finished products into the EU. This process may be granted special quota and tariff conditions. Second, EU trade openness results from growing competition from lower cost countries, mainly due to wage differences. This competition was mirrored in growing

imports in the low and medium-price and quality segments of the market.

Between 1984 and 1993, both extra-EU exports and imports of clocks and watches nearly doubled. In 1993, imports represented 2.8 billion ECU, or 96 % of EU's consumption against 70.6 % in 1984.

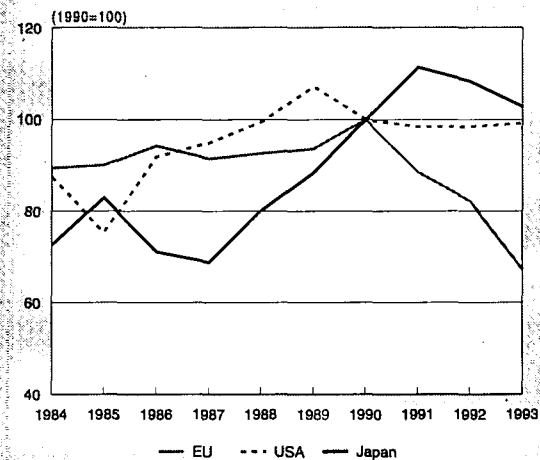
EU exports of clocks and watches are mainly oriented towards Switzerland, Hong Kong and the USA. The main countries of origin for extra-EU imports are: Switzerland, whose share in total extra-EU imports is above 50 %, Hong Kong (15.8 %) and Japan (10.9 %). China, which benefits from a significant wage cost advantage, has seen its share of the EU market increase from 4.5 % in 1988 to almost 10 % in 1993.

**Figure 4: Clocks and watches**  
**International comparison of production in current prices**



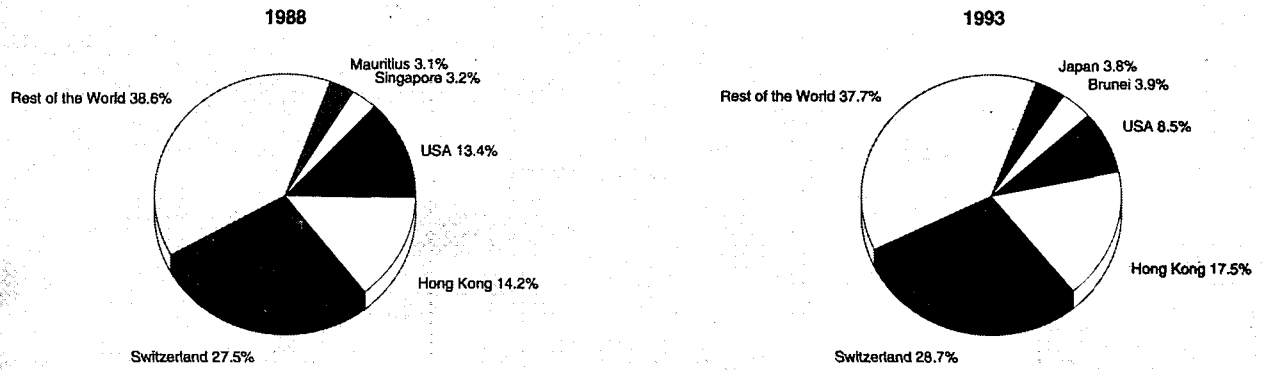
Source: DEBA

**Figure 5: Clocks and watches**  
**international comparison of production in constant prices**



Source: DEBA

**Figure 6: Clocks and watches  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

A large portion of the clocks and watches industry is exclusively consumer-oriented and highly dependent on fashion trends. Technological content has lost importance as the same technologies have been in use for several decades, leaving design as the major factor influencing consumer choice. In recent years however, the introduction of new technologies such as solar radio watches has prompted renewed interest in some countries (e.g. Germany) for the products' technological content from the consumers' point of view.

Being consumer oriented, the sector is also influenced by trends in final expenditures. This feature was reflected in the recent downturn of EU apparent consumption of clocks and watches, which followed shrinking household expenditures of the past three years.

Another important segment of the industry is oriented towards technical applications through the production of time meters and triggers. Activity in this segment is dependent upon investment trends from industry customers, which also followed a declining trend over the past three year period.

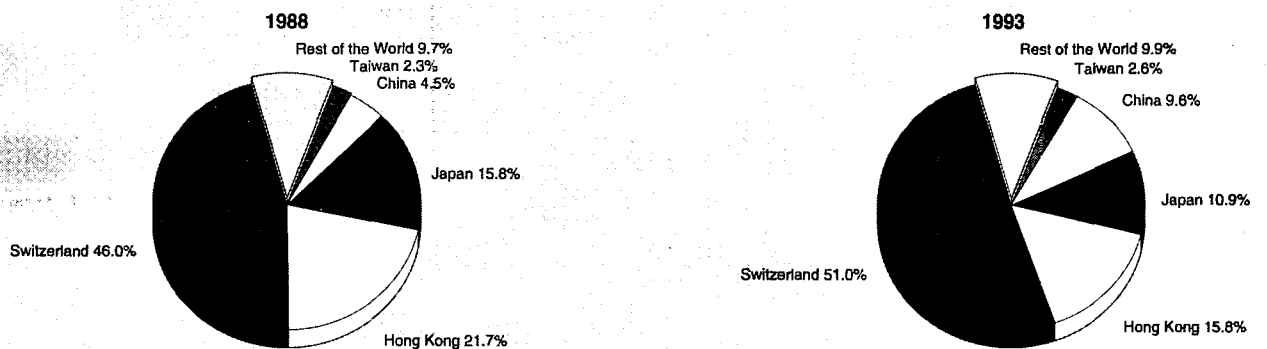
Over the long run, however, demand for clocks and watches has benefited from increasing affluence among consumers, in line with improving standards of living, personal disposable income, and demographic factors. The ageing of the population is, in particular, an important factor explaining demand for such discretionary goods. The population group between 45 and 55 years is considered to have the highest purchasing power in the total population. This group, which tends to buy higher quality clocks and watches, has seen its share in Europe's total population significantly increase, offering growing market opportunities to the industry.

### Supply and competition

EU manufacturers mainly operate in the field of mid-range watches. They face stiff competition from China, Hong Kong and Japan on low-end electronic watches, and from Switzerland on top-of-the-line mechanical watches.

EU manufacturers are not able to compete on price with electronic watches originating in the East Asian NICs, which not only enjoy lower labour costs but also benefit from the availability of components necessary to the production of electronic movements. However, EU manufacturers can count on their

**Figure 7: Clocks and watches  
Origin of EU imports**



Source: Eurostat

strong competitive edge in design and fashion. Furthermore, the production of components (especially cases and straps) by EU firms is still very important at international level.

Switzerland has also emerged recently as a formidable competitor in the field of mid-range products, thanks to the outstanding success of the Swatch watch. This development is partially linked to the different industrial structure of the Swiss industry. Whereas EU producers are usually small to medium-sized, Swiss manufacturers are of international size, enabling them to benefit from economies of scale and implementation of formidable marketing and sales strategies.

Prices are bound to decline as competition is expected to intensify. This will add pressure to EU companies' profitability, already severely dampened by the recent downturn in activity.

### Production process

EU clocks and watches manufacturers have to operate in a highly labour intensive environment; although recent technological innovations have somewhat alleviated this feature. This, along with growing import competition from lower cost countries, has forced EU firms to relocate part of their production process outside of European borders. International subcontracting, sometimes under the form of outward processing trade, has considerably expanded in recent years.

Besides these strategic moves, EU companies have sought to streamline production costs and to increase productivity. A substitution process of capital equipment for labour has thus been taking place, leading to an important decline in employment levels.

## INDUSTRY STRUCTURE

### Companies

The clocks and watches industry is composed of a large number of small and medium-sized firms. A large portion of these small companies operate as subcontractors for large producers and are highly specialised in narrowly defined areas. Many firms have a local and family background from which some have expanded to become large multinational companies. For the most part though, SMEs in the sector operate on a local basis.

Large companies are mainly involved in the production of case and movement components. The major producers in the EU are: Junghans, Dufa-Kienzle and Kundo Staiger in Germany; Ambra, Vedette Industries, Fralsen, Isa Quartz and France Ebauches in France.

### Strategies

To meet the challenges of increasing competition, EU clocks and watches manufacturers have implemented a set of strategies: investment, research and development, cooperation, concentration, and relocation. Investment activities have shown an upward trend, with the main motive for companies being to retain their share of the market by renewing production lines and increasing productivity. Another important strategy has consisted of making large investments in low labour cost countries by establishing subsidiaries or acquiring production units, in order to streamline production costs. At the same time, EU based firms have increasingly been involved in outsourcing activities to low labour cost countries.

In order to strengthen their EU market position and to reach a critical size, a number of EU firms are being forced to regroup. This concentration movement has actually accelerated in recent years as a result of increasing competition within EU borders and tough market conditions.

Innovation in new technologies and production design is also seen as a crucial competitive factor by EU producers, and has focused important efforts in research and development.

### Impact of the Single Market

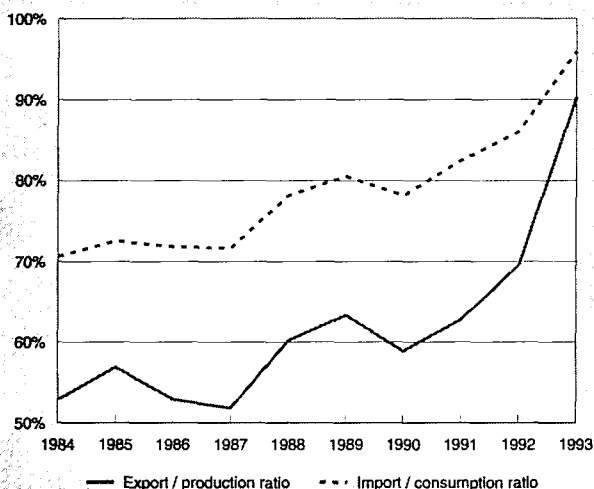
The advent of the common market in 1993 did not drastically change the landscape for the industry in the EU, since most of the firms were already operating internationally. However, it has allowed the EU companies to increase their competitiveness, even though it is too early to formulate definitive judgements about the total impact on the sector. The elimination of non-tariff barriers to trade has facilitated trade, while efforts towards technical harmonisation have led to considerable positive effects by allowing companies to benefit from economies of scale. Moreover, the establishment of the European legislation on counterfeiting has contributed to reduce significantly the flow of imitation watches from some Asian countries, while common research programmes have played an important role in the industry. Besides, the inception of the Internal Market has led some companies from outside the Community (mainly, Japanese and Swiss) to invest in the EU. This has allowed some EU companies to prosper with foreign capital. In the future, a simplification of the regulatory framework in the area of consumer and environment protection seem to be a priority for EU companies.

## REGIONAL DISTRIBUTION

Production of clocks and watches is concentrated in four EU Member States. France and Germany take the lion's share of EU production, with a 42 % share of output each. With a 12 % share, the United Kingdom hosts a number of manufacturers, while Italy accounts for about 4 % of output.

Furthermore, EU production of clocks and watches is very concentrated in particular regions. For example, the largest producing region in France is by far Franche Comté, with over 74 % of France's turnover and 72 % of employment in 1993. An important horological cluster has existed in this region for decades, which is closely linked to the region's traditions and history. Moreover, activity has benefited from close proximity to the Swiss clocks and watches industry, with which it has developed trans-border links.

Figure 8: Clocks and watches Trade intensities



Source: DEBA

**Table 5: Clocks and watches  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.00	0.00
Danmark	0.00	0.00
BR Deutschland	1.49	1.25
Hellas	N/A	N/A
España	0.17	0.18
France	1.93	2.21
Ireland	N/A	N/A
Italia	0.56	0.31
Luxembourg	0.00	0.00
Nederland	0.00	0.00
Portugal	0.00	0.18
United Kingdom	0.41	0.57

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## ENVIRONMENT

Environmental concerns are of minor importance for the clocks and watches industry. The only issues that affect the industry concern disposal of the small nickel-cadmium batteries used to power electrical and electronic time pieces, and the use of nickel in cases. Particularly in the latter case, the substitution of nickel in steel alloys is proving to be a real problem for the industry.

## REGULATIONS

Trade restrictions are relatively absent in the sector. However, an important matter for the EU clocks and watches industry is the progress towards proposed EU Directive (93/C 318/06 amended by 94/C 209/04) for the harmonisation and free movement of precious metal articles. The Directive addresses harmonisation of standards which would replace existing national provisions and would require Member States to comply with "fineness" conformity attestation procedures beginning 1 January 1997.

During 1993, the European Commission adopted a regulation about Community trade mark and has worked out a proposal dealing with the problem of Community design. These two instruments bring about significant simplification to the rules of intellectual property registration. The fight against counterfeiting is of particular importance for the EU clocks and watches industry, which must also face the problem of false indications of origin on watches manufactured in the Far East.

## OUTLOOK

Intensifying competition from outside the EU will continue to dampen EU production of clocks and watches and will further hamper the sector's trade performance. In light of such a competitive climate, EU producers will need to continually reduce their production costs and increase their efforts in terms of product innovation.

Positive signs are coming from the market, however. As the European Union is gradually turning the corner from the economic recession, demand will slowly recover, while a huge market potential is offered by some developing countries like China. However, at the moment the custom duties for clocks and watches to enter the Chinese market are about 70 %, which constitutes a serious restriction to EU exports: the exploitation of the market potential in China is strictly linked to the lifting of such obstacles.

Written by: DRI Europe

The industry is represented at the EU level by: Permanent Committee of European Watch and Clock Makers Secretariat (CPHE): c/o Fédération de l'Industrie Horlogère Suisse. Address: Rue d'Argent 6, CH-2501 Bienne; tel: (41 32) 28 08 28; fax: (41 32) 28 08 80.







Overview

NACE 41

The food, drink and tobacco sector has reached an advanced level of saturation of demand, and growth does not exceed 2 % p.a. Accordingly, this has determined a constant internal production, also distinguished by rather low rates of growth. With regard to foreign trade, the EU is extremely active in both internal and external trade. The trade balance is positive, and the level of imports in value terms is about 30 % lower than that of exports.

As for consumption, two main trends are recognisable which affect most of the sector: the health trend and the shift towards ready-to-use products. The distribution structure, more oriented towards large distribution networks, shows a drop in sales due to the ever more significant presence of discount stores and low-price retail outlets.

A certain imbalance exists between the industrial structure and market structure of the sector. The former is somewhat fragmented, and 90 % of enterprises employ less than 20 workers; the latter is rather concentrated, with a limited number of large enterprises (i.e. with more than 100 employees), which account for over half the turnover of the industry as a whole. The country with the biggest industrial concentration is the United Kingdom which boasts over half of the ten most important EU companies, some of which are also ranked high at the world level. Acquisitions still represent the main external growth strategy for companies which tend towards consolidation of their respective positions on domestic markets and an increase of market outlets outside the EU.

INDUSTRY PROFILE

Description of the sector

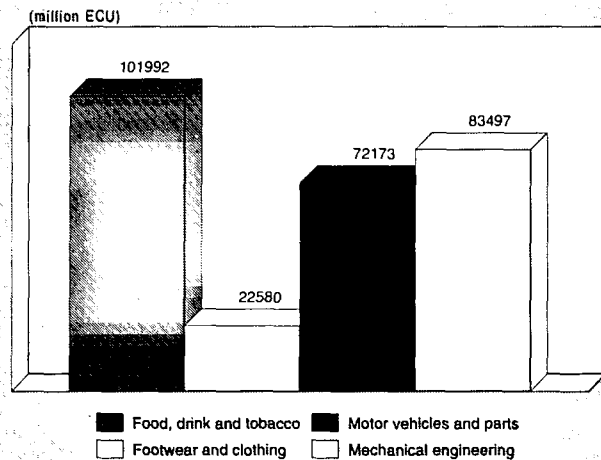
The food, drink and tobacco sector includes all processing activities involving food, drink and tobacco. Besides consumption as the final product, many outputs in the sector are utilised as intermediate products in other manufacturing industries (not necessarily food industries). Included in this group are oils and fats, flours, sugar, ethyl alcohol, etc.

The economic importance of this sector is considerable, especially compared to other manufacturing industries: in terms of value added, the food, drink and tobacco industry attains figures approximately equal to those of the transport and chemical industries, which in modern economies are expressions of the degree of development achieved. Unlike those sectors, however, the food sector has the advantage of having an anti-cyclical nature.

The member countries which contribute most to the formation of value added are Germany, the United Kingdom, France, Spain and Italy. The first three present a higher level of industrial concentration and the highest inclination towards the use of advanced production techniques because there is a greater demand for products with a strong value added content; the other two have more fragmented economies, with strong production traditions and consumer preferences for fresh, non-industrial products.

Over the last ten years, nearly all countries have undergone a restructuring process, aimed at increasing productive efficiency and lowering production costs. This has led to a progressive replacement of labour with capital-intensive

Figure 1: Food, drink and tobacco Value added in comparison with related Industries, 1993



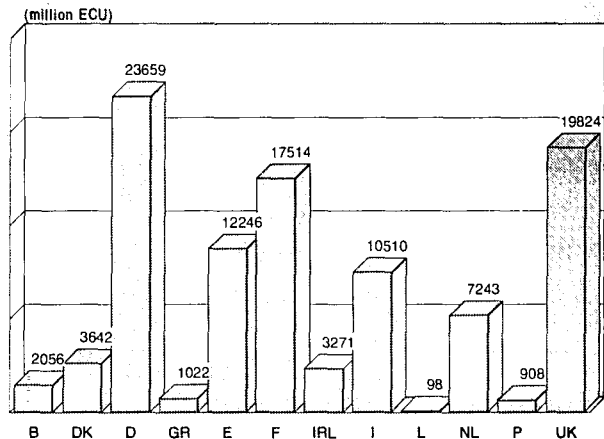
Source: DEBA

production techniques, especially in the less diversified sectors like sugar, the grinding of seeds for oil and grain milling.

The process of rationalisation also has affected distribution companies in numerous EU countries, especially Germany. This was necessary for several reasons, but above all was the unfavourable economic situation, which has greatly increased the importance of price variables in purchasing, thus boosting the degree of competitiveness and leading to the drop in demand for consumer goods. German and French enterprises maintain their absolute leadership in terms of sales, while some UK and Belgian companies show a drop in sales and profitability.

Despite the evolution towards more uniform models within the EU, differences continue to exist among the Member States

Figure 2: Food, drink and tobacco Value added by Member State, 1993



Source: DEBA



**Table 1: Food, drink and tobacco**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	324 781	361 178	391 853	415 572	441 849	449 326	448 944	463 346	481 000	500 000	519 400
Production	327 105	363 601	396 814	420 515	447 257	455 926	457 830	472 239	490 600	510 200	530 400
Extra-EU exports	23 745	21 477	25 068	24 860	26 099	27 908	30 758	33 309	35 200	36 900	38 600
Trade balance	2 324	2 423	4 962	4 943	5 408	6 601	8 886	8 893	9 600	10 200	11 000
Employment (thousands)	2 472	2 382	2 409	2 451	2 468	2 406	2 357	2 331	2 330	2 330	2 320

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Food, drink and tobacco**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Dairy products	68 416	71 692	4 107
Processing of fishery products	11 220	9 007	787
Meat	79 415	79 675	4 244
Alcohol and spirits	9 975	13 487	3 914

(1) Apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Food, drink and tobacco**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.21	2.35	2.27	1.07
Production	2.23	2.27	2.25	0.94
Extra-EU exports	-0.02	-0.55	-0.26	-3.21
Extra-EU imports	-0.97	0.34	-0.39	-1.32

(1) Some country data for apparent consumption and production have been estimated.

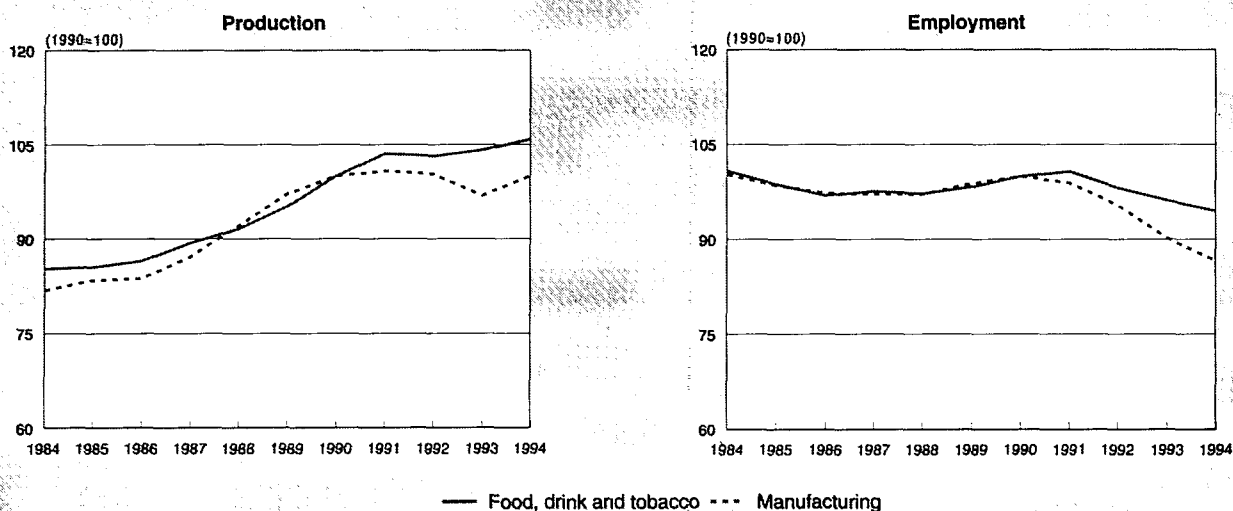
Source: DEBA

**Table 4: Food, drink and tobacco**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	23 745	24 672	20 701	20 305	21 477	25 068	24 860	26 099	27 908	30 758	34 249
Extra-EU imports	21 421	21 180	17 880	17 266	19 054	20 106	19 917	20 691	21 308	21 873	24 480
Trade balance	2 324	3 492	2 821	3 039	2 423	4 962	4 943	5 408	6 601	8 886	9 769
Ratio exports / imports	1.11	1.16	1.16	1.18	1.13	1.25	1.25	1.26	1.31	1.41	1.40
Terms of trade index	92.5	98.9	94.8	95.8	89.7	99.2	100.0	102.1	105.9	116.0	N/A

Source: DEBA

**Figure 3: Food, drink and tobacco  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

in the shares of products consumed. In northern European countries the consumption of meat is high compared to the southern countries. In the southern countries, the second most important sector in terms of consumption is fruit and vegetables, while in the northern countries it is cereals and cheese.

**Recent trends**

In 1993, the main indicators in the food sector at current prices showed values similar to those of previous years, following the slowdown in many sectors of the industry. As regards employment figures, these went down throughout the ten-year period except in 1989-91. This drop was steeper after 1992. The balance of trade, on the contrary, was extremely favourable and on the upgrade, thanks to a greater increase of exports to, over imports from third countries.

The sectors that contributed most to production, apparent consumption and exports are meat, dairy products, alcoholic drinks, fish and tobacco. Meat accounts for 18 % of EU internal demand followed by dairy products (about 15 %). With

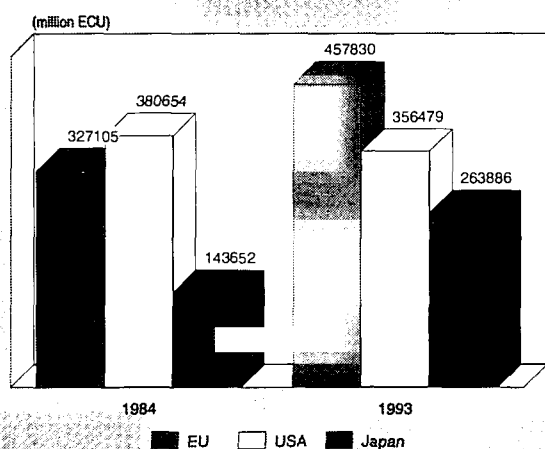
regard to available internal supply, the same proportions apply for both sectors.

With regard to foreign demand, the most requested products are meat, followed closely by dairy products and alcoholic beverages, which both reach more or less the same levels. As far as foreign trade is concerned, though altogether inflow beats outflow, there are some sectors where the balance of trade is in the red, e.g. oils and fats, and meat.

At constant values, growth rates during 1993 were fairly low both in terms of production and apparent consumption. Meanwhile, foreign trade was substantially negative, especially as regards exports to third countries.

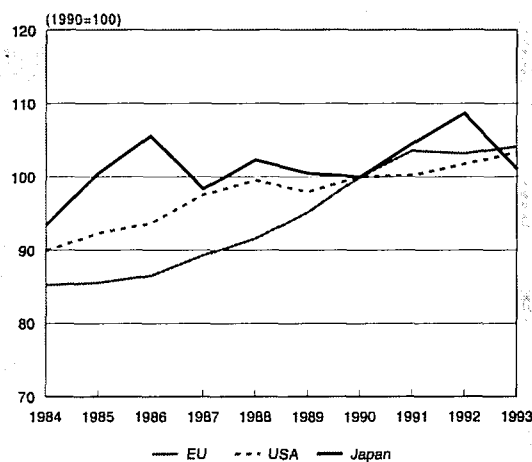
Considering the entire ten-year period, the food sector recorded an internal growth equal to about 2 %, showing that large growth margins no longer exist. The relative pattern of foreign trade showed little growth, and as mentioned above, things worsened during 1993.

**Figure 4: Food, drink and tobacco  
International comparison of production in current prices**



Source: DEBA

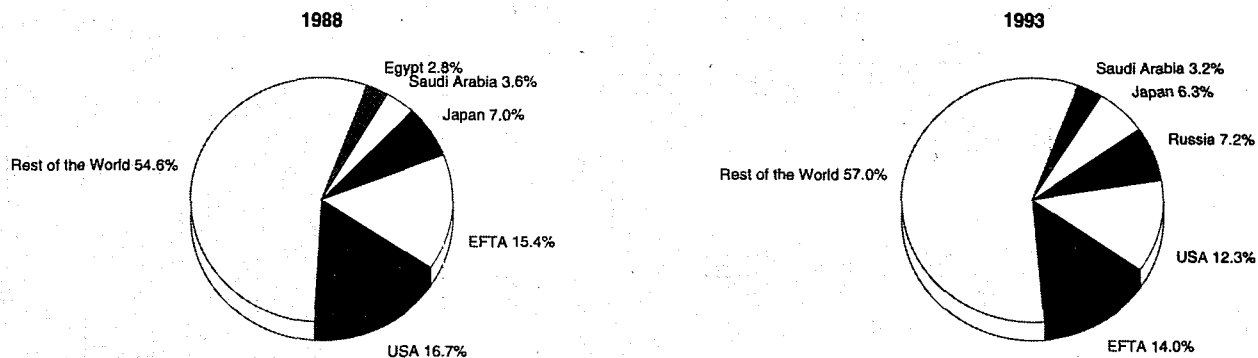
**Figure 5: Food, drink and tobacco  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Food, drink and tobacco  
Destination of EU exports**



Source: Eurostat

### International comparison

In the ten years up through 1993, there was strong growth in the food, drink and tobacco sector of the EU; greater in fact than that of the USA and Japan. While there was a drop in production in the USA in 1989, in Japan the trend was positive, but not as big as that of the EU. In 1993, the EU was the number one world producer of food products in terms of value, followed by the USA and Japan.

In Japan, which traditionally has been "closed" to EU producers, a change in eating habits more like those of Europe has taken place over the last twenty years: while rice, fish and greens still dominate in Japanese diets, meat and dairy products have gained ground in recent years. Ready-made meals also have had some success, as a result of more women going out of the home to work. In the USA on the other hand, there has been a recent drop in the demand for low-fat content products and a return to fatty foods. As a result, the demand for dairy products and dressings has risen.

The structure of food distribution in Japan is more like that of Europe than the USA, given the great fragmentation of retail outlets. Most of the major Japanese distribution com-

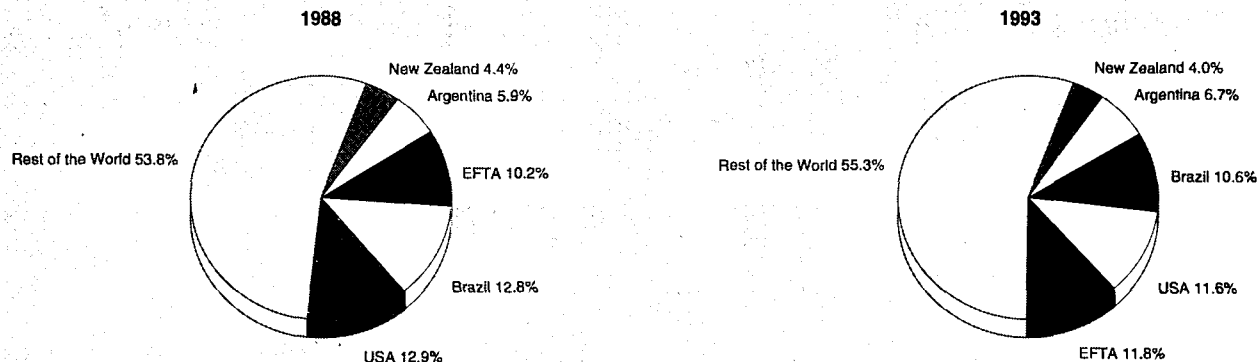
panies have met with drops in sales and profitability, although in terms of market shares, their positions have not changed.

In the USA, there was a generalised drop in profitability in 1993, due to the economic recession, a slowdown in demand for consumer goods and a generally more competitive situation. Some enterprises in the sector which were operating in the red, reacted by restructuring sales networks, selling a number of trademarks, closing down less profitable retail outlets and reducing their number of employees. The major US companies, after consolidating their positions at home, are now widening their presence in Europe.

### Foreign trade

The balance of trade in the sector, though remaining favourable for the entire period under consideration, has slowly improved, thanks to an increase in exports over imports. Some countries, however, show an extremely unfavourable balance of payments, e.g. Germany, Italy and the United Kingdom; the Netherlands, France and Denmark on the other hand have very favourable balances of payments. The export/import ratio shows EU inflow to be greater than outflow, but their rates of growth are quite similar. Furthermore, prices of the former tend to grow more than those of the latter.

**Figure 7: Food, drink and tobacco  
Origin of EU imports**



Source: Eurostat

**Table 5: Food, drink and tobacco  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	84.5	86.7	89.2	91.5	94.3	96.9	100.0	102.9	105.1	108.3
Unit labour costs index (3)	89.1	92.3	92.8	93.7	95.2	97.8	100.0	104.9	108.4	107.2
Total unit costs index (4)	92.0	94.2	92.3	90.7	93.9	99.3	100.0	102.7	105.0	104.1
Gross operating rate (%) (5)	7.24	7.49	8.08	8.57	8.70	8.52	8.74	8.61	8.49	8.71

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

The main EU partners are the USA and South American countries, e.g. Brazil and Argentina, from which the EU imports mainly meat and fruits and vegetables. The markets on which the EU is focusing the greatest attention are those of south-east Asia and Eastern Europe, where a low level of development and low degree of penetration exist.

As it is favoured by the elimination of customs barriers, trade between EU countries is fairly strong. In fact, it is higher than that towards third countries.

## MARKET FORCES

### Demand

The demand for products belonging to the food, drink and tobacco sector has reached an advanced stage of development and growth is slow. In terms of composition and levels of expenditure for this type of product, strong differences exist between the various countries. In the countries of Southern Europe, demand centres mainly on fresh products, with less service and innovation content. In the northern countries, on the other hand, ready-made meals and innovative products are more popular; exceptions are southern France and Italy which, though Mediterranean regions, are more inclined to follow typically northern consumption models.

Two main trends affect most subsectors of the food, drink and tobacco industry: health priorities, with a preference for

low-residue, high nutritional value, low-calorie and low-fat foods; and a tendency towards ready-made meals that are immediately available for consumption, of high quality and good tasting. Such trends have led consumers to focus on natural and ecological products, and, at the same time, to introduce increasing quantities of ready-made meals into their daily diets. The effects of these trends also can be seen in the drink sector; alcoholic drinks (including beer), and, to some extent, coffee, are experiencing a drop in demand, with a preference being given to mineral waters or soft drinks. Meanwhile, ready-to-drink beverages like tea - often aromatised with various flavours - and fruit juices are widening their market.

In terms of distribution, the food, drink and tobacco sector is undergoing significant changes. The number of discount stores is rising quickly. These attract customers with non-perishable and liquid goods, while consumers continue to turn to the large distribution networks for fresh products.

### Supply and competition

The labour productivity index continues to rise slowly, given the small increase in production and the substantial balance of the employment aggregate. Labour costs also have tended to go up in line with productivity. Over the last ten years, the food sector has undergone a process of industrial conversion towards more automated structures with greater use of capital assets, often in place of manual labour. This process is part of a restructuring project aimed at increasing production efficiency. The sectors most involved in this trend are those which produce undifferentiated commodities and where cost-inefficiency would weigh heavily on the final price of goods. France and the United Kingdom show a higher productivity per worker than do Spain and Germany.

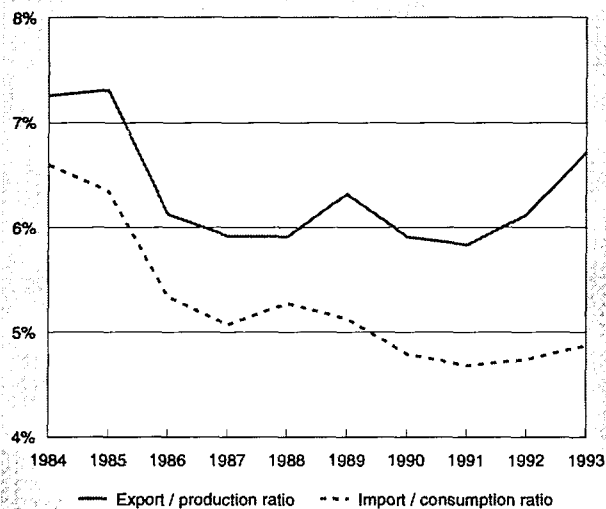
Going along with their penetration onto the markets of Eastern Europe and Asia, EU enterprises are also trying to make headway in Japan, in an effort to capitalise on the growing similarity between their eating habits. However, strong entry barriers still exist in this country, demarcated by specific protectionist measures and by the trade structure.

### Production process

The tendency to use labour-saving production techniques and the rationalisation of production resources are factors common to many EU enterprises. In the United Kingdom, where such objectives seem to be pursued with greater tenacity, the amount of money spent on R&D in 1993 totalled 747.4 million ECU. Unilever accounted for 84 % of this figure, while the other groups, though having paid out much less, considerably increased this expense item compared to the previous year. For example, Tate & Lyle increased investments in R&D by 88 % and Devro International by 53 %.

On the international scenario, Unilever still heads the list of companies with greatest R&D expenditure, followed by Nestlé

**Figure 8: Food, drink and tobacco  
Trade Intensities**



Source: DEBA

**Table 6: Food, drink and tobacco  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	233 280	92.2	29.5	12.2
20-99 employees	15 458	6.1	19.2	20.2
100 or more employees	4 213	1.7	51.3	67.6

(1) Estimates.  
Source: Eurostat "Enterprises in Europe"

and Philip Morris. Another EU enterprise which made strong investments in 1993 was Ferruzzi which, despite a negative growth rate compared to 1992, spent nearly 3 % of its sales figures on R&D.

## INDUSTRY STRUCTURE

### Companies

In 1990, over 90 % of the enterprises within the EU had a work force of less than 20 and 6 % had between 20 and 99, while less than 2 % had 100 or more employees. These data show that the industrial structure of the food, drink and tobacco sector is highly fragmented into numerous small firms, often of a semi-industrial nature. Because of their small size, overall turnover reaches only 12 %. The medium-sized firms, which represent 6 % of EU enterprises, account for 20 % of the overall turnover. Meanwhile, the larger companies, including the multinationals, account for a 67 % share of overall turnover.

The most important companies in terms of turnover and employment are located in the United Kingdom: of the top ten EU companies, seven are British.

Strong industrial concentration is not accompanied by any sharp production specialisation: in fact, the production specialisation ratio achieves its highest values in countries where the industrial structure is not particularly developed, like Ireland, Denmark and Greece, and is lower in Germany, Italy and the United Kingdom.

### Strategies

There were 82 acquisitions in the food, drink and tobacco sector in 1993 and 62 in 1994. Of these 144 acquisitions, 113 were made by EU enterprises. The role of UK companies was particularly prominent, accounting for 53 % of all acquisitions. The groups responsible for the largest number of

acquisitions were Tesco, Albert Fisher Group, Allied-Lyons, Matthew Clark Bros. (all in the UK), Ahold in the Netherlands and Fyffer in France.

Three trends are evident from the data on acquisitions. First, the majority of acquisitions are carried out by distribution groups looking to strengthen their presence in the sector. The second is that the acquisitions of distribution firms respond to a strategy of downstream integration promoted by industrial groups, while the acquisitions of manufacturing companies by distribution groups are rare. The third tendency is that nearly all acquisitions made by bidders of EU countries show a preference for enterprises from their country or at least which belong to the EU or EFTA. In other words, such acquisitions are aimed at consolidating a company's presence on European, if not domestic, markets.

With regard to distribution, the importance of large, organised networks has increased considerably over time, especially in the countries of southern Europe where distribution models are more fragmented and backward than those of the northern European countries. More and more, the smaller firms are tending to work as subcontractors for large distributors.

Two main organisation models outside of the less clear-cut national organisations can be identified: one in the Anglo-Saxon countries and one in France. The first is distinguished by fast growing profits - thanks to a large share of private labels - a less-keen competitive atmosphere, high-quality service and an efficient organisational structure in terms of logistics. Furthermore, labour costs are somewhat lower compared to other European countries and there is a greater capacity for self-financing.

The French model is distinguished by smaller profit margins, pushed down by lower prices as a result of more aggressive competition, which has tended to diminish brand value. The cost of labour has a 73 % bearing on value added, which is

**Table 7: Food, drink and tobacco  
The ten largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Unilever	UK / NL	35 734	3 350	294.0
B.A.T. Industries	UK	18 897	2 611	88.4
Ferruzzi Finanziaria	I	12 394	1 494	41.4
Groupe Danone	F	10 589	1 589	56.4
Grand Metropolitan	UK	10 295	1 308	87.2
Eridania Beghin-Say	F	7 689	712	24.2
Allied-Lyons	UK	6 254	1 181	71.8
Associated British Foods	UK	5 561	521	50.0
Hillsdown Holdings	UK	5 366	344	43.3
Cadbury Schweppes	UK	4 803	780	39.1
Share in EU total (%)		23.8	32.3	33.8

Source: DABLE, DEBA



**Table 8: Food, drink and tobacco  
Main acquisitions in food distribution**

Areas (per bidder)	Food & distribution (1)		Distribution (2)	
	1993	1994	1993	1994
European Union	19	9	39	32
Other Western Europe	2	1	3	0
North America	3	2	7	2

(1) Acquisition of distributor by food company or vice versa.

(2) Acquisition of distributor by distributor.

Source: Nomisma

rather weak. Consequently, the capacity for self-financing is penalised.

In recent years, the level of competition between the different forms of distribution within the EU has been affected by the increase in the number of discount stores, especially in the countries of northern Europe. UK trade is showing the first signs of restructuring, through downsizing the work force, cutting profit margins and reducing the number of retail outlets. There is also a tendency to renew assortments, with the penetration of low-cost and low-stock products and the introduction of additional services (e.g. pharmacies) inside retail outlets.

In Germany, where the first hard discount stores were born, the capacity of distribution companies to react has produced positive outcomes already. In fact, important processes of concentration and rationalisation have been achieved through acquisitions, which have given excellent results in terms of turnover growth, the highest in Europe.

In Italy and Spain, food distribution is distinguished by poorly-developed systems. In addition to large, organised distribution networks, small, non-specialised distribution outlets co-exist with hard discount stores imported from continental Europe. The latter have brought with them particularly aggressive competition, in the face of which current distribution networks have shown themselves to be fairly vulnerable.

### Impact of the Single Market

The creation of the Single Market had a globally positive impact on the food and drink sector, through the reduction and/or elimination of internal barriers to trade.

However relevant internal barriers still remain. In particular they are linked to Member States' legislation going beyond harmonised Community measures, to problems due to differences in interpretation or lack of clear definitions, to lack of acceptance by Member States and to lack of equivalence of methodologies adopted within EU countries and, in some cases, lack of coherence between provisions in vertical and horizontal directives. The practical implementation of Internal Market legislation not hindered by differences of application or in-

terpretation, the promotion of consumer protection with the delivery of meaningful information, and the set-up of health and of high safety standards in food supply remain priorities for the industry.

### ENVIRONMENT

The food, drink and tobacco sector has a low environmental impact, not at all comparable to that of other manufacturing industries. The major problems stem from the extensive use of plastic packaging for the preserved products and drinks which are typical of the sector, as well as from the disposal of polluting substances and the emission of fumes into the atmosphere.

With regard to packaging, the EU has issued specific regulations with the aim of harmonising legislation in the different countries. The need for such harmonisation has been felt for some time now to prevent distortions in terms of competition. New regulations on packaging call for the use of recyclable or biodegradable materials for preserved foods and provide measures which favour the collection and recycling of drink containers. The expected effect of the implementation of such measures is an increase in production costs and greater energy requirements.

The problem of wastes is particularly serious in the livestock rearing and oil sectors, where the dispersion of waste organic substances can pollute the environment. Many operators in this sector are implementing recovery and recycling techniques based on the use of "ecological" micro-organisms.

### REGULATIONS

Among the numerous provisions regulating the agri-foodstuffs sector, particular reference can be made to

the GATT (General Agreement on Tariffs and Trade). This agreement focuses on three main aspects of public intervention in agriculture: internal subsidies, access to markets and export subsidies. The implementation period for these measures is between 1995 and 2000.

To begin with, a 20 % reduction of internal subsidies is envisaged, taking as a reference point the global level of subsidies granted between 1986-88. Exemptions are contemplated for those internal subsidy measures which do not represent an incentive to increase production, inasmuch as they do not directly affect price levels.

Regarding access to markets, each country will reduce its simple average tariff by 36 % over the implementation period and will reduce each tariff line by at least 15 %, taking the 1986-88 period as a base. All non-tariff barriers are to be subjected to tariffs. Minimum market access equal to 3 % of average domestic consumption in the base period must be allowed in the first year of the implementation period and increased in equal instalments up to 5 % by the end of the implementation period.

**Table 9: Food, drink and tobacco  
Main acquisitions in food distribution by Member State**

Areas (per bidder country)	1993-1994
EU	113
France	17
BR Deutschland	7
Ireland	7
Nederland	8
España	6
United Kingdom	60
Other Western Europe	7
North America	16

Source: Nomisma

**Table 10: Food, drink and tobacco  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.98	1.00
Danmark	2.31	1.99
BR Deutschland	0.72	0.71
Hellas	1.26	1.73
España	1.28	1.37
France	0.94	1.05
Ireland	2.48	2.25
Italia	0.85	0.88
Luxembourg	0.51	0.49
Nederland	1.56	1.56
Portugal	1.14	1.18
United Kingdom	1.18	1.07

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

The provisions of the agreement do not seem likely to produce significant effects in the short term, as taxation is based on a period (i.e. 1986-88) when the gap existing between internal prices and world prices was much wider than it is today. Furthermore, the agreement between the US and the EU is not likely to result in significant changes in trade flows: realistically, for the most sensitive commodities, the only binding constraint will be a reduction of each tariff line by at least 15 %. This makes sense because all countries will achieve the 36 % reduction in their simple average tariff by larger percentage reductions of tariffs imposed on less sensitive commodities.

The lowering of customs duties can thus be restricted to a maximum of 20 % for products such as wine, powdered skimmed milk, sugar, tobacco, and fruits and vegetables, compensated for by a steeper reduction for other products, chiefly from the USA (e.g. processed turkey meat, pigs' liver, fresh asparagus, potato-based products, some cheeses, fresh grapes, honey and orange juice).

Finally, export subsidy expenditures are to be reduced by 36 % and the volume of subsidised exports by 21 % over the implementation period, using the years 1986-90 as a base. For those commodities that experienced an increase in exports between 1986-90 and 1990-91, a bilateral agreement between the US and the EU allows for a phasing in of the reduction of the volume of subsidised exports, which permits larger subsidised exports over the implementation period, taking the 1991-92 levels as the base, instead of 1986-90.

In any event, the Community will have to lower its overall level of exports. This will result in a progressive drop in production levels, to avoid the accumulation of surpluses and strains on prices on the internal market. The drop in production provided for by the CAP reform, however, could prove insufficient to comply with the commitments undertaken within GATT, making it necessary to adopt new restrictive measures.

To conclude, mention must be made of horizontal regulations affecting the food, drink and tobacco industry. Community Directive 93/43 is a horizontal directive establishing general rules of hygiene for food products as well as procedures for enforcing such regulations. The directive has a broad application, not only because it covers all sectors, but also because it lays down hygiene and safety standards for all stages of industrial production, from preparation to processing right up through transport and sale. Food enterprises are obliged to adopt procedures to guarantee food hygiene (basing themselves on the Hazard Analysis and Critical Control System), monitoring the risks for each work process, with greater emphasis placed on control within the enterprise as opposed to outside controls.

## OUTLOOK

In the future, it is reasonable to expect that there will be no major improvement as regards the saturation of the demand for consumer goods, the current economic recovery notwithstanding. Consequently, enterprises will seek opportunities for growth in new markets, perhaps in related sectors or in as yet unexplored market niches. Furthermore, there will be a strong tendency towards greater product segmentation and greater innovation in order to reach new consumers. Greater focus will also be put on product quality, guaranteed by EU-recognised certification, so that EU companies in the sector can become more and more competitive. From a structural viewpoint, greater competitiveness will ensue from rationalisation and the use of more advanced production techniques. The achievement of a greater degree of concentration will be the goal of most EU companies, pursued through either external growth or integrative development.

Written by: NOMISMA

The industry is represented at the EU level by: Confederation of the Food and Drink Industries of the EEC (CIAA). Address: Rue de la Loi 74, bte 9, B-1040 Brussels; tel: (32 2) 230 8145; fax: (32 2) 230 8569.

# Oils and fats

## NACE 411

The sector was characterised by a dwindling trade balance throughout the decade under consideration. Oil seeds are used in industry and for human and animal consumption. They typically have a fairly low value added. Both internal supply and demand in the EU rose at a reasonably rapid pace (4 %) during the 1984-93 period. The oil seed industry is highly concentrated within the EU in the grinding, raw oil extraction and refining stages. On the other hand, the olive oil subsector is highly fragmented. Total quality and cost reduction are the main strategies pursued by EU oil seed companies. Product diversification and innovation policies represent an important line of strategy pursued by olive oil, animal feed and fat producers.

### INDUSTRY PROFILE

#### Description of the sector

The vegetable oils and fats sector comprises the initial processing of raw materials, the products of which are used either as the primary inputs in manufacturing industries outside the food sector, or for direct retail. From the processing of oil seeds, protein-meals are made for the food and animal feed industries. Such oil is also employed in other industrial sectors (fuels, lubricants, paints and enamels, etc.); and soya proteins and lecithins are used in the cosmetics, chemicals and health sectors.

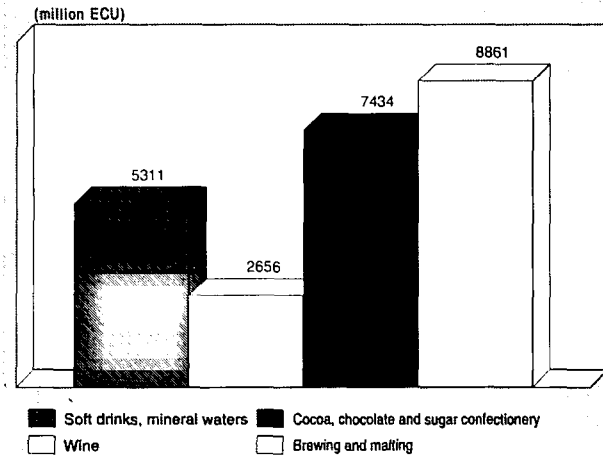
Oils for consumption as food can be eaten in their original state or in the form of margarine and reduced-or low-fat spreads. The major seeds used for consumption as food are: soya, colza, sunflower and, on a smaller scale, groundnuts and corn. Naturally, mention also must be made of olive oil, the "King of Mediterranean cuisine."

The products with the highest value added (protein and lecithin concentrates) have undergone favourable development over the last few years, because market outlets have become very diversified and extensive. This is the sector which can expect the brightest future. Soya lecithins are also widely used in non-food sectors, such as the cosmetic and chemical sectors. Furthermore, they could also play an important role in the health sector, as they help to reduce the levels of cholesterol and triglycerides in the blood. Moreover, soya protein concentrates are ideal for integrating or replacing animal-derived proteins in diets.

Processing is not particularly elaborate and the value added of the industry is consequently one of the lowest in the entire manufacturing industry. In 1993, it was equal to about half that of the fruit and vegetable sector, and about one-fifth of that of dairy products and meat. Among the EU countries, that with the highest value added is Germany (27 %), followed at a distance by Spain (18 %). Italy, Germany and Spain are the biggest producers and processors of oil seeds. The main olive oil producing countries are Spain, Greece, Italy and Portugal.

The main indicators in the sector display two stages: the first - from 1984 to 1987- shows a general drop of all indicators expressed at current prices. Starting in 1988, there was an upswing in production, consumption and exports. The balance of trade, though in the red, showed a trend towards slight improvement over the decade. Employment figures dropped by about 10 % in 1986 and 1989, while there was a partial recovery in subsequent years. These figures started to drop again, however, in 1992.

**Figure 1: Oils and fats**  
Value added in comparison with related industries, 1993

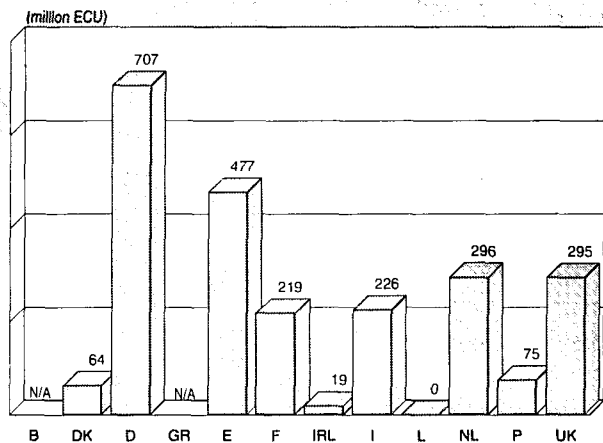


Source: DEBA

The production of fats of vegetable origin is prevalently carried out within the EU, though some product lines (e.g. laurics, castor and palm) are heavily dependent on countries outside the EU. On the other hand, imports of protein products exceed internal production capacity. In fact, many of these rely on raw materials which are not normally grown in Europe (e.g. coconut); and therefore the only way to meet internal demand is to turn to foreign markets. More than 90 % of the vegetable oil and protein production, excepting olive oil, is made up of soya, rape and sunflower.

With regard to final consumer markets, the biggest producers of margarine, fat spreads, reduced- and low-fat spreads within the EU are Germany (30 %) and the United Kingdom (22 %), followed by the Netherlands (12 %), Belgium (9 %) and France (7 %). The 1992/93 production of olive oil in the Community was estimated in about 1 300 000 tonnes, compared to 1 728 000 tonnes for 1991/92. Cultivated areas have remained more or less stable at around 5.6 million hectares.

**Figure 2: Oils and fats**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Oils and fats**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	22 013	19 015	19 965	21 459	21 147	21 424	21 457	22 930	23 500	24 100	24 600
Production	18 287	15 925	16 950	19 077	18 721	19 104	18 823	20 011	20 500	21 000	21 500
Extra-EU exports	2 264	1 297	1 535	1 479	1 394	1 572	1 575	1 973	2 100	2 100	2 200
Trade balance	-3 726	-3 090	-3 015	-2 382	-2 426	-2 320	-2 634	-2 920	-3 000	-3 100	-3 100
Employment (thousands)	55.5	54.3	49.1	51.0	53.7	51.2	50.3	49.7	49.0	48.0	48.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Oils and fats**  
**Breakdown by major product line in volume, 1993 (1)**

(thousand tonnes)	Production	Total imports	Total exports
<b>Vegetable products</b>			
Liquid	6 231	393	1 262
Laurics	40	782	21
Linseed	129	4	32
Castor	10	67	1
Palm	0	1 504	34
Total	6 410	2 750	1 350
<b>Protein meal</b>			
Soya	10 118	11 491	1 033
Rape	3 091	1 041	48
Sunflower	2 244	1 206	12
Cotton	368	701	3
Copra	21	862	7
Palmkernel	4	1 489	0
Lin	236	222	9
Maize	243	880	0
Others	38	880	1
Total	16 363	18 772	1 113
<b>Marine products</b>			
Fish meal	533	837	339

(1) Due to the modification of the data-collecting system on the intra-EU trade exchanges, import and export figures may present some imprecisions.

(2) Excluding olives.

Source: Fediol

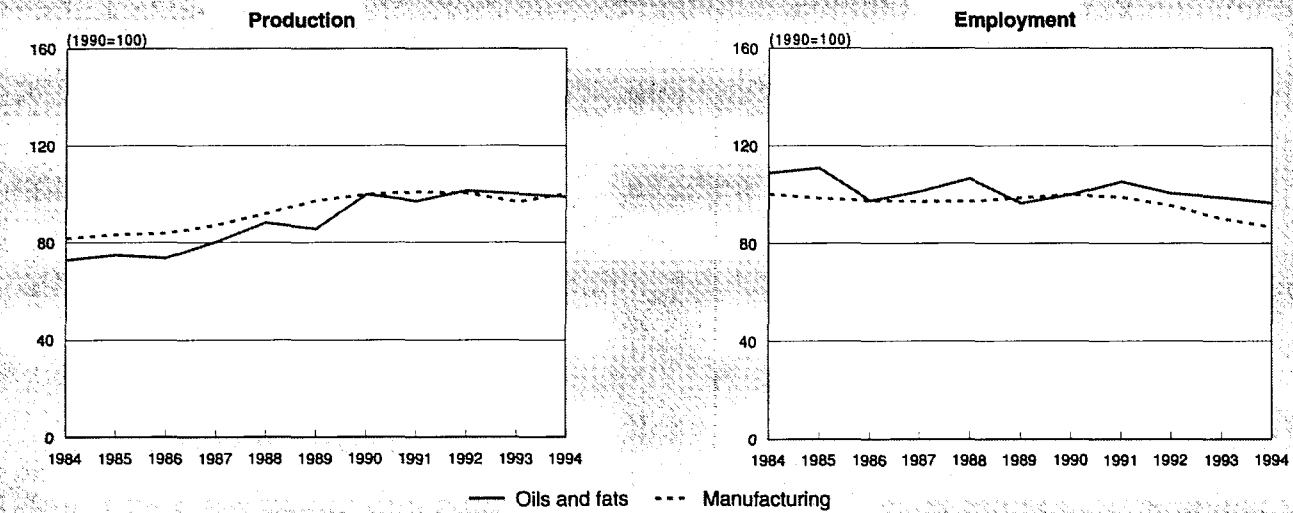
**Table 3: Oils and fats**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.38	3.83	3.58	-0.86
Production	3.26	3.95	3.57	-1.27
Extra-EU exports	-1.33	1.08	-0.27	-3.20
Extra-EU imports	1.79	2.11	1.93	0.25

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Figure 3: Oils and fats**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

**Recent trends**

In real terms, the situation revealed by the main indicators at current values is confused. In fact, both internal demand and supply went up during the 1984-93 period at a fairly quick pace (4 %). Only in 1993 was there a slight drop. Conversely, exports showed a somewhat unstable pattern with a tendency to go down, especially during 1993, while imports tended to rise slowly.

The 1990 base production index at constant prices presented a trend similar to that of the manufacturing industry as a whole with fairly high growth rates from 1987 to 1990, even though in the oils and fats sector, 1986, 1989 and 1991 were in a counter-trend compared to the total manufacturing industry. In 1993, the growth trend of vegetable oils production came to a halt and was followed by a small recovery in 1994. Employment has fluctuated widely over the last decade. Since 1991, employment has been on a downward trend.

**International comparison**

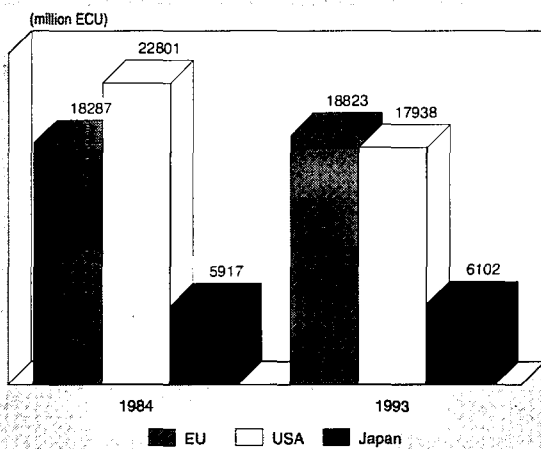
Production data at current prices shows that in 1984 the USA was the biggest world producer of oils and fats, followed by the EU, while Japan lagged behind. In 1993, US production figures fell to match those of the EU which, together with Japan, reached the same production level as 1984.

The 1990 production index at constant prices shows an uninterrupted drop in Japan. In point of fact, over the decade, this country recorded a drop of 5 %, due above all to a big index fall in 1984-87. EU and US production patterns showed a slight upswing.

As regards soya seeds, the USA has always played a lead role in production and currently has an over 50 % share. Brazil retains a share of 18 % of world production whereas Argentina has a share of about 10 %.

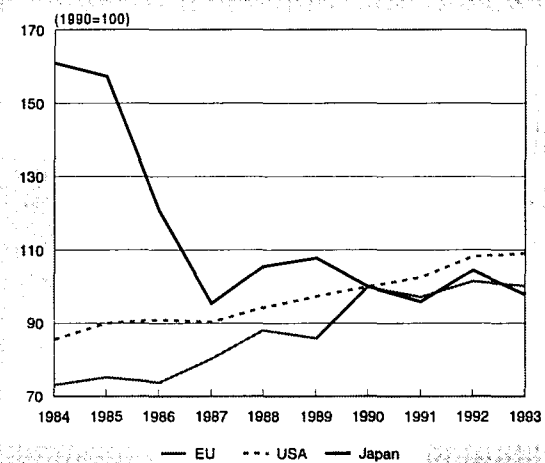
In terms of quantity, the world production of sunflower seeds ranks fourth among oilseed production, with a share of around

**Figure 4: Oils and fats**  
**International comparison of production in current prices**



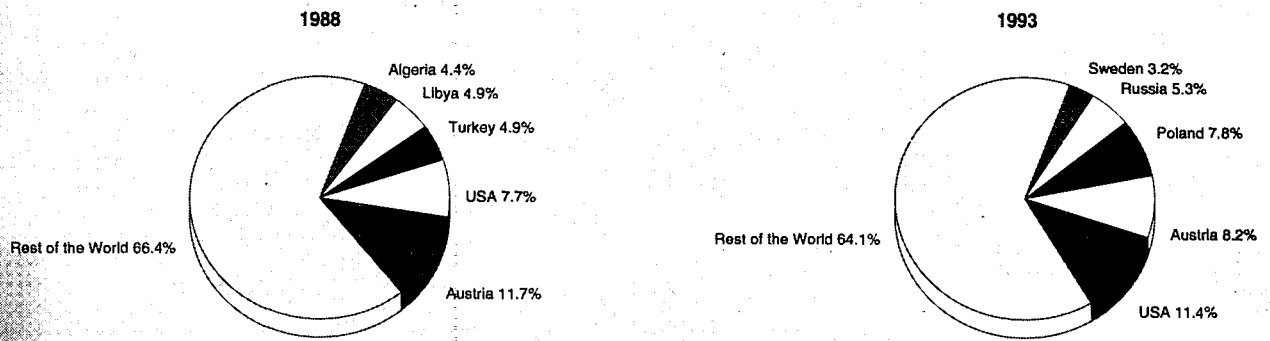
Source: DEBA

**Figure 5: Oils and fats**  
**International comparison of production in constant prices**



Source: DEBA

**Figure 6: Oils and fats  
Destination of EU exports**



Source: Eurostat

9 %. The biggest producer of sunflower seeds remains the area of the former Soviet Union, which currently accounts for about 20 % of world production, along with Argentina (20 %). The EU occupies an important role in the sector, and is the third biggest world producer, with a market share of around 18 %; Asian countries (China and India) account together for another 11 %.

Colza production has taken on growing importance within the aggregate of oilseeds and currently detains a 12 % share. Most of the world production of colza is concentrated in the Asian countries which currently have a share equal to about 48 % in terms of production and 53 % as regards cultivated area. However, this production is mainly for domestic use: there are almost no exports of rapeseed from these countries. Now as in the past, the EU is the second biggest world producer, with a production share that has gone up from 10 % in 1961 to about 23 % today (12 % in terms of cultivated area).

The international scenario of oil seeds can be split into two blocs: the American bloc, more export-oriented, with a 70 % share of world exports; Europe and Asia, more import-oriented, notwithstanding the growing importance of Europe as regards global export volumes.

Finally, world production of olive oil in 1992/93 was on average equal to 1 800 000 tonnes, of which 80 % came from EU countries. The other major world producers are Turkey, Tunisia, Syria and Morocco. Production varies greatly from year to year, but the development of the world market reflects, in general, that of the Community market.

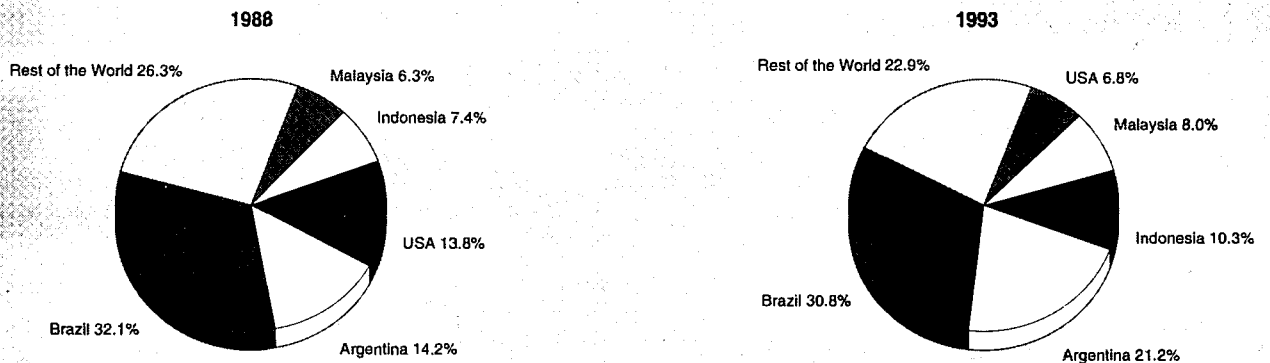
**Foreign trade**

The big producers of oil seeds are not necessarily big processors and consumers of the processed product. Consequently, a complex system of trade flows of raw materials and initial-process materials (oils and cakes or meals) has been established. For example, the top world producers of oil seeds, like the USA, Argentina and Brazil, are substantially self-sufficient as regards cakes and meals.

EU exports traditionally go to the Mediterranean area, East European countries and increasingly to China.

The trading deficit for oil seeds as a whole can be attributed chiefly to soya imports, which represent 85 % of overall seed imports, with a volume equal to more than 14 million tonnes. From 1965 to 1980 imports, compared to the almost negligible level of exports, have doubled over every five-year period.

**Figure 7: Oils and fats  
Origin of EU imports**



Source: Eurostat

**Table 4: Oils and fats**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 264	2 157	1 319	1 289	1 297	1 535	1 479	1 394	1 572	1 575	1 973
Extra-EU imports	5 989	5 537	4 344	3 727	4 387	4 550	3 861	3 820	3 891	4 208	4 893
Trade balance	-3 726	-3 380	-3 026	-2 438	-3 090	-3 015	-2 382	-2 426	-2 320	-2 634	-2 920
Ratio exports / imports	0.38	0.39	0.30	0.35	0.30	0.34	0.38	0.36	0.40	0.37	0.40
Terms of trade index	78.6	88.0	88.4	84.1	76.1	82.0	100.0	102.2	98.7	94.7	N/A

Source: DEBA

**Table 5: Oils and fats**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	67.1	67.9	75.7	79.4	82.7	88.9	100.0	92.2	100.9	101.5
Unit labour costs index (3)	117.3	115.3	112.7	108.2	103.8	107.6	100.0	110.7	108.2	110.5
Total unit costs index (4)	131.2	126.0	97.9	89.0	97.2	104.3	100.0	101.4	96.8	97.0
Gross operating rate (%) (5)	4.63	4.61	4.91	6.72	6.62	5.31	6.42	6.14	5.68	5.65

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

Obviously, the Community is still far from being self-sufficient. With regard to oil seeds as a whole, only France, and, to a lesser extent, Denmark, show any degree of self-sufficiency, while the other countries are more or less dependent on imports.

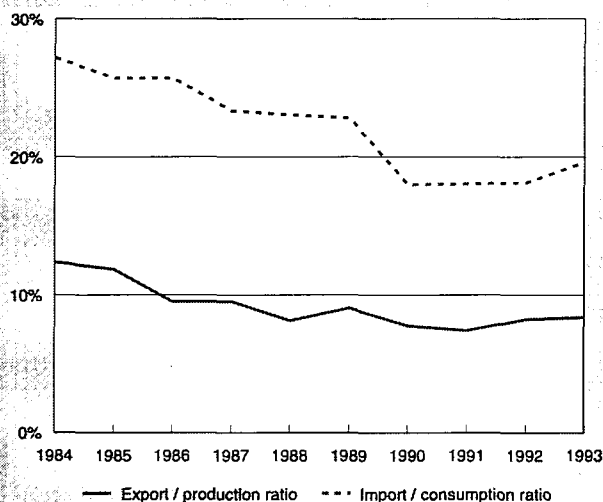
In 1993, most EU exports of oils and fats (in value terms) went to the USA which had increased its market share since 1988. Conversely, Austria's share dropped. Among the major importers can now be counted Poland and Russia, which oc-

cupied third and fourth places in 1993, with respective shares of 8 % and 5 %.

On the import side, the importance of Brazil is confirmed. With a 31 % share of EU imports of oils and fats in value terms, Brazil is the biggest exporting country, while Argentina has increased its market share by 50 %. In 1993, the share of imports from Indonesia and Malaysia went up compared to 1988 and, at the same time, imports from the USA dropped.

The export/production index fell over the decade, going from 12.4 % in 1984 to 8.4 % in 1993. The import/consumption ratio also fell, going from 27.2 % in 1984 to 19.6 % in 1993.

**Figure 8: Oils and fats**  
**Trade intensities**



Source: DEBA

## MARKET FORCES

### Demand

The demand in the oils and fats sector stems on the one hand from industrial uses and on the other from the human and animal food sector. The percentage of product for industrial use is around 40 % and over the last five years has gone up considerably. As was mentioned above, oleaginous substances are used in the cosmetics industry, as well as in the manufacture of soaps and detergents, lubricants, fuel and plastics. The demand for animal consumption concerns cakes and protein-rich foods which are particularly price-sensitive.

Human consumption is primarily of margarine, vegetable oils and olive oil and low-fat products, which are used as dressings or in cooking. Over the last five years, the human consumption of oils has increased by 15 % in volume, particularly in Germany, Denmark, Belgium and Portugal, while there has been a drop in the United Kingdom and France.

With regard to margarine (part of the vegetable-fat group), despite an overall growth of 4 % within the EU, there has been a steep drop in consumption in many countries, due to the fact that margarine has been replaced by low-fat spreads

**Table 6: Oils and fats**  
**Production and consumption of olive oil**

(thousand tonnes)	1990/91		1991/92		1992/93		1993/94 (1)					
	EU	Extra-EU	World	EU	Extra-EU	World	EU	Extra-EU	World			
<b>Production</b>												
Olive oil	994	457	1 451	1 719	487	2 206	1 392	422	1 814	1 347	460	1 807
Edible olive pomace oil	84	7	91	151	11	162	119	10	129	113	12	125
<b>Total</b>	<b>1 078</b>	<b>464</b>	<b>1 542</b>	<b>1 870</b>	<b>498</b>	<b>2 368</b>	<b>1 511</b>	<b>432</b>	<b>1 943</b>	<b>1 460</b>	<b>472</b>	<b>1 932</b>
<b>Consumption</b>												
Olive oil	1 211	472	1 683	1 360	492	1 852	1 374	519	1 893	1 362	547	1 909
Edible olive pomace oil	100	18	118	112	33	145	115	35	150	104	29	133
<b>Total</b>	<b>1 311</b>	<b>490</b>	<b>1 801</b>	<b>1 472</b>	<b>525</b>	<b>1 997</b>	<b>1 489</b>	<b>554</b>	<b>2 043</b>	<b>1 466</b>	<b>576</b>	<b>2 042</b>

(1) Provisional figures.  
Source: Fedolive

**Table 7: Oils and fats**  
**Oils and meals produced from oilseeds by country, 1993**

(thousand tonnes)	Oilseeds processed (1)	Share (%)	Crude oil & fats produced (1)	Share (%)	Meals & cakes produced (2)	Share (%)
EU	23 196	100.0	6 410	100.0	16 360	100.0
Belgique/België	1 942	8.4	519	8.1	1 394	8.5
Danmark	384	1.7	135	2.1	244	1.5
BR Deutschland	6 036	26.0	1 816	28.3	4 186	25.6
Hellas	699	3.0	122	1.9	532	3.3
España	3 001	12.9	785	12.2	2 065	12.6
France	2 184	9.4	806	12.6	1 406	8.6
Italia	2 060	8.9	439	6.8	1 619	9.9
Nederland	4 347	18.7	961	15.0	3 252	19.9
Portugal	667	2.9	178	2.8	473	2.9
United Kingdom	1 876	8.1	649	10.1	1 189	7.3

(1) Excluding olives, maize germ, grape and tomato pips.  
(2) Excluding olives.  
Source: Fediol

**Table 8: Oils and fats**  
**Production of olive oil by country**

(thousand tonnes)	1990/91			1991/92			1992/93			1993/94(1)		
	Olive oil	Edible olive pomace oil	Total	Olive oil	Edible olive pomace oil	Total	Olive oil	Edible olive pomace oil	Total	Olive oil	Edible olive pomace oil	Total
EU	993.7	83.3	1 077.0	1 718.8	150.5	1 869.3	1 391.6	119.4	1 610.2	1 316.3	108.8	1425.1
Hellas	170.0	17.0	187.0	385.0	38.5	423.5	310.0	29.8	339.8	254.0	20.3	274.3
España	639.4	51.2	690.6	593.0	47.4	640.4	623.0	49.8	672.8	550.0	44.0	594.0
France	1.0	0.0	1.0	4.3	0.0	4.9	1.6	0.0	1.6	2.3	0.0	2.8
Italia	163.3	13.1	176.4	674.5	53.9	728.4	435.0	34.8	469.8	480.0	38.0	518.0
Portugal	20.0	2.0	22.0	62.0	10.7	72.7	22.0	5.0	27.0	30.0	6.5	38.6

(1) Provisional figures.  
Source: Fedolive



**Table 9: Oils and fats  
Margarine: Production by country**

(thousand tonnes)	1988	1989	1990	1991	1992	1993
Belgique/België, Luxembourg	183	185	189	196	209	217
Danmark	102	107	108	103	100	96
BR Deutschland	454	479	561	632	687	664
Hellas	27	31	32	35	33	32
España	88	78	82	84	80	84
France	161	161	168	165	164	161
Ireland	19	26	22	24	18	18 (2)
Italia	74	74	79	81	83	86
Nederland	244	247	256	271	280	292
Portugal	59	59	60	63	64	61
United Kingdom	375 (1)	378 (1)	475	467	482	489

(1) Approximate figures  
(2) Provisional figures  
Source: IMACE

or vegetable oils. The biggest drops have occurred in Italy (-15 %), the Netherlands and France (-9.84 %) and in the United Kingdom (-5.28 %), while consumption has risen in Germany, Belgium and Denmark. The per capita consumption of margarine is 4 kg and occupies a one-quarter share of that for the entire sector. It should be noted that although this demand for low-fat products rose considerably in the past, it is currently stable.

The consumption of vegetable oils shows a growth rate over the last five years equal to 15 %. The increase in the consumption of oil can be attributed to a high-quality and safe product image. The fastest growing markets are found in regional specialities, reflecting the interest in exotic foods and desire to introduce new flavours into the kitchen.

The pattern of oil consumption shows marked regional differences within the EU, due to the different eating habits and supply patterns in each country. Germany and Italy are the biggest consumers of soya oil, followed by the United Kingdom, the Netherlands, Portugal and Spain. Sunflower oil is number one in France, followed by Spain, Germany, the United Kingdom and Italy. The success of sunflower oil is due to its healthy image as a product with a high vitamin E and polyunsaturated acid content, as well as the fact that it tastes good. More than half the colza oil goes to the United Kingdom

followed by Germany and Italy; and half the corn germ oil goes to Italy, followed by France, Greece and Germany. The Mediterranean countries are the biggest consumers and producers of olive oil. Specifically, the largest production centres are in Italy, France and Greece. Olive oil has experienced the fastest growth rates, again because it is considered to be of high quality, healthy and suitable for either dressings or cooking.

#### Supply and competition

With regard to oleaginous seeds, production in the EU increased considerably during the 1980s and 1990s. The crushing of soya beans in order to obtain crude oils on one hand and meals for animal feedstuffs on the other hand is concentrated mainly in the USA, South America and Europe. The first crusher of sunflower seeds is the former USSR, followed by Europe and Argentina, which is also the biggest exporter worldwide. The biggest importer of sunflower seeds is the EU. With regard to olive oil, the countries of North Africa are more competitive than those of the EU.

Recently, many production sites have been set up near oleaginous seed processing plants within the EU. For example, in the case of soya, Italy is the top producer, but the grinding capacity in this country has not changed. Conversely, in the

**Table 10: Oils and fats  
Acquisitions**

1993 Bidder	Country	Target	Target country
Golden Vale	Ireland	Vejle Margarinefabrik	Danmark
Ferruzzi	Italia	Elosua SA	España
FISVI	Italia	Cirio Bertolli De Rica	Italia
Unilever	United Kingdom / Nederland	Tata Oil Mills Company	India
Unilever	United Kingdom / Nederland	N/A	Poland
Philip Morris	USA	Marsa Margarin Sanayi	Turkey
1994 Bidder	Country	Target	Target country
Unilever	United Kingdom / Nederland	Cirio Bertolli De Rica (oil business)	Italia
Unilever	United Kingdom / Nederland	State-owned company	Kazakhstan
Unilever	United Kingdom / Nederland	State-owned company	Kazakhstan

Source: Nomisma



Netherlands and Germany, the processing capacity has increased considerably. Due to the heavy effect of transport costs, above all road transport, the location of manufacturing plants is of fundamental importance.

The total cost of the production process per unit of product which was extremely high at the beginning of the period considered, is slowly going down, following the rationalisation of the processing cycle. The highest cost item is labour, which follows a pattern identical to that of the total cost index: high at the beginning of the period with a tendency to fall thereafter. The biggest investments in innovation in the production process occurred in 1986/89 and 1989/90 when the cost of labour shrank considerably. Finally, high labour costs are not matched by particularly high productivity levels, though these were on the increase during the period.

### Production process

Given the variety of products belonging to this sector, it is difficult to identify one single production process applicable to them all. Consequently, mention will be made only of the main stages needed to obtain the most important products.

To extract oil from seeds, a chemical-physical process is used. After going through a preliminary preparation stage (drying, cleaning, decortication and shelling), most of the seeds are crushed and then extracted by a solvent process in order to obtain crude oil. The crude oil is then refined, deodorised and bleached. The refined oil is further processed into final consumption products.

The production process of olive oil is split into five stages: pressing, from which olive paste is obtained; kneading, which favours the flow of oil and increases yields; the extraction of the oleaginous oil, which can be done using three different systems - i.e. centrifugation and settling; filtration (from which extra-virgin oil is obtained); and finally, refining and working residues.

The major companies operating in the margarine sector have introduced new technologies to maintain the quality of products distributed at long distances and in particularly hot climates.

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## INDUSTRY STRUCTURE

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### Companies

Companies operating in the vegetable oil sector specialise in the different phases of the production process: i.e. crushing, crude oil extraction and refining. The average crushing capacity is around 750-1 000 tonnes per day. Industries can easily work different types of seed (soya, sunflower and rape). The crushing and refining industry is highly concentrated. In fact, six groups exist which together cover about three quarters of EU activities and have plants located in various Member States. These are: ADM (USA), Bunge, Cargill (USA), Cereol (I), Unilever (UK-NL) and VDM (B). Cereol belongs to the Eridania-Bèghin-Say Group (F-I), and is the European leader in the field with a market share above 20 %.

The situation of olive oil is different. With regard to processing, there is greater market fragmentation, especially in Italy and Greece. Marketing companies tend to be large, particularly in Spain.

Manufacturing companies are both multinational and national: the first, like Eridania-Bèghin-Say, and Unilever, are integrated along the entire production cycle. The leader in the margarine sector is Unilever. With regard to raw oil, there is a highly competitive world market and reference prices are fixed by the Chicago and Rotterdam exchanges.

## Strategies

Producers in the sector employ total-quality strategies, with a careful eye on costs. The idea is to replace workers with capital investment in order to improve operating margins.

Product diversification and innovation policies represent an important line of strategy pursued by both oil and fat producers. In the sector of oil for human consumption, the main innovations relate to aromatised products and those specially-made for odour-free frying.

In the margarine sector, product types have been introduced with high vitamin content, to compete with the healthy image of low-fat spreads. Though this has resulted in higher prices compared to butter, it has also brought about an increase in value added in the sector. Other innovations concern packaging, e.g. in packets or tubes. Likewise, olive oil producers are tending to diversify by introducing completely natural processing systems, tied in particular to regional traditions, through the adoption of a Protected Geographic Indication label, acknowledged by the EU.

Growth strategies adopted by companies in the sector are directed towards the expansion of markets with good development prospects, such as those of the East European countries and Asia, either through direct acquisitions or increased exports to those countries. The large multinationals, on the other hand, implement integrative development policies towards downstream sectors or policies of penetration into new markets which are not labour-intensive and which present good prospects for.

### Impact of the Single Market

The creation of the Single European Market had an overall positive impact on the oils and fat industry, increasing international trade thanks to the elimination of controls at internal frontiers, technical harmonisation and mutual recognition of rules. Furthermore it enhanced know how and quality standards, assuring higher consumer protection. Higher costs of distribution were, however, recorded after the implementation of environmental policies.

The remaining internal barriers are linked to differences within countries in control implementation, and to differences in VAT levels.

On the export side the reduction of taxes and duties on EU export production should be taken into account.

Next priorities are linked to the reform of the Common Market Organisation regulating olive oil, the implementation of long term policies at Community level and the worldwide deregulation of the raw material market.

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## ENVIRONMENT

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The industries of the oils and fats sector use organic solvents, principally hexane, for the extraction of vegetable oils and fats. A proposed directive on the limitation of emissions of organic compounds due to the use of organic solvents imposes limits to the emission of volatile organic compounds.

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## REGULATIONS

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### Olive oil

The common organisation of markets in the olive oil sector came into effect with Regulation number 136/66, amended by the latest Regulation, number 2046/92.

Every year, the Community fixes the indicative production price; the reference price susceptible to modification during the course of the season, in the event of significant variations in the market situation; and the intervention price and threshold price, so the product sales price settles near the reference price. European prices are generally higher than those on the

**Table 11: Oils and fats  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.98	N/A
Danmark	1.28	0.82
BR Deutschland	0.77	0.71
Hellas	1.54	2.24
España	2.11	2.72
France	0.59	0.45
Irland	0.48	0.22
Italia	0.98	1.27
Luxembourg	0.00	0.00
Nederland	2.75	2.41
Portugal	1.59	1.30
United Kingdom	0.65	0.65

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

world market, so the Community also intervenes with import duties and export compensations. Aid to production (and, in the oil sector, also to consumption) is provided, in the event of the indicative production price - reduced through production aid - being above the indicative market price.

### Oil seeds

The sector was profoundly concerned by the CAP reform. Regulations were established similar to those for cereals (compensation per hectare and on a lump-sum basis, determination of basic area for compensation, set aside incentives): the calculation of the amount of aid to be provided was studied so as to reach a balance with that established for cereals, with the aim of not creating any particular incentive for one of the two crops and maintaining the current ratio between cereal crops and seed crops (for this purpose, the average support price is calculated starting with that of cereals and applying a 2.1 factor).

The CAP reform, with the resulting reduction of the amount of support provided, seems to have paved the way for a considerable drop in oil seed production (the land area cultivated with seeds in the 1993/94 season was considerably lower than that of the previous year). Furthermore, soya would appear to be particularly involved in the disinvestment of cultivated areas, not only because since 1993, only first crop soya has been eligible for contributions.

### Spreadable fats

On 5 December 1994, the EU Council of Ministers adopted the Regulation laying down marketing standards for spreadable fats. The Regulation, which enters into force on 1 January 1996, lays down the sales designation for all the products concerned (butter, margarine and blends). The uniform classification will make it easier for the consumer to choose between products which are different as regards the fat content in general and as regards the plant and/or animal fats used.

### OUTLOOK

With regard to demand, it is considered that the industrial uses of oils and fats will expand (biofuels, lubricants). The use of vegetable oils for human consumption will continue to be promoted by the healthy image of the product. Also, innovative low fat products may get a bigger share of the market at the expense of traditional products like margarine.

In terms of industrial structure, the olive oil market will become less fragmentary following an increase in the number of acquisitions by multinational companies. The process of integration will also continue towards downstream sectors, and there will be a greater penetration onto new markets with good development prospects.

Written by: NOMISMA

The industry is represented at the EU level by: Federation of Seed Crushers and Oil Processors in the EEC (FEDIOL). Address: rue de la Loi 74, Bte 4, B-1040 Brussels; tel: (32 2) 230 3125; fax: (32 2) 230 0946; Fédération de l'Industrie de l'huile d'olive de la CEE (FEDOLIVE). Address: bd. Baudouin 21, Bte 7, B-1210 Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244; and Association of the Margarine Industry of the EEC Countries (IMACE). Address: rue de la Loi 74, Bte 3, B-1040 Brussels; tel: (32 2) 230 4810; fax: (32 2) 230 2274.

# Meat

## NACE 412

Over the next few years the meat sector will undergo important changes as a result of the ratification of the GATT treaty and the introduction of Community regulations on critical aspects of the production and distribution process. In particular, the fall in exports will limit the possibility for expansion to the high-potential markets of south-east Asia. Meanwhile, the increase in the level of concentration of large and modern distribution networks, coupled with the drop in beef, pork, sheep meat and goat consumption, is sharpening competition between enterprises within the EU. To face the changes under way, enterprises are increasing their degree of concentration on the Community market by an extensive process of acquisitions and are turning their attention to higher value-added products.

### INDUSTRY PROFILE

#### Description of the sector

The animal slaughtering and meat processing industry includes all of the processing stages following animal rearing up to final market consumption. In particular, reference is made to the slaughtering, processing and storage of beef, pork, sheep meat, goat, and poultry. Also included is the intermediate processing of products, like the manufacturing of plasma and the melting of animal fats. Further details concerning animal fats are provided in the chapters on dairy products (i.e. butter) and, more specifically, in the chapter on fats and oils. The final products to be covered are cuts of meat; processed meat, including chilled and frozen meat; and canned meat and deli meats, to which must be added pre-prepared foods.

Meat represents the biggest single item of expenditure with regard to the overall purchase of agri-foodstuffs (30 % on average). In 1990, this figure was particularly high in France, Belgium and Denmark, with about 35 %; while the lowest figures were to be found in Greece, Holland and the United Kingdom with around 25 % (source: Eurostat).

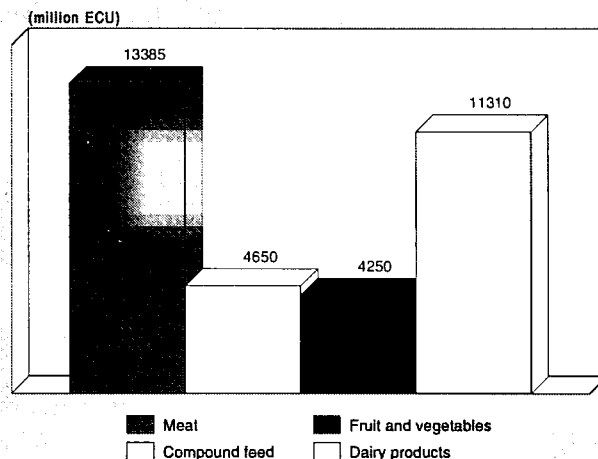
The biggest meat producers within the EU are, on average, France and Germany, thanks to the climatic conditions there, which are well-suited to stock farming. These are followed, according to subsector, by Denmark (pork), Italy (beef), the United Kingdom (poultry) and, finally, Spain (sheep meat and goat).

1993 marked the end of a five-year growth period between 1984-1992, during which there was a 51 % increase in the value of production and apparent consumption. This recent drop, underscored by the main indicators of the sector, is a result of the slow-down in all economic sectors of the EU and of the economic effects of the CAP (see Table 1).

In terms of quantity, since 1990 there has been a slight drop in the production of pork, sheep meat and goat, and a steeper one as regards beef. Conversely, poultry production increased with a growth rate higher than those recorded in the other subsectors.

During the period under consideration, improvement in the trade balance occurred, and it was again in the black in 1993 for the first time since 1991. Exports increased, while employment figures tended to fall slightly. The meat sector showed a higher added value compared to other sectors such as fruits and vegetables and dairy products, the latter being direct substitutes for meat. Among the Member States, France, the United Kingdom and Germany achieved the highest value added (1993) and were the biggest producers (1992).

**Figure 1: Meat**  
Value added in comparison with related industries, 1993



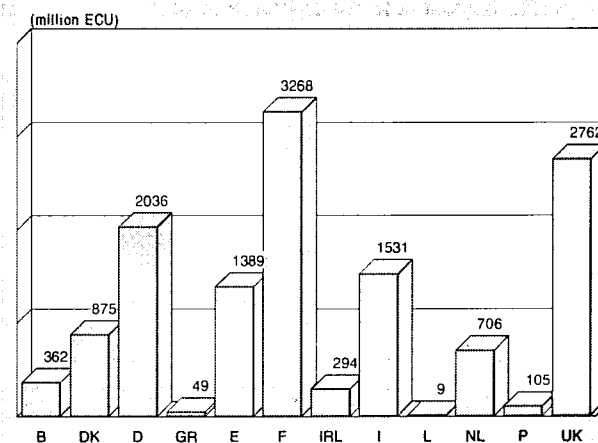
Source: DEBA

In 1992, the highest value in terms of internal production and consumption concerned pork and beef, the latter also achieving the highest volume of exports, immediately followed by pork and poultry. In these subsectors, the EU is entirely self-sufficient while it is a big importer of horse meat, sheep meat, goat and entrails.

In 1993, EU production of beef touched 8.1 million tonnes with a further drop of 3.4 %, after the 3.2 % drop of 1992. Cattle rearing in the Community, directed toward a drop in the number of milk cows, will be altered also by the activity level reduction process begun in 1991 in Germany, and the effects of the CAP, which chiefly has concerned the major producer countries (i.e., Ireland, France, Germany and Italy).

The pork subsector was distinguished in 1993 by an overall increase in production after the consistent hike in prices of 1992. This trend has given rise to a production surplus which has brought about a 30 % drop in prices. The biggest producers were Denmark (+3.8 %), France (+3.2 %), Belgium and

**Figure 2: Meat**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Meat**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	53 276	61 587	68 841	72 768	77 620	80 845	79 415	81 690	86 380	91 480	96 750
Production	52 297	60 756	68 133	72 082	77 647	80 568	79 675	81 897	86 600	91 700	97 000
Extra-EU exports	3 134	3 173	3 648	3 373	3 796	3 770	4 244	4 790	5 200	5 500	5 900
Trade balance	-978.6	-831.1	-708.4	-685.4	27.3	-277.6	259.9	207.3	220.0	220.0	250.0
Employment (thousands)	394.7	426.3	432.0	439.2	444.1	436.7	431.0	429.4	440.0	450.0	460.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Meat**  
**Breakdown by major product line, 1992 (1)**

(thousand tonnes carcass weight)	Total domestic use	Usable production	Total exports
Adult cattle and calves	7 451	8 384	1 163
Pork	14 007	14 402	419
Sheep and goats	1 423	1 177	1
Equidae	178	93	14
Poultry	6 558	6 923	522
Other meat	874	821	21
Offal	2 019	2 016	91
Total meat	32 510	33 816	2 231

(1) Including former East Germany.

Source: Eurostat

**Table 3: Meat**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.60	3.72	3.65	1.37
Production	3.76	4.03	3.88	2.05
Extra-EU exports	3.96	4.87	4.36	7.43
Extra-EU imports	1.37	-0.69	0.45	-5.44

(1) Some country data for apparent consumption and production have been estimated.

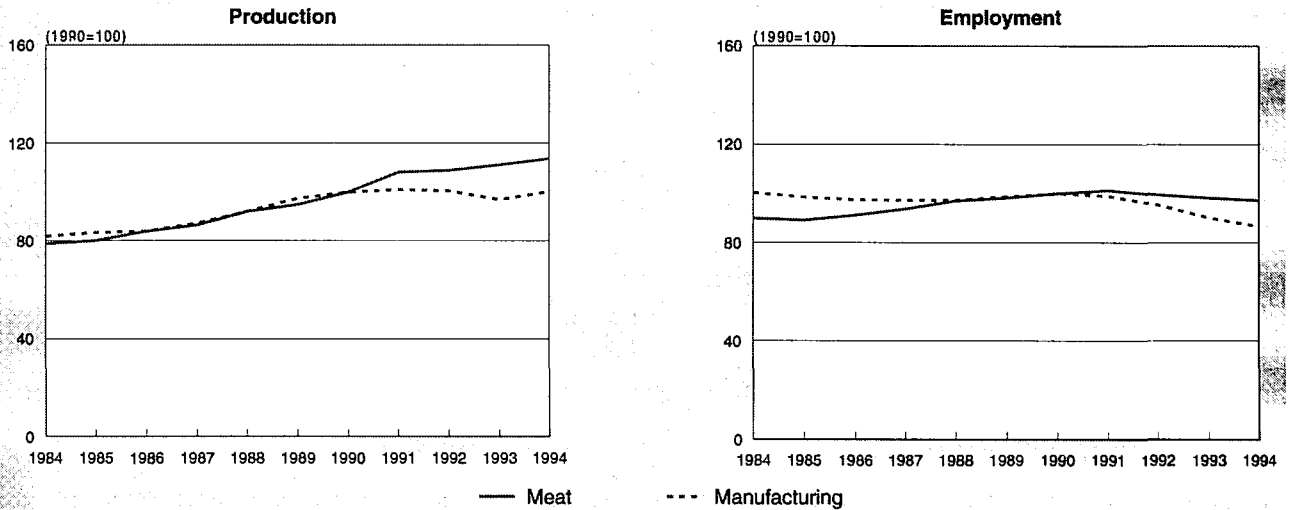
Source: DEBA

**Table 4: Meat**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 134	3 200	3 125	3 077	3 173	3 648	3 373	3 796	3 770	4 244	4 790
Extra-EU imports	4 112	4 503	3 748	3 765	4 004	4 356	4 059	3 769	4 048	3 984	4 583
Trade balance	-979	-1 304	-623	-688	-831	-708	-685	27	-278	260	207
Ratio exports / imports	0.76	0.71	0.83	0.82	0.79	0.84	0.83	1.01	0.93	1.07	1.05
Terms of trade index	100.1	100.2	107.0	102.1	98.6	97.0	100.0	96.7	98.5	99.2	N/A

Source: DEBA

**Figure 3: Meat  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

Luxembourg (+2.8 %). The self-sufficiency rate in 1993 was equal to 104 %.

The production of sheep meat and goat, according to Ismea estimates, went up by about 1.3 %. This can be attributed to increases in the output of the United Kingdom, Ireland and Spain.

Finally, the production of poultry in the EU is around 7 million tonnes. 70 % is made up of chickens. There are increases in production in most member countries, e.g. 5 % in the Netherlands, 3.9 % in Italy, 3.2 % in Germany, 1.4 % in United Kingdom and 1 % in France.

**Recent trends**

In constant prices, the 1984-1992 period produced stable growth in the entire sector (+3.65 %). This ended, however, in 1993. Particularly significant are the growth patterns relating to foreign trade which have shown very high export values (on average 4.39 % up to 1992) with peaks in 1993 reaching

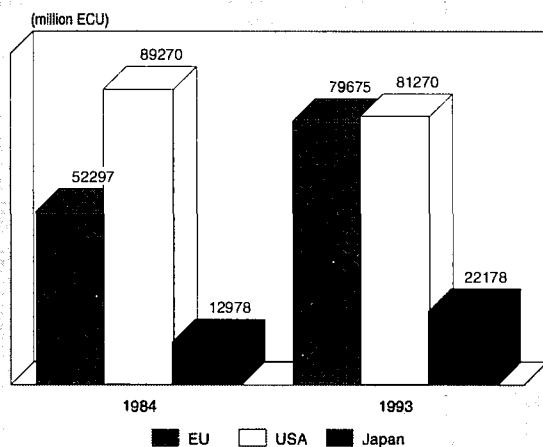
7 % and imports distinguished by an unsteady pattern and much lower values (see Table 3).

Until 1990, production in the meat sector showed a pattern in line with that of the manufacturing industry. Since 1991, the gap between the two has widened, with a general stagnation in the manufacturing industry and a growth in that of meat.

With regard to employment levels, up through 1990 there was strong growth in the meat sector while figures tended to shrink in the manufacturing industry. The number of persons employed began to fall in 1992, however, levelling off in 1993 at 431 018, a figure slightly lower than that recorded in 1989. The recorded drop touched figures much lower than those in the manufacturing industry, once again underlining the anti-cyclical nature of the food industry.

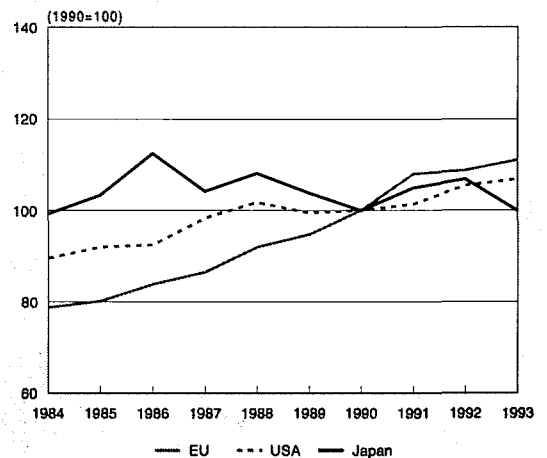
Labour costs grew steadily up to 1992. Thereafter, they peaked and returned to 1991 values, while the total of input costs in the 90s was substantially similar to that of base year 1990.

**Figure 4: Meat  
International comparison of production in current prices**



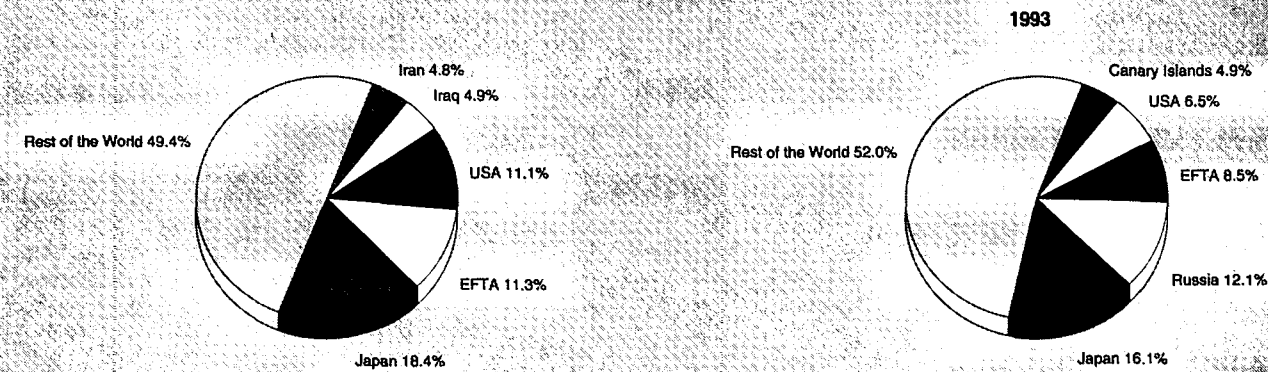
Source: DEBA

**Figure 5: Meat  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Meat  
Destination of EU exports**



Source: Eurostat

**International comparison**

The EU is the world's biggest overall meat producer. Over the last 10 years, there has been a gradual increase in European production which, at current prices in 1993, was almost the same as that of the USA. The strongest growth rate, however, was recorded in Japan, which upped production over the ten-year period by nearly 70 %.

In constant prices, there has been an exceptional rise in quantities produced by the EU which, in 1984, recorded values much lower than those of the USA where variations tend to be far less extreme, albeit against a pattern of constant growth. With regard to Japan, an unstable trend has determined a production flow in 1993 comparable to that of 1984 (see Figure 5).

The sector has been affected by the structural decline of production in the former Soviet Union and the East European countries, following the depletion of state subsidies, the increased cost of production inputs and the scarcity of feed. This trend has been countered by the strong expansion of production in China, thanks to a soaring domestic demand and the development of intensive animal farming systems which have improved herds through the use of better-quality feeds, among other things.

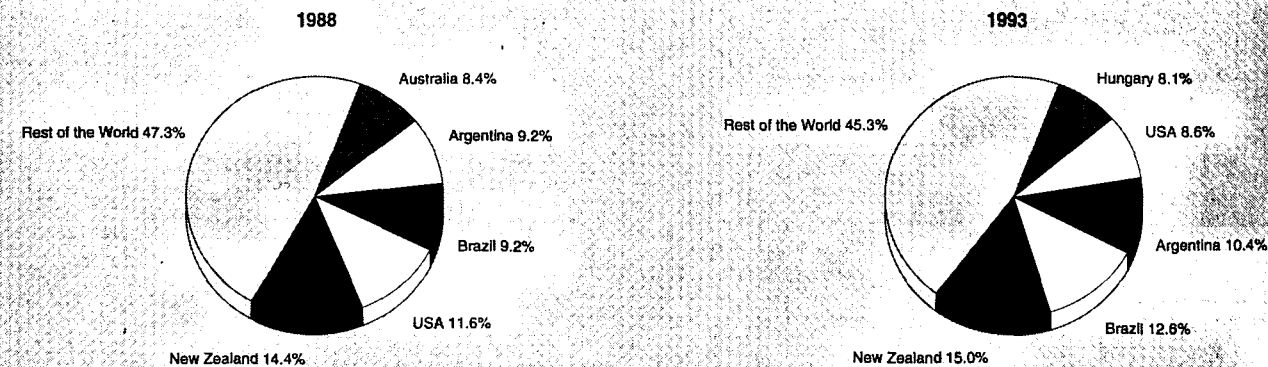
In 1993, 185 million tonnes of meat were produced, with an increase of only 0.5 % over the previous year. According to FAO sources, this pattern can be attributed to the spreading of epizootic diseases and the high cost of animal fodder.

Beef stocks at the end of 1993 equalled around 460 thousand tonnes, a considerable drop compared to the previous year (-45 %). This was caused by a heavy fall in production, sustained consumption patterns and strong export flows to third countries. Consequently, prices increased steeply by about 16 %.

The pattern of beef production over the ten-year period showed particularly high values from 1984 to 1987 following the slaughtering of numerous animals in accordance with milk quotas; and again in 1990 following the reunification of Germany, which led to an increase of around 4.4 %.

While the USA plays the lead role in the beef and poultry sectors, China is way ahead in the sheep meat and goat sector, which has been concentrated in Asia since the start of the 80s. The EU is the second biggest producer of pork, after China; the second most important producer of poultry and beef, after the USA; and the third biggest producer of sheep meat and goat, after Asia and Africa.

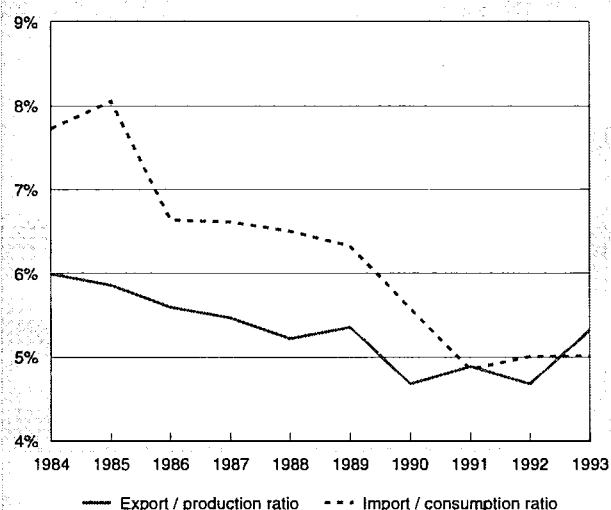
**Figure 7: Meat  
Origin of EU imports**



Source: Eurostat



**Figure 8: Meat Trade intensities**



Source: DEBA

### Foreign trade

The balance of trade in the meat sector was in the red for almost the entire ten-year period under consideration. Positive results were achieved only in 1991 and 1993. The 1993 result is above all tied to the exceptional increase in the value of exports (+12.5 %) and a steep fall in imports, especially in France, Italy, Spain and Greece. Germany, on the other hand, upped its imports from outside the EU. It is important to point out that about 81 % of exports and 79 % of imports occur between the countries of the EU, thereby making foreign trade outside the area less significant. Export figures have, in fact, dropped slightly while there has been a gradual 'closure' against the imports of foreign products, driven out by the strong growth in production recorded in the EU (see Figure 8).

In the pork subsector, the fall in prices recorded in 1993 persuaded the Community to authorise the subsidised export of 30 000 tonnes to Russia. Meanwhile, the level of EU beef exports remained unchanged between 1992 and 1993, while imports increased.

In the sheep meat and goat subsector, in 1993, the occurrence of diseases like foot and mouth disease in the East European countries led to import restrictions. Meanwhile, the drop in production in New Zealand affected the Community market by favouring the exports of the United Kingdom and Ireland.

The poultry subsector, while having recorded a by-volume increase of about 14 %, still had difficulty extending its export markets due to the strong competitiveness of US and Brazilian products and the greater degree of self-sufficiency of the non-industrialised countries.

Exports from the US have at times been subsidised by amounts double that of the EU restitution. 40 % of European meat exports go to Japan, the USA and the EFTA countries. In 1993 there was a general reduction of trade with these countries in favour of Russia, which has a market share equal to 12 %, greater than that of the USA and EFTA, and second only to Japan. This same trend involved Poland, where imports from Europe increased considerably, though the figure reached was not particularly high (around 3 %). As a consequence of trade sanctions imposed following the Gulf War, Europe's meat exports to Iraq plummeted by 90 % from 153.9 million ECU in 1988 to 13.1 million ECU in 1993.

In 1988, the meat sector did not show any specific concentration in terms of source of imports. Apart from New Zealand (15 %) and Brazil (12.6 %) which are major partners, we find Argentina (10.6 %) and the USA (8.6 %), to which must be added Hungary, Australia and the EFTA countries, all of which have similar shares of around 8 %. From a geographic viewpoint, it is right to say that every continent except Asia contributes about equally to European imports. In 1993, greater importance was acquired by Brazil, while the USA and Australia considerably reduced their flow of trade.

## MARKET FORCES

### Demand

Generally speaking, there was an increase in the demand for products in all sectors, with a greater service component, particularly for pre-packaged and pre-cooked products. Two examples are the growing demand for pre-processed foods (spiced meats and pre-cooked vegetables, meat pieces, mince-meat - especially pork and beef, etc.) and for cuts of fresh meat presented on polystyrene or cardboard trays.

The demand for beef is affected by the supply of fish, cheese and pasta, especially in the Mediterranean countries; and poultry, which has an image that is more in line with the demand for food freshness and hygiene. The image of beef has been damaged somewhat by the widespread diseases affecting cattle and by the negative opinion of consumers towards the use of hormones in animal feeding. The consumption of canned beef is dropping, although that is of minor importance.

The demand for pork is directed in particular to deli meats - mainly Parma ham and salami - eaten as snacks or as a substitute for other meat products during main meals. In this case too, the spread of diseases - e.g. swine fever, which hit

**Table 5: Meat Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	87.7	90.0	91.9	92.6	94.7	96.4	100.0	106.8	109.5	113.2
Unit labour costs index (3)	88.3	91.6	92.4	94.3	97.3	99.6	100.0	101.0	103.3	101.3
Total unit costs index (4)	93.0	94.7	93.0	90.1	92.6	100.5	100.0	99.8	103.1	99.9
Gross operating rate (%) (5)	4.96	4.88	5.61	6.13	5.10	4.91	5.53	5.24	4.78	4.87

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Table 6: Meat  
Gross per capita consumption, 1992**

(kg per head)	Total meat	Cattle and calves	Pork	Sheep and goats	Poultry
EU (1)	93.9	21.5	40.5	4.1	18.9
Belgique/België, Luxembourg	102.6	20.3	50.4	2.0	18.1
Danmark	108.5	20.7	64.6	1.0	13.5
BR Deutschland (1)	95.4	19.7	55.7	1.0	12.5
Hellas	85.3	22.7	22.9	14.9	18.2
España	102.2	13.0	49.6	6.7	23.4
France	111.5	29.7	37.4	5.6	21.9
Ireland	99.8	16.9	37.8	7.9	23.1
Italia	89.7	25.2	33.4	1.9	19.7
Nederland	90.6	20.9	44.1	1.2	20.5
Portugal	80.0	16.8	30.3	3.9	19.9
United Kingdom	74.3	19.5	23.0	6.7	21.2

(1) Including former East Germany.  
Source: Eurostat

pig farms in Flanders in 1990 - strengthens consumer belief that pork is not very healthy.

The demand for poultry is favourably sustained not only by its image as lighter and lower in fat than red meat, but also because it is cheaper. The fastest expanding subsectors are those of turkey, roast chicken, either pre-cut or found in pre-processed foods. On more advanced markets, like that of France, there is a big demand for certified-label products, such as the label rouge, guaranteeing the respect of particular poultry farming and slaughtering techniques, such as the type of feed, life span of the poultry and percentage of various feeds used, etc.

The demand for sheep meat and goat is concentrated in those EU countries where it is traditionally eaten during main meals, e.g. the United Kingdom and Greece.

#### Supply and competition

The EU is, taken as a whole, the world's second biggest producer of beef, pork and poultry, after the USA. In the sheep meat and goat sector, China is well in the lead, as was mentioned above. The EU is the second biggest producer of pork (taken on its own) after China, the second biggest producer of poultry and beef after the USA and the third biggest producer of sheep meat and goat after Asia and Africa.

The work productivity index underwent stable growth between 1984 and 1993 with greater variations in the 1990s. In these years, levels of employment dropped as did the unit cost of labour. This pattern was followed by a fall of the gross operating rate, however, which was tied to a drop in the value added in production (see Table 5).

Currently, the retreat of foot and mouth disease, now only present in Italy, could favour greater competitiveness and enable the EU to once more be a part of the zero-risk group of countries. As it stands now, no-risk areas like the USA and Japan tend to refuse imports from the EU.

#### Production process

The biggest innovations in production processes concern the increase in the shelf life of fresh products, particularly the greater availability of products in modified atmospheres and the introduction and spreading of technologies for the production of pre-packaged and pre-cooked meats. In the beef subsector, production costs are greater than those in the USA and South American countries which have raised the technological level of their plants considerably over the last few years.

**Table 7: Meat  
Usable production (slaughtering) by country, 1992**

(thousand tonnes carcass weight)	Cattle and calves	Pork	Sheep and goats	Equidae	Poultry
EU (1)	8 384	14 402	1 177	93	6 923
Belgique/België, Luxembourg	359	952	6	2	226
Danmark	217	1 370	2	1	155
BR Deutschland (1)	1 829	3 684	44	5	590
Hellas	80	153	132	0	175
España	535	1 912	247	8	862
France	1 877	1 994	172	13	1 853
Ireland	553	181	89	0	93
Italia	1 217	1 342	86	62	1 096
Nederland	635	1 584	17	1	572
Portugal	123	265	27	1	206
United Kingdom	960	965	355	1	1 095

(1) Including former East Germany.  
Source: Eurostat

**Table 8: Meat  
Production in current value by Member State, 1993 (1)**

(million ECU)

EU	79 675
Belgique/België	2 021
Danmark	4 415
BR Deutschland	11 812
Hellas	354
España	7 277
France	22 022
Irland	2 723
Italia	10 164
Luxembourg	50
Nederland	6 214
Portugal	785
United Kingdom	11 797

(1) Estimates.  
Source: DEBA

## INDUSTRY STRUCTURE

### Companies

The meat sector comprises a high number of large companies, as well as numerous small and medium-sized enterprises. The production structure is fragmented, even though Community regulations relating to new agricultural policies and the level of concentration achieved by large and modern distribution networks have given rise to a level of concentration in the sector that is among the highest ever to have occurred within the entire agricultural sector. In Italy, the phenomenon of productive reorganisation essentially involved large enterprises and the animal slaughtering subsector.

Especially in the beef subsector, there has been a gradual increase in value added in production aimed at large distribution networks, due to the integration of cutting and packing services into butchering companies. Such 'extensions', made possible by improvements in cold storage, have given added importance to companies' supply and transport services, considering the short shelf life of the product (five days). Likewise, storage technologies, such as those in modified atmospheres enabling shelf life to be extended, are becoming more significant.

The poultry subsector, characterised by high economies of scale in production, presents an industrial structure comprising numerous large enterprises in most EU countries. These companies have a totally integrated structure upstream of the processing stage, ordinarily using automated systems.

The pork subsector shows important differences in terms of industrial structure depending on the categories considered. In particular, ham production is characterised by small production units, with a large number of people still employed in the manufacturing process. In these subsectors, scale economies are substantially limited and the process of concentration of production takes place at subsequent stages, particularly during seasoning. Conversely, a greater concentration of production takes place in other subsectors where there is a higher possibility of process industrialisation, e.g. wurst, Bologna sausage and boiled ham.

The major enterprises at the European level operating in the meat sector belong to highly-diversified, multinational companies like Unilever and Nestlé; to enterprises prevalently concentrated in the sector like Hillsdown Holdings (4 828 million ECU in 1993), Booker (4 580 million ECU in 1993), BP Nutrition (3 129 million ECU in 1993), Cremonini (1 780 million ECU in 1993); and finally, firms operating exclusively

in the sector like Sudfleisch (2 033 million ECU in 1992), Nordfleisch (2 000 million ECU in 1992), Socopa (1 890 million ECU in 1993) and Moskel (1 750 million ECU in 1992). Concentration levels within the sector are generally low. In particular, the first six companies specialised in the production and processing of meat retain 19.6 % of the overall market, while multinationals Unilever and Nestlé cover about 10 % of the delicatessen market.

About 50 % of the animals slaughtered in 1992 in the EU were pigs raised mainly in Germany, Holland and Denmark. 26 % were cattle, with production concentrated chiefly in Germany, France and Italy. Finally, 22 % were poultry, slaughtered mainly in France and Italy (see Table 7). In 1993, the biggest producers (value-wise) of meat in the EU were France, Italy and Germany.

The per capita consumption of meat in 1992 was an average 94 kg, of which about half was pork, about one-quarter beef, a fifth poultry and the remainder sheep meat. The biggest consumers of meat are France, Denmark, Belgium, Luxembourg and Spain: France has the highest per capita consumption of beef, Denmark of pork, Spain of poultry, while Belgium and Luxembourg have a particularly high per capita consumption of meat of all kinds.

- **Cattle:** The consumption of beef by volume declined constantly between 1988-1993 in most EU countries (notably in the UK: -15 %), except for Portugal, Denmark and Greece where consumption rose by about 10 %. 53 % of beef consumption was concentrated in Italy, France and Germany, while the biggest per capita consumption was in Italy and the countries of northern Europe (Source: Euromonitor).
- **Pigs:** The consumption by volume of pork declined constantly throughout the EU until 1992, while in 1993 there was an approximate 1 % growth compared to the previous year. Exceptions were Spain and Portugal, where consumption continued to fall. About 50 % of consumption is concentrated in France, Germany, Italy and the United Kingdom, though the biggest per capita figures are to be found in Denmark with about 67 kg, Belgium with 50 kg and Ireland with 35 kg.
- **Sheep and goats:** The consumption of sheep meat and goat in the 1988-1993 five-year period failed to show a uniform pattern within the EU. In fact, though there was an overall drop equal to about 13 %, contributed to by the United Kingdom and Spain, in all the other countries there was a considerable increase, especially in Italy (+13 %) and Germany (+28 %). The biggest per capita consumption is to be found in Greece, with about 15 kg.
- **Poultry:** Over the five-year period considered, the consumption of poultry showed the strongest growth at around 4.8 % and reached 19 kg per capita in the EU, varying from 23 kg in Ireland and Spain and about 12 kg in Germany.

### Strategies

The meat sector is a mature market in most countries of the EU. The strategies adopted by enterprises in the various subsectors aim at differentiating and determining supply - according to the production process, the product and/or its region of origin - the elements on which to base the process of differentiation. In particular, reference is made to ISO standards, to labels as indicators of process differentiation, to PGIs as indicators of origin and to new products, such as flavoured deli meat or meat with a low fat content, etc.

Such strategies are determined by the degree of market development and by the food consumption patterns which distinguish the market. Some difficulty exists with regard to the introduction of labels certifying farming methods in those countries whose markets for beef are more advanced in terms of consumption.

**Table 9: Meat  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.57	0.74
Danmark	4.97	3.49
BR Deutschland	0.52	0.46
Hellas	0.32	0.61
España	1.12	1.32
France	1.35	1.47
Irèland	3.67	3.07
Italia	0.81	0.91
Luxembourg	0.47	0.34
Nederland	1.58	1.65
Portugal	0.48	0.74
United Kingdom	1.04	0.98

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

The most sophisticated differentiation strategies concern the pork meat trade subsector, which is also that with the greatest value added. In those countries where the meat market has reached an advanced stage, like France, the enhancement of the area of origin plays an important role, as is indicated by the popularity of Souchon d'Auvergne. Product differentiation also involves the introduction of deli meat for different stages of a meal, such as round salami for hors d'oeuvres and short and dry salami for sandwiches. Finally, there is the production of sausage products made from goat, wild boar or flavoured with walnuts and chanterelles; and vintage pork meat or products with a low fat content.

In the poultry subsector, company strategies are essentially based on the certification of quality. This, to guarantee that recognised farming methods have been used, e.g. during the production of pre-processed dishes where the poultry is combined with other foods.

The sector has been among the most active in terms of acquisitions with 31 such operations in 1993 and 15 in 1994. Acquisitions were prevalently made by UK, French and US companies and showed - excepting those made by US firms - a tendency to strengthen positions consolidated within respective domestic markets.

### Impact of the Single Market

The impact of the creation of the Single Market has been positive. It favoured international trade by liberalising the movement of persons and goods, increasing also competition inside the market. In relation to the meat sector, the creation of the Single Market also had a positive effect, mainly on small and medium firms by reducing financing and administrative burdens and by stimulating investment. Unfortunately, internal barriers still remain, due to the lack of fiscal harmonisation, and to differences within countries in the implementation of adopted legislation.

The harmonisation of legislation especially referring to production standards and product composition with the USA is a priority for the industry.

### REGIONAL DISTRIBUTION

Meat production shows different regional concentrations within the EU depending on the type of animal being reared. With regard to cattle, production is concentrated in Brittany and the regions of southern Germany like Bavaria and Niedersachsen. The Netherlands, Denmark and the plains of northern Germany and Emilia Romagna are pig farming centres;

while poultry is produced mainly in southern Lombardy, Veneto and western France. Finally, the central regions of Spain, the whole of Greece, Sardinia and parts of Wales and Scotland are sheep and goat herding centres.

### ENVIRONMENT

Environmental problems related to the meat sector chiefly involve territorial concentration. This problem is particularly keen in Emilia Romagna, Italy, where there is also the difficulty of the disposal of pig waste which pollutes the deep underground strata. On a more positive note, the disposal of industrial by-products is facilitated through the large and well developed industry which processes them for the manufacturer of fertilisers and animal feeds.

### REGULATIONS

#### Beef

The beef sector is regulated by EEC Regulation 805/68 - which has been amended several times over the years - and by EEC Regulation 125/93.

Every year, the Community intervenes in the operation of the market by setting the intervention price and the orientation price, taking into account the growth prospects of production and consumption as well as the situation of the milk and dairy products market. As part of the CAP reform, the intervention price was reduced by 5 % beginning in July of 1993.

The measures adopted with the McSharry reform have affected the intervention and financial incentive systems. With regard to the intervention system, the general criteria (normal regime) provide for intervention when the mean Community market price is less than 84 % of the intervention price or the mean domestic price is less than 80 % of the intervention price of each country. With the reform of the CAP, new limits have been introduced for intervention as part of the normal regime, set at 750 thousand tonnes for 1993 and 650 thousand tonnes for 1994. Furthermore, safety measures operate when the Community market price drops below 78 % of the intervention price and when the market price is less than 60 % of the intervention price of a Member State or of a region (the previous threshold was 72 %).

The incentive system also has been adapted to the new situation brought about by the CAP reform and included in the body of regulations of the Common Market Organisation (CMO). In this framework, incentives go to:

- compensate for the drop in income due to the fall of prices threshold (special incentive - awarded on the basis of a limited regional ceiling and incentive for lactating cows);
- balance the market during the course of the year (seasonal adjustment incentive awarded for animals slaughtered between 1 January and 30 April, if in the Member State the animals slaughtered in the September-November period exceed 40 % of the yearly total);
- encourage extensivisation; and
- reduce meat production in favour of milk production (incentive for conversion or, alternatively, participation in intervention for light carcasses).

The CAP reform also contains a programme for the promotion and sale of quality beef (Regulation 2067/92). This focus on quality, along with the protection of human health, led to Directive 93/43, a horizontal directive setting general rules of hygiene for food products and methods for controlling the observance of such regulations. This directive has widened the areas covered by previous sectoral regulations (e.g. Regulations 91/497 and 92/05 for the meat sector) forcing food companies (and others) to adopt HACCP (Hazard Analysis and Critical Control Points) methods for the control of all

processes - from preparation to sale - and recommending the adoption of quality manuals and EN 29 000 quality standards.

### Sheep meat and goat

The common market in this sector is standardised by Regulation 3013/89. Each year, the Council sets a single base price for fresh and chilled sheep meat for the entire Community. This price takes into account seasonal market variations.

For sheep meat and goat, the CAP reform restricts, according to the producer's sheep stock of reference, the number of sheep a farmer can raise and still have the right to incentives. This limit corresponds to the number of sheep a farmer can breed and still benefit from the incentive in the best of years between 1989 and 1991, but with a maximum of 1 000 sheep in less favoured areas and 500 sheep in other areas. Above this limit, only 50 % of the incentive is paid.

### Effects of the GATT agreement on the meat sector

- **Exports:** An overall restriction of Community exports is expected, with the criteria of a 36 % reduction in export subsidy expenditure and a 21 % reduction in the volume of subsidised exports. In the year 2000, the maximum quantity of subsidised exports will equal 817 thousand tonnes for beef, 389 thousand tonnes for pork and 291 thousand tonnes for poultry. The bilateral agreement between the USA and the EU allowing for a gradual reduction of the volume of subsidised exports, permits larger subsidised exports over the implementation period, taking the 1991/92 levels as the base, instead of those in 1986/90. Consequently, the Community will be able to recover 362 thousand tonnes of beef, 253 thousand tonnes of poultry and 16 thousand tonnes of eggs.
- **Access to the market:** The agreement provides for a minimum market access equal to 3 % of average domestic consumption in the first year of the implementation period and up to 5 % by the end of the implementation period. In any event, the impact of market access measures will be minor, partly because current EU imports exceed the limits set by the agreement, except for pork, imports of which will need to double. Reduced tariff access quotas will be opened for a total of 75 thousand tonnes, of which 39 thousand will relate to loins, boned loins and boned hams. The current 7 % tax on fresh, chilled and frozen pig's liver will be abolished by 2000. Furthermore, as different types of meat can be recorded in the calculation of the minimum access quota (as opposed to the single customs items as provided for in the Dunkel document), imports can be planned with greater flexibility.
- **Support:** Compensatory aid to income provided for by the CAP for cattle and sheep is not subject to the support reduction measures laid down by the GATT agreement.
- **Health and plant health measures:** Two criteria laid down by the agreement are of particular interest to the meat sector. The "principle of equivalence" states that if the health measures of a supplier country guarantee health protection levels required by the buyer country, these should be accepted even if they are formally different from internal measures. The second criterion concerns the status of the "area free from disease". Traditionally understood to mean a country or geographic area, it finds a more flexible interpretation in the GATT agreement, which provides that an area within a region where there are epidemics or outbreaks may continue to export its products if it can offer proof of being free of contagion.

## OUTLOOK

Over the next few years, competitiveness between enterprises is expected to become more intense due to the substantial lack of opportunity to expand and consolidate European exports to south-east Asian markets, which will be served to an ever greater degree by the USA and New Zealand.

Meanwhile, on the domestic market, Community measures regarding the control of the production and distribution processes will inevitably affect cottage and small enterprises. Moreover, increased concentration in the distribution sector and a drop in consumption levels will tend to erode profit margins of producers.

Forecasts therefore envisage an increase in the process of concentration under way in the sector, the adoption of more sophisticated differentiation strategies and the growing tendency to prefer greater value-added products.

Written by: NOMISMA

The industry is represented at the EU level by: Union Européenne des Exploitants d'Abattoirs (UEEA) (NACE 412.1). Address: 197 rue Belliard, Bte 6, B-1040 Brussels; tel: (32 2) 230 6170; fax: (32 2) 230 3063; Association of Poultry Processors and Poultry Import and Export Trade in the European Union (AVEC). Address: Trommesalen 5, 4th floor, DK-1614 Copenhagen V; tel: (45 33) 25 41 00; fax: (45 33) 25 35 52; and Liaison Centre of the Meat Processing Industry in the EU (CLITRAVI) (NACE 412.2). Address: Blvd. Baudouin 21, 7th floor, B-1210 Brussels; tel: (32 2) 233 0141; fax: (32 2) 223 1244.

# Dairy products

## NACE 413

The production of milk by volume has dropped following a Community policy aimed at the overall restriction of production surpluses in Europe. EU consumption of milk and cream is stable, while that of butter continues to drop while that of yoghurt and cheeses is rising.

In such a context, enterprises are strengthening their respective positions on domestic markets through a process of takeovers, particularly on the German market, in order to gain access to East European countries. Such a process is continuing despite the high degree of concentration existing in most sectors already.

The coming into effect of Community regulations aimed at developing procedures to control critical stages in the production process will help to change the structure and organisation of the sector.

### INDUSTRY PROFILE

#### Description of the sector

The dairy sector includes activities of milk thermo treatment for alimentary use - e.g. pasteurised and UHT milk (both powdered and condensed) - and the processing of milk into by-products. The latter are used as both intermediate processed products (casein) and end products like cream, butter, yoghurt and cheeses. Ice cream made from milk is dealt with in a separate chapter, together with chocolate, cocoa and sweets.

The dairy industry is among the major agri-foodstuff sectors in all European economies. In fact, it represents about 13 % of the overall food budget on average. The highest figures relate to the United Kingdom and Germany with 16 %, while the lowest figures are to be found in Spain and Portugal with around 11 %.

Although consumer patterns within the EU still differ significantly, the most consumed dairy product remains milk, followed by cheese, yoghurt and (albeit to a decreasing extent) butter.

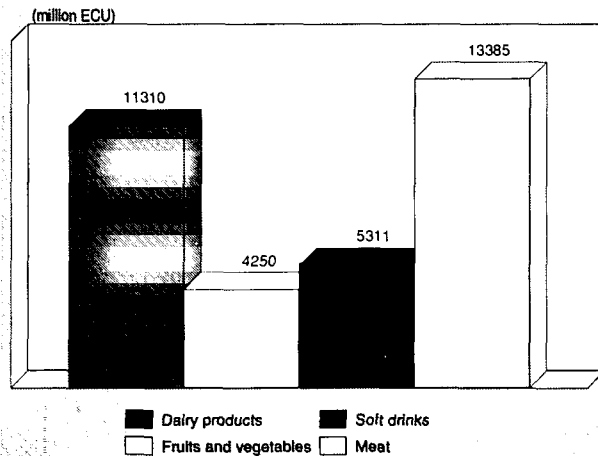
The distribution of production activities in the dairy sector and the levels of self-sufficiency of the Member States have been significantly shaped by the strict regulations enforced within the sector since 1984, when milk quotas were introduced. The list of structurally 'deficient' countries includes the United Kingdom, Italy, Spain and Greece, while the other EU countries are fully self-sufficient.

#### Recent trends

The 1984-93 period witnessed a steady growth in production and consumption at current prices. On the other hand, exports and the trade balance show a more uncertain pattern, with a 20 % drop in exports and an almost 26 % drop in the trade balance in 1986. These drops were somewhat less steep in 1990 (16 % exports, 18.7 % trade balance). Employment figures in the sector shrunk from 281 000 in 1984 to 246 000 in 1993.

Fresh milk-based products (including milk) within the EU make up about 84.5 % of overall production in the sector. These are followed in order of importance by cheese and butter. Total production is sufficient to completely meet the internal needs of the EU and therefore the market share of imports is modest (at around 1 %). Only the demand for drinking milk is slightly greater than the EU production capacity. The demand from abroad met by internal production is equal to almost 6 %, a share which has been shrinking since 1984.

Figure 1: Dairy products  
Value added in comparison with related Industries, 1993



Source: DEBA

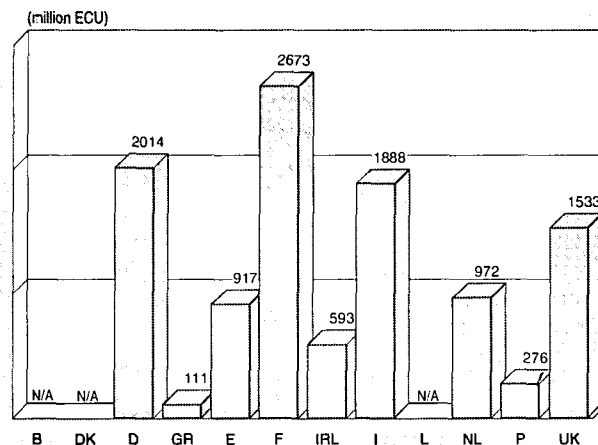
Exported products are full cream and skimmed powdered milk, cheeses, condensed milk and butter.

Altogether the dairy industry is marked by a high value added, only slightly less than that of the meat sector and considerably more than that of fruit and vegetables and soft drinks. The countries with the highest value added are France, Germany, Italy and the United Kingdom.

At steady prices, average growth rates for the dairy sector have been positive with regard to production and internal requirements, while exports have gradually continued to shrink. In 1992/93, such variations increased, and while internal production and consumption grew by about 3 %, exports dropped by 3.58 % and imports went up by 5.16 %.

At steady prices, dairy production between 1984-90 showed growth rates lower than those of the manufacturing industry. Subsequently, both sectors were marked by irregular growth patterns. Employment figures in the dairy industry have been on an almost constant decrease over the last 10 years, in keeping with a similar trend in the manufacturing industry.

Figure 2: Dairy products  
Value added by Member State, 1993



Source: DEBA

**Table 1: Dairy products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	49 629	55 533	61 387	64 243	65 775	66 699	68 416	70 481	72 700	75 100	77 500
Production	52 797	58 369	64 802	67 020	68 747	69 920	71 692	73 423	75 700	78 200	80 700
Extra-EU exports	3 846	3 598	4 295	3 595	3 732	3 980	4 107	3 851	4 000	4 100	4 200
Trade balance	3 168	2 837	3 415	2 777	2 971	3 221	3 276	2 943	3 000	3 100	3 200
Employment (thousands)	281.3	254.5	252.3	256.7	257.0	250.0	246.0	242.8	241.0	240.0	239.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Dairy products**  
**Breakdown by major product line, 1992 (1)**

(thousand tonnes)	Usable production	Total domestic use	Total exports
Fresh milk products except cream	34 994	34 760	138
Drinking milk	29 490	30 721	214
Cream	1 155	1 157	27
Concentrated milk	1 237	856	278
Whole milk powder	963	362	593
Skimmed milk powder	1 191	1 137	487
Butter	1 676	1 568	234
Cheese	5 592	5 300	375

(1) Including former East Germany.

Source: Eurostat

**Table 3: Dairy products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.78	2.52	2.11	2.88
Production	1.50	2.32	1.86	2.48
Extra-EU exports	-2.11	-1.70	-1.93	-3.58
Extra-EU imports	1.65	-2.45	-0.19	5.16

(1) Some country data for apparent consumption and production have been estimated.

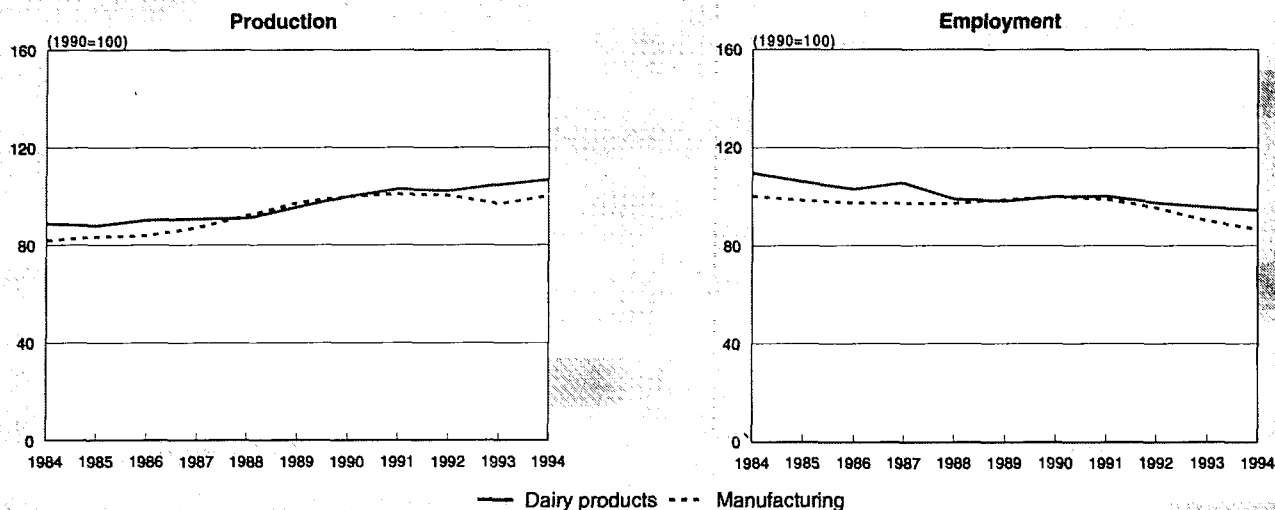
Source: DEBA

**Table 4: Dairy products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 846	3 765	3 013	3 081	3 598	4 295	3 595	3 732	3 980	4 107	3 851
Extra-EU imports	677	703	736	710	762	879	818	761	759	831	908
Trade balance	3 168	3 062	2 278	2 372	2 837	3 415	2 777	2 971	3 221	3 276	2 943
Ratio exports / imports	5.68	5.36	4.10	4.34	4.72	4.88	4.39	4.90	5.25	4.94	4.24
Terms of trade index	95.4	96.8	84.6	74.2	79.1	99.1	100.0	94.3	94.7	97.3	N/A

Source: DEBA

**Figure 3: Dairy products**  
Production and employment compared to EU total manufacturing industry



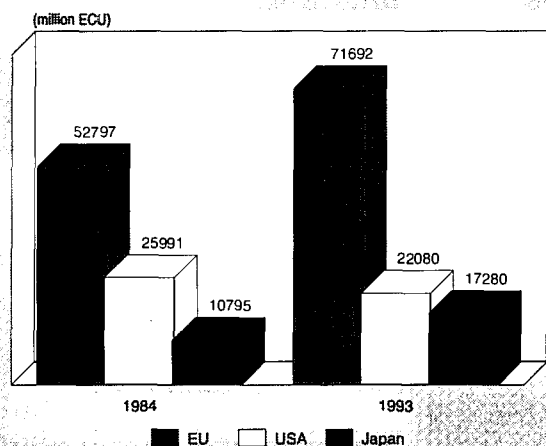
1994 are Eurostat estimates.  
Source: DEBA

Following are the consumption figures for the subsectors of the dairy industry in the EU (Source: Euromonitor):

- Milk: in many countries of the EU, milk consumption dwindled through 1993. The biggest drop was in Belgium (-6%). Germany was an exception, and consumption actually increased (+5%) as it did in Greece (+2%). Ireland recorded the biggest per capita consumption, with 147 litres/year followed by Denmark with 112 litres/year and the United Kingdom with 103 litres/year. The countries with the lowest per capita consumption were Greece and Germany with around 50 litres.
- Cheeses: cheeses represent the main item of expenditure for dairy products in Europe. The biggest consumers in terms of volume are France, Germany, Italy and the United Kingdom which together accounted for more than 70% of overall consumption in 1993. From 1988 to 1993, there was an overall growth in cheese consumption which, again in terms of volume, was greater in Denmark and France.

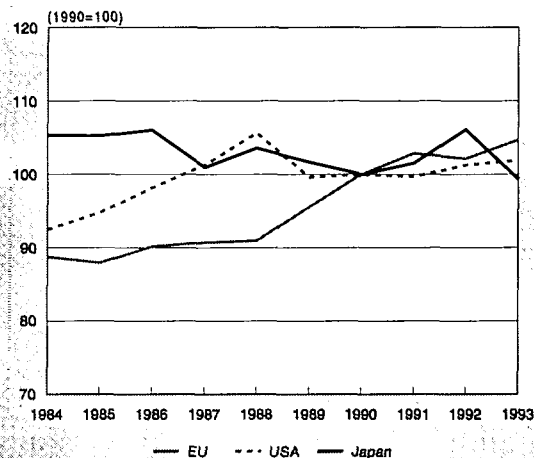
- Butter: between 1988-93, there was a definite drop in butter consumption in many EU countries. Average figures hovered around 10% over the five-year period, the biggest drop being in Denmark (52%). An exception was Germany, which showed a rise of 4% and Portugal, where there was a 140% increase. About 83% of butter consumption is concentrated in four countries (Germany, France, Belgium and the United Kingdom), of which Germany alone accounts for 43%. These countries also have the biggest per capita consumption. In 1993, there were no variations in consumption levels, apart from Germany, where there was a large increase equal to 6% in volume.
- Yoghurt: the consumption of yoghurt jumped considerably over the 1988-93 period in all EU countries. The biggest rises were in Italy (55.8%), Spain (32.6%) and the United Kingdom (29.7%). Conversely, the smallest increase was recorded in Ireland (8.33%). The countries that consume the largest volumes of yoghurt are France, Germany and

**Figure 4: Dairy products**  
International comparison of production in current prices



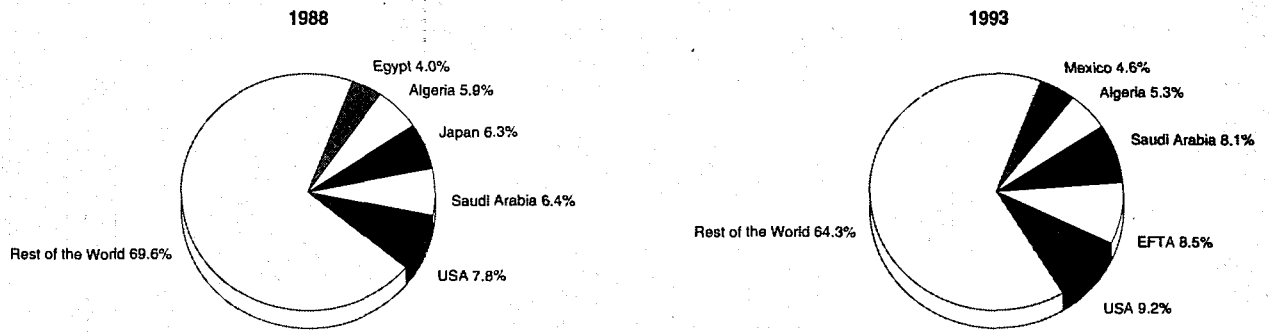
Source: DEBA

**Figure 5: Dairy products**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Dairy products  
Destination of EU exports**



Source: Eurostat

Spain, while the biggest per capita consumers are The Netherlands (21.5 kg), France (19 kg) and Denmark (16.2 kg). Spain, France and Germany also accounted for 58.28 % of overall volumes consumed in 1993. During 1993, these figures maintained the growth patterns recorded for the five-year period in most of the EU countries, except for The Netherlands, where there was a slight drop of 1.2 %, and in Denmark, Luxembourg and Greece, where figures remained unchanged compared to the previous year.

#### International comparison

The EU was the world's largest producer and exporter of dairy products at current prices between 1984-93, despite an 8 % drop in production levels between 1990-93. The EU provides the international market with about 58 % of its cheeses, 57 % of its powdered milk and 31 % of its butter.

The former Soviet Union makes roughly a 19 % overall contribution to world production, while the USA contributes 15 %. These figures represent a significant drop compared to 1984.

Between 1990-93, there was a general increase in production in the United States, Australia, New Zealand and the developing countries, especially those of Asia. Japan also underwent growth, but to a lesser extent than the other countries under

consideration, despite the fact that in 1984 its production rose by about 60 %.

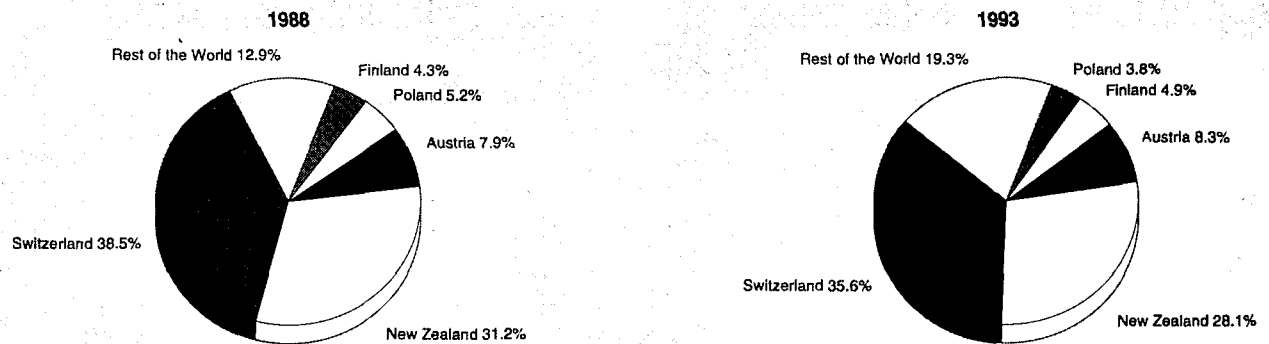
At steady prices, the EU recorded growth throughout the period, with stronger variations in the years 1988 and 1991. The USA recorded particularly strong growth up to 1988, after which figures tended to level off, while growth patterns in Japan were stable.

In the EU, there was a strong increase in the production of cheese from full cream milk (7.6 %) in 1992. This trend was greatly amplified in the USA where the rise touched 20.5 %, while there was a sharp and general drop in East European production caused by the precarious economic situation in those countries. On the other hand, the production of butter in the EU fell by about 19 %, while the drop in the former Soviet Union was not as sharp. The only increases in production were recorded in Australia and New Zealand.

#### Foreign trade

The balance of trade of the EU with regard to dairy products remained generally favourable for the entire 1984-93 period, though the trend was not stable. The ratio of exports to imports, which remained extremely high, showed a slight drop until 1991, proof that variations in import figures were larger than

**Figure 7: Dairy products  
Origin of EU imports**



Source: Eurostat



**Table 5: Dairy products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.9	82.9	87.4	85.9	91.8	97.2	100.0	102.7	104.9	109.3
Unit labour costs index (3)	91.6	95.0	93.7	98.1	96.4	96.3	100.0	104.7	108.6	104.8
Total unit costs index (4)	89.6	92.4	93.5	93.0	96.6	101.2	100.0	99.2	101.6	100.6
Gross operating rate (%) (5)	5.15	5.52	5.56	5.53	5.64	5.74	5.40	5.69	5.36	5.47

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

variations in export figures. The only exception was 1992, when there was a substantial stagnation in imports and a strong growth of exports. The terms of trade index for 1990 shows that the prices of exports are more or less equal to those of imports. This situation worsened during the 1986-88 period when a tendency for import prices to rise was contrasted by a decrease in export prices.

In 1988, the main trading partners for the EU were the United States and EFTA countries; Saudi Arabia and Algeria, with equal shares, are the main players in the Middle East and North Africa. Combined, the USA and EFTA countries took 18 % of total EU exports in 1993, while Algeria and Saudi Arabia took 12 %. In 1993, there were no particularly significant changes to these figures, although EFTA's share grew to 8.5 % and there was an increased contribution from the USA. Alongside these trading partners, Mexico acquired growing importance with a share of 4.6 %. As far as the Arab countries are concerned, it should be emphasised that, while in 1988 Iraq took 4 % of European exports for a value at current prices of 67.3 million ECU, in 1993 this figure had dropped drastically to 0.7 million ECU at current prices. The overall share of the Arab countries underwent a slight increase, however, while the overall share of the countries of North Africa shrank by 3 %.

Around 49 % of imports come from EFTA countries. Switzerland has a 35.6 % share followed at a distance by Austria and Finland. Another European partner is Poland with a very small 4 % share. Among non-European countries, New Zealand plays a lead role with 28 % of EU imports. 1993 also saw a rise in imports from Eastern Europe (outside Russia and Poland), especially from Lithuania, Ukraine, the Czech Republic, Bulgaria, Hungary and Romania.

Generally speaking, the degree of penetration of imports did not undergo any noticeable change between 1984-93, remaining steady at around 1 %. Exports dropped, except for the period between 1987-90, due to the more aggressive policies adopted by rival countries and a reduction in production levels due to the Community policy for the restriction of surpluses.

## MARKET FORCES

### Demand

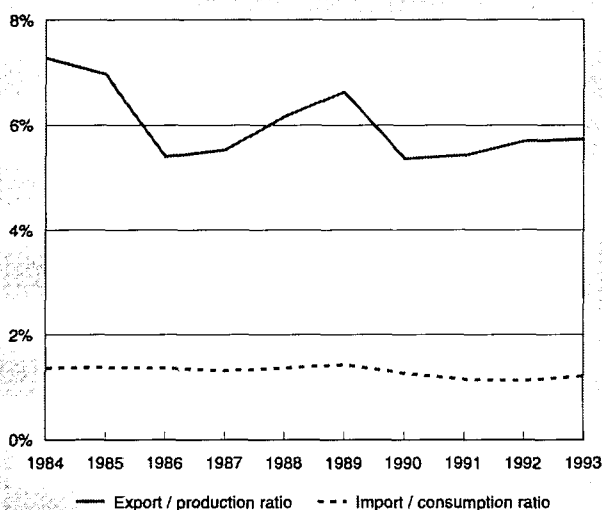
Dairy products are used primarily for human consumption. An exception is powdered milk, which is also used for cattle rearing. All the segments considered relate to a saturated final market, looking to marketing instruments for product differentiation and the progressive increase of market segmentation. In line with this trend, the products are distinguished by the ongoing growth of services as emphasised by the introduction and development of fast foods. Since the early 1990s, consumers have tended to prefer low-fat products and fresh foods, which has led to their dissemination in all segments of the sector.

Milk is considered a dietary staple in all EU countries. It is used at breakfast mixed with tea, coffee and cereals, and is consequently tied to the consumption patterns of these products. It is also consumed on its own as a beverage and thus feels the competition of mineral waters, fruit juices and soft drinks. Over recent years, the increasing consumption of alternative drinks and the drop in the consumption of tea have caused a further drop in the consumption of milk. The popularity of low-fat diets has resulted in milk being used in place of cream during cooking. Since early in this decade, the fastest growing segments are those of milks containing flavourings and nutritional additives.

The demand for butter, though used in different ways in accordance with the different eating habits in the EU countries, has fallen sharply as a result of the tendency to prefer 'lighter' products over animal fats. Subsequently, butter is being replaced by oil, above all in the southern EU countries, and also by margarine. In some areas, mixed-fat products are also used.

Cheeses are primary foodstuffs in France and in Italy, where there is a strong consumption tradition. In other countries, they are more commonly eaten as snacks and are not usually

**Figure 8: Dairy products**  
**Trade intensities**



Source: DEBA

**Table 6 : Dairy products  
Employment by Member State, 1993 (1)**

(units)	
EU	245 953
Belgique/België	7 094
Danmark	8 102
BR Deutschland	40 298
Hellas	5 327
España	19 854
France	56 750
Ireland	8 654
Italia	36 514
Luxembourg	N/A
Nederland	17 350
Portugal	11 152
United Kingdom	35 471

(1) Estimates.  
Source: DEBA

alternatives to meat for main meals. Apart from Spain, there has been an increase in the consumption of fresh and low-calorie cheeses to which must be added dessert cheeses (intended for children) and green-mould cheeses.

The demand for yoghurt is tied in most EU countries to the consumption of desserts at different times of the day. In the southern areas of the EU, this demand very much follows a seasonal pattern, given the abundance of fruit during the summer and a greater consumption of ice cream year round. Among the products taken into consideration, yoghurt presents the highest degree of differentiation and the fastest growing segments concern products for children, bio yoghurt, Greek yoghurt (mainly in the United Kingdom), low-calorie yoghurt and liquid yoghurt (for drinking).

### Supply and competition

The EU is the world leader in all subsectors of the dairy business. This position was validated with regard to cow, sheep and goat milk for human consumption in 1993, though production had dropped compared to 1992. A drop has also occurred in the production of North and Central America, though to a much lesser extent. Certain countries in Asia, Oceania and Africa have recorded increases.

The labour productivity index has continued to grow steadily, with particularly significant increases between 1985-89 and 1992-93. Unit labour costs also tended to increase between 1985 and 1989, whereas a sudden drop was recorded between 1992-93. Meanwhile, the gross operating rate fell after 1989 following a reduction in production value added. Likewise, overall production costs are dropping, as are the number of employees in the sector as a result of the introduction of labour-saving technologies. Though the biggest producer of milk, the EU is distinguished by a high cost of raw material, which is above the level of costs in the USA, Australia and New Zealand. The use of the Bovine Somatophyn hormone in the USA - forbidden in the EU - will enable that country to further reduce its overall production cost of raw material.

The butter segment has seen a substantial fall in exports due to the steep drop in demand in the major traditional markets. The cheese subsector has recorded the regular growth of fresh products and increased its exports of cream cheese between 1992-93 by about 11 %. Finally, the yoghurt subsector recorded a drop in consumption at EU level for the first time in ten years.

There is an affirmed trend towards a progressive erosion of profit margins in the dairy industry within the EU. This is due to the high concentration achieved by modern organised distribution in the management of dairy products and by the competition - triggered after the application of Community policies aimed at reducing production surpluses - among companies in the raw material supply stage.

The market share of dairy products which involve the most advanced forms of distribution varies according to the buying habits of consumers, the degree of development of such forms and the types of products considered. Such advanced distribution is more common in Northern Europe, e.g. in The Netherlands, where 86 % of dairy sales were managed by these forms of distribution in 1992, while in Spain and Italy this figure dropped to 65 % and 49 % respectively. There has been a strong rise in the sale of dairy products through discount stores, which detain a share around 63 % in Germany.

Milk, butter and yoghurt are the chief products purchased through modern distribution networks. In 1992, milk retailed through supermarkets represented 86 % of the total in The Netherlands, 72 % in Spain and 50 % in Italy. An exception to this trend was the United Kingdom where 58 % of milk is delivered directly to the home. This figure, which in 1988 touched 73 %, has fallen sharply due to the lower retail price of milk purchased through advanced distribution set-ups. Dis-

**Table 7: Dairy products  
Number of enterprises**

(units)	1982	1985	1988	1991
EU	6 161	5 583	6 767	4 581
Belgique/België	71	83	77	60
Danmark	167	90	65	67
BR Deutschland	546	489	408	315
Hellas	N/A	N/A	985	N/A
España	N/A	N/A	595	N/A
France	1 497	1 332	1 143	998
Ireland	93	90	84	31
Italia	3 115	2 816	2 625	2 416
Luxembourg	2	2	2	N/A
Nederland	49	38	33	24
Portugal	N/A	N/A	97	N/A
United Kingdom (1)	621	643	653	670

(1) United Kingdom figures include producer dairies with a milk intake above 180 tonnes per annum.  
Source: ASSILEC

**Table 8: Dairy products  
Dairy cow numbers**

(thousands)	1983	1987	1992	1993
EU	29 963	27 025	21 838	21 211
Belgique/België	984	922	758	690
Danmark	1 003	811	712	707
BR Deutschland (1)	5 735	5 077	5 412	5 255
Hellas	225	245	203	206
España	1 861	1 837	1 468	1 435
France	7 104	5 892	4 606	4 450
Ireland	1 628	1 527	1 400	1 281
Italia	3 068	3 024	2 317	2 277
Luxembourg	69	65	51	50
Nederland	2 554	2 166	1 837	1 804
Portugal	305	395	391	379
United Kingdom	3 333	3 042	2 683	2 677

(1) 1983 and 1987 for West Germany only.

Source: ASSILEC

tributor brands of dairy products are also on the rise, though growth rates differ between the various Member States. In particular, the market share is higher for products which are more difficult to differentiate, e.g. UHT milk and butter. In 1992, this figure touched 85 % in Germany, 28 % in France and 13 % in The Netherlands in 1992.

### Production process

The dairy sector is distinguished by the presence of companies of different size, starting with the small cottage industries producing cheese only, to the large multinationals with high production outputs and fully-automated production cycles. Consequently, production levels vary significantly depending on the type of company.

Compared to past years, intensive capital production techniques have been adopted in every subsector in order to cut costs and provide greater standards of product hygiene. An exception is cheese production, above all the controlled denomination of origin type, made prevalently by small and medium-sized enterprises.

The consumer trend towards a greater consumption of fresh products has stimulated the introduction of milk processing techniques able to increase the storage life of pasteurised milk up to 15 days (e.g. in France). Finally, developments in the production of fresh products have elevated the importance of the supply and transport stages within both production and distribution enterprises.

## INDUSTRY STRUCTURE

### Companies

The dairy industry comprises a group of multinational enterprises which exist alongside numerous small and medium-sized firms with regional marketing areas. The introduction of the milk quota system has brought about strong competition between milk processing companies in the raw material supply stage. This situation has triggered a process of mergers and take-overs which has strongly curtailed the number of enterprises in the subsector, to the detriment of the smaller firms that had not adopted a differentiation strategy aimed at achieving a position in a niche market or an alignment in terms of prices with the large groups.

From 1982 to 1991, the number of dairy enterprises dropped by about one-third, although there is a significant difference between the levels of fragmentation of the EU countries. The situation goes from that of Italy with, 2 400 enterprises having

a turnover of 12 billion ECU in 1992, to those of Germany (315 enterprises and overall turnover of around 15.6 billion ECU) and France (998 enterprises and 16 billion ECU). The Netherlands has 24 enterprises, the United Kingdom 670 and Spain has around 600.

In terms of employment in 1993, jobs in the industry were mainly concentrated in France, Germany, Italy and the United Kingdom. Besides the actual weight of the countries considered in terms of production in the sector, this situation stems from a bigger concentration in the countries of northern Europe of such products as powdered milk. In the livestock rearing subsector, the number of dairy cows fell between 1983-93 with more substantial variations in Belgium, The Netherlands, Italy and France.

In terms of processing, the biggest producers are Germany, France and the United Kingdom: the first two show extremely high production levels for all types of products in the subsector, while the third specialises in the production of fresh milk-based products and drinking milk. Of considerable importance is the production of condensed milk, full cream powdered milk, butter and cheese in The Netherlands, of drinking milk in Spain and of cheese in Italy.

However, very few enterprises present a market extension equal to that of the EU. Among the top ten European groups is a large majority of French and Dutch companies, confirming the predominance of France and the Netherlands in the sector, while German firms are absent, despite the fact that Germany is the biggest producer of milk in the EU. The first 10 European firms offer a range of different products and have a strong presence on the market in all the major segments (milk for human consumption, butter, cream, yoghurt and cheeses). The leading companies at the European level are:

- Yoghurt: Danone, Yoplait, Muller, Zott, Milram, Northern Food, Unigate, MD Food;
- Cheeses: Campina Melkunie, Kraft, Coberco, Friesland Frico Domo, Entremont, Besnier, MD Food; and
- Milk: Campina Melkunie, Dairy Crest, Unigate, Waterford, Parmalat, MD Food.

The individual subsectors show high concentration levels, except in the fresh milk market, where Dairy Crest has a 5.6 % share, Northern Food 4.2 % and Sodial 2.3 %. With regard to powdered milk, however, Nestlé, France Lait and HL Food have a 60-65 % share.

**Table 9: Dairy products  
Usable production by country, 1992**

(thousand tonnes)	Fresh milk products except cream	Drinking milk	Cream	Concentrated milk	Whole milk powder	Skimmed milk powder	Butter	Cheese
EU (1)	34 994	29 490	1 155	1 237	963	1 191	1 676	5 592
Belgique/België, Luxembourg	1 238	982	58	22	40	54	73	70
Danmark	769	552	60	0	103	13	62	292
BR Deutschland (1)	8 004	6 070	561	503	237	404	477	1 291
Hellas	607	576	7	0	0	0	3	173
España	4 355	3 937	52	42	13	23	29	245
France	5 689	4 198	194	77	280	397	467	1 514
Irland	676	660	21	0	31	126	148	93
Italia	3 453	3 268	91	1	3	0	102	916
Nederland	1 794	1 355	51	386	160	64	199	623
Portugal	975	872	4	0	12	8	17	65
United Kingdom	7 435	7 020	56	206	84	102	99	309

(1) Including former East BR Deutschland.  
Source: Eurostat

Elsewhere, examples of concentration can easily be found. For example, Danone has a 35-40 % share of the yoghurt sector. And, Kraft (Philip Morris) has a 17 % share of the cheese market while Danone had an approximate 30 % share of the fresh cheese market in 1992.

### Strategies

Companies confirmed the trend through 1993 towards an increase in the combination of activities through takeovers and commercial and production alliances. This trend has slowed down compared to previous years due to the general recession, which kindled uncertainty in international investors.

In Europe, takeovers were generally concentrated within respective domestic markets in 1993. This pattern can be explained by a desire on the part of medium-sized firms to strengthen their positions in relation to large distribution networks. A case in point is Italy, where takeovers in 1993 were concentrated in the domestic market following the abolition of the so-called 'white areas' which led to the purchase of central dairies by large groups, thus consolidating and increasing their market share of fresh and UHT milk.

Another trend is the takeover of German companies or of firms with a consolidated share of the German market. Examples of such takeovers were those of Unicolait (30 % turnover on the German market) and Sudmilch by Campina Melkunie. The German market is of fundamental importance, not only because of its size, but also because of its potential as a launch pad for penetration into the East European markets.

The differentiation of products in the diverse subsectors has characterised the strategies of European dairy companies. In the milk subsector, one can see a greater distribution of flavoured milks, nutritionally enriched and either partially or fully skimmed. In terms of consumption, niche markets have been established for biological milk.

In the cheese subsector, companies have pursued a differentiation strategy based on the production of typical varieties, recalling aspects tied to tradition, and of green-mould low-calorie cheeses and dessert cheeses. Meanwhile, aspects of differentiation in the yoghurt subsector have involved packing (i.e. in terms of quantities offered), flavours, consistency, caloric and nutritional value and, finally, modes of consumption. Niches for biological products have been established as well in this subsector as well.

The attention given at various levels towards the production of quality foods has convinced many companies to certify

their production processes in accordance with the ISO 9000 standard. This trend chiefly has involved greater value-added production lines.

### Impact of the Single Market

The impact of the creation of the Single Market on the dairy products sector has been positive, increasing competition inside the market and favouring international trade. Harmonisation on labelling, product definition and product composition is, however, still not completed. Higher distribution costs have, however, resulted from the approval of the packaging regulations. Among the dairy subsectors, the cheeses are more penalised, since the cheeses market is very fragmented. In fact, the hygiene framework regulation affects the small and artisanal cheese producers.

### REGIONAL DISTRIBUTION

Within the Community it is possible to pinpoint areas where dairy production is the most concentrated. In particular, reference is made to Spain (Catalonia, Castille and Galicia); Italy (Lombardy, Veneto and Emilia Romagna), though there is a progressive tendency for activities to spread to the southern regions in that country; the United Kingdom (the West Country, Shropshire, Cheshire and Lancashire); France (lower Brittany, Normandy and the Loire Valley); and Germany (Bavaria and Württemberg). Belgium, The Netherlands and Luxembourg present a uniform distribution of activities throughout their territories, while Greece and Portugal show no particular concentrations.

### ENVIRONMENT

From an agricultural perspective, the main environmental problems affecting the dairy industry relate to the pollution of water beds by animal farming. As far as the processing industry is concerned, the biggest problems stem from the disposal of packing and recycling of used containers. In Germany, a country particularly attentive to environmental problems, milk is sold in recyclable polycarbonate bottles.

### REGULATIONS

The basic regulation concerning the designations of dairy products in the context of market organisation is Regulation 804/68. The market is regulated by fixing the indicative price of milk and the intervention price of butter, skimmed powdered milk

**Table 10: Dairy products Acquisitions**

1993 Bidder	Country	Target	Target country
Nestlé	Switzerland	Magnolia Corporation	Philippines
Nestlé	Switzerland	Longa Vida Industrias Lacteas	Portugal
Avonmore Foods	Ireland	Dairy Crest (Birmingham & Hereford)	United Kingdom
Golden Vale	Ireland	Vonkpol	Poland
Waterford Foods	Ireland	Dairy Crest (Durham Dairy)	United Kingdom
Besnier	France	Union de Cooperatives Laitieres	France
Besnier	France	Roussel	France
BSN	France	Aliments Delisle Ltee	Canada
BSN (1)	France	Galbani	Italia
Soparind (1)	France	Veszprem	Hungary
Coloniale	Italia	Frejtej	Hungary
Coloniale	Italia	Giglio Finanziana	Italia
FISVI	Italia	Cirio Bertolli De Rica	Italia
Parmalat	Italia	Fejertej	Hungary
Parmalat	Italia	Spam	Brazil
Cragnotti & Partners	Luxembourg	N/A	Italia
MD Foods	United Kingdom	Dairy Crest (Bamber Bridge)	United Kingdom
Northern Foods	United Kingdom	MD Foods	United Kingdom
Unigate	United Kingdom	Clifford Foods	United Kingdom
Unigate	United Kingdom	Dairy Crest (Marshfield Dairy)	United Kingdom
Unigate	United Kingdom	MD Foods	United Kingdom
Dairy Enterprise	USA	Tuscan Industries	USA
General Mills	USA	Colombo	USA
QUF Industries	Australia	Associated Dairies	Australia
Premier Group (1)	S.Africa	Bonnita Holdings	S.Africa
<b>1994 Bidder</b>	<b>Country</b>	<b>Target</b>	<b>Target country</b>
Nestlé	Switzerland	Foremost Foods Taiwan	Taiwan
Ost Commerz Holding	Switzerland	Mecklenburger Schmelzkaese	BR Deutschland
MD Foods Amba	Denmark	MD Food Norge	Norway
Dairygold Co-operative Society	Ireland	Horlicks Farms and Dairies	United Kingdom
BSN (1)	France	Galbani	Italia
BSN (1)	France	Delta Dairy	Hellas
Fromageries Bel	France	Cademartori	Italia
Papillon	France	Lacandou	France
Naabtaler MilchwerkeBechtel	BR Deutschland	Gruenland Allgauer Kaesewerke	BR Deutschland
Fage	Hellas	Pindos	Hellas
Fage	Hellas	Vakali	Hellas
Parmalat	Italia	Soprocara	Chile
Parmalat	Italia	Fejertej	Hungary
Cirio Bertolli De Rica	Italia	Ala	Italia
Cirio Bertolli De Rica	Italia	Polenghi	Italia
Cragnotti & Partners	Luxembourg	Cirio Bertolli De Rica	Italia
Campina Melkunie	Nederland	Suedmilch	BR Deutschland
Campina Melkunie	Nederland	Sachsenmilch	BR Deutschland
Henniker-Parker	United Kingdom	Loseley Dairy Products	United Kingdom
KKR & Co	USA	Borden Inc	USA
QUF Industries	Australia	Port Curtis Co-Operative Dairy Ass.	Australia

(1) Diversified company.

Nomisma

Source: Nomisma

and certain types of cheese. Furthermore, the threshold prices of certain products are fixed each year, in order to guarantee that the prices of imported dairy products are placed at a level corresponding to the indicative price.

Aid measures are provided for public storage (butter and powdered milk) and for private storage (butter, prime-quality

skimmed powdered milk and some types of cheese), as well as to support the use of milk to feed animals, making casein from skimmed milk and fats from butter.

The main decisions involving the dairy industry taken as part of the CAP reform include:



**Table 11: Dairy products  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.08	1.08
Danmark	3.07	2.31
BR Deutschland	0.74	0.66
Hellas	0.61	1.32
España	0.82	0.83
France	1.37	1.51
Ireland	4.37	3.60
Italia	0.74	0.89
Luxembourg	N/A	N/A
Nederland	1.75	1.63
Portugal	0.95	1.39
United Kingdom	0.76	0.67

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

- for the milk sector, the major changes already introduced into the CMO with Regulations 3950/92 and 536/93 have been confirmed; and the extension of the quota system is provided for up to the year 2000, with a reduction of global guaranteed quantities equal to 1 % in both 1993/94 and 1994/95;
- a 5 % reduction of the intervention price of butter split over the years 1993/94 and 1994/95; and
- the abolition (effective 1 April 1993) of the co-responsibility levy, a payment previously made by producers and used to fund promotional activities, market development and the development of new products.

With regard to hygiene and quality standards, enterprises in the sector are affected by the development of procedures for the control of critical stages of all processes, from production to distribution, provided for by horizontal regulations, Directive 93/43.

The milk sector has been affected further by a vertical Directive concerning hygiene and quality standards, Directive 92/46, with an implementation date of 1 January 1994. This Directive lays down the health rules for the production and distribution of raw-milk, heat-treated milk and milk-based products (some temporary exceptions are contained in Directive 92/47). Also, through Regulation 323/93, some Member States have been exempted from the minimum fat content in drinking milk.

Finally, a proposal has been presented to amend Directive 92/46 as regards the following aspects:

- temperatures for raw milk, according to the species of animal concerned;
- rules on equipment in treatment and processing establishments; and
- hygiene and standardisation requirements for the production of heat-treated drinking milk and milk-based products.

## OUTLOOK

The process of concentration in the sector will continue and competition will sharpen within the EU, caused by a drop in production and consumption coupled with the concentration in the distribution sector, which will provoke the adoption of more sophisticated differentiation strategies. The number of acquisitions and mergers will also rise, aimed at the consolidation of domestic market shares and expansion into new high-potential areas.

Furthermore, the coming into effect of regulations directed towards the harmonisation of norms relating to the processing and marketing stages of production will help to change the structure of the sector within the Community, penalising those operators who are not prepared to improve.

Written by: NOMISMA

The industry is represented at the EU level by: European Dairy Association (EDA). Address: Rue des Deux Eglises 7, B-1040 Brussels; tel: (32 2) 230 1010; fax: (32 2) 230 2440.

# Fruit and vegetable processing and preserving

## NACE 414

The fruit and vegetable processing and preserving sector showed a positive trend throughout the 1984-93 ten-year period, with demand boosted by health trends and strongly tied to consumption patterns. Most jellies, jams and marmalades are manufactured in the countries of northern Europe, with Germany in the lead, while canned fruits are more important in the Mediterranean countries and canned vegetables in France, Spain, Belgium, Netherlands and Italy. The trade balance remained in the red for the entire decade, with a slight improvement in 1991. The major importers into the EU are the less-developed countries (Brazil, Turkey, Israel), and the USA.

From a structural viewpoint, the sector is characterised by a high fragmentation and most firms are of small size. Labour is still a fundamental factor for vegetable processing, if nothing else because few innovations have been introduced into the subsector. The average firms size doesn't allow the exploitation of scale economies. The degree of competition is very high inside the market especially within small and medium enterprises, because of extra EU imports which are characterised by lower labour costs. Import production quality is quite often low even if they are more competitive in terms of price.

### INDUSTRY PROFILE

#### Description of the sector

This sector includes all activities related to the processing of fruit and vegetables and their preservation. The main product categories are tomato, peach, pears and fruit salads, jams and marmalades, pickled vegetables and in oil, fruit juices and nectars. Frozen vegetables and fruits are dealt with in the chapter on deep-frozen foods.

#### Recent trends

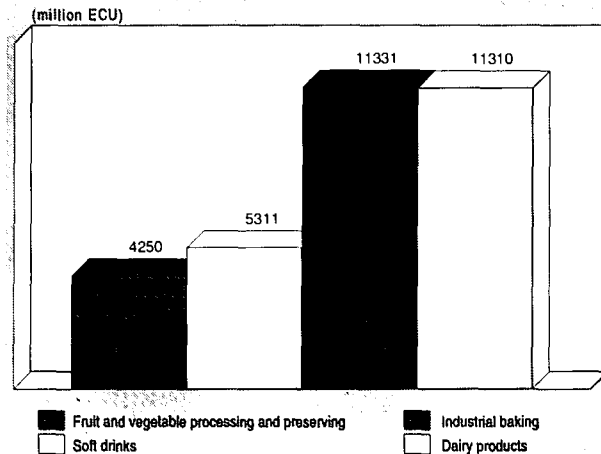
The processed and preserved fruit and vegetable sector is one of the food sectors to have followed a positive trend over the 1984-93 decade. The situation of production at current prices, despite fluctuations over the last three years, appears closely related to consumption patterns which, given the big swing towards health diets and vegetarian foods, have seen an increase in demand both within and outside the EU. Employment figures failed to follow a similar pattern and, despite alternate phases, these fell by 7.2 % between 1983 and 1994.

In 1993, Germany accounted for 22 % of all fruit and vegetable processing and preserving within the EU, with a workforce of 21 200; France and Italy followed with a 20 % share and a workforce of 17 000 and 20 000 respectively. Spain is the country with the highest number of workers in the sector (25 580), while its production share is equal to 8 % of the EU total.

The value added produced by the fruit and vegetable processing and preserving sector in 1993 was slightly less than that recorded in the soft drinks sector and roughly half that generated by the bread and dairy products sectors.

Despite the fact that fruit and vegetables are traditional products of southern Europe, their processing involves, in a significantly differentiated manner, all the countries of the EU. The number one producer of fruit preserves is Spain which has a share equal to around 22 % of total EU production;

Figure 1: Fruit and vegetable processing and preserving Value added in comparison with related industries, 1993

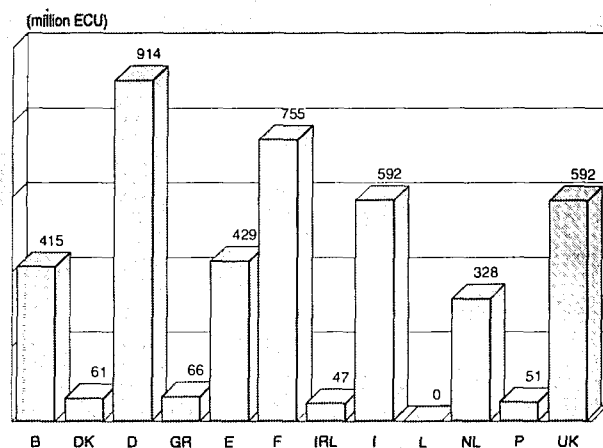


Source: DEBA

France, Greece and Italy follow with shares between 17 % and 20 %. France, with a share of about 48 %, is the number one producer of vegetable preserves (excluding baked beans) followed by the Netherlands and Belgium, which has a share of around 17 %. In the jam, jelly, marmalade and maroon pure sector, Germany leads the way with approx. 31 %, followed by France with 25 %. Greece, despite a drop in quantities produced in 1993, remains European leader with regard to the production of canned fruits, in particular peaches. Italy leads the way in tomato processing within the EU and is the second in the world after the USA. In 1993, Italy processed 56 % of the tomatoes utilised by EU industry.

Dividing the sector up into main production segments, we can observe, for instance, how marmalades, jellies, etc., are almost exclusively restricted to Northern Europe, especially Germany, while with regard to canned fruits and vegetables, the Mediterranean countries play important role. In both segments, France is among the leaders, and geographically speaking too, this country occupies a central position. Thanks to the greater earning power of the more elaborate products such

Figure 2: Fruit and vegetable processing and preserving Value added by Member State, 1993



Source: DEBA

**Table 1: Fruit and vegetable processing and preserving**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	13 067	15 405	16 726	18 885	21 346	21 236	19 644	20 028	21 300	22 600	23 900
Production	11 987	13 931	15 332	17 119	19 198	19 149	18 062	18 113	19 200	20 400	21 600
Extra-EU exports	1 383	1 368	1 634	1 456	1 512	1 551	1 679	1 901	2 000	2 100	2 200
Trade balance	-1 080	-1 473	-1 393	-1 765	-2 148	-2 087	-1 582	-1 914	-2 100	-2 200	-2 300
Employment (thousands)	138.7	129.3	130.2	137.0	137.4	132.8	130.6	129.9	129.0	128.0	127.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Fruit and vegetable processing and preserving**  
**Breakdown of production by country and by major product line, 1993**

	Jam, marmalade, jelly and chestnut paste (thousand tonnes)	Canned vegetables excluding baked beans (million 850 ml tins)	Canned fruit (million 850 ml tins)
Belgique/België	30.4	82.0	44.9
Danmark	45.5	N/A	N/A
BR Deutschland	198.0	89.6	136.3
España	41.0	245.4	302.0
France	161.1	1 261.7	272.1
Hellas	N/A	N/A	237.6
Italia	44.0	214.5	223.0
Nederland	25.0	452.0	105.8
United Kingdom	82.9	312.2	24.9

Source: OEITFL / OEICT

**Table 3: Fruit and vegetable processing and preserving**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-4.38	3.44	3.96	-3.92
Production	3.87	3.00	3.48	-2.23
Extra-EU exports	1.64	1.65	1.65	12.30
Extra-EU imports	5.61	4.82	5.26	-5.57

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

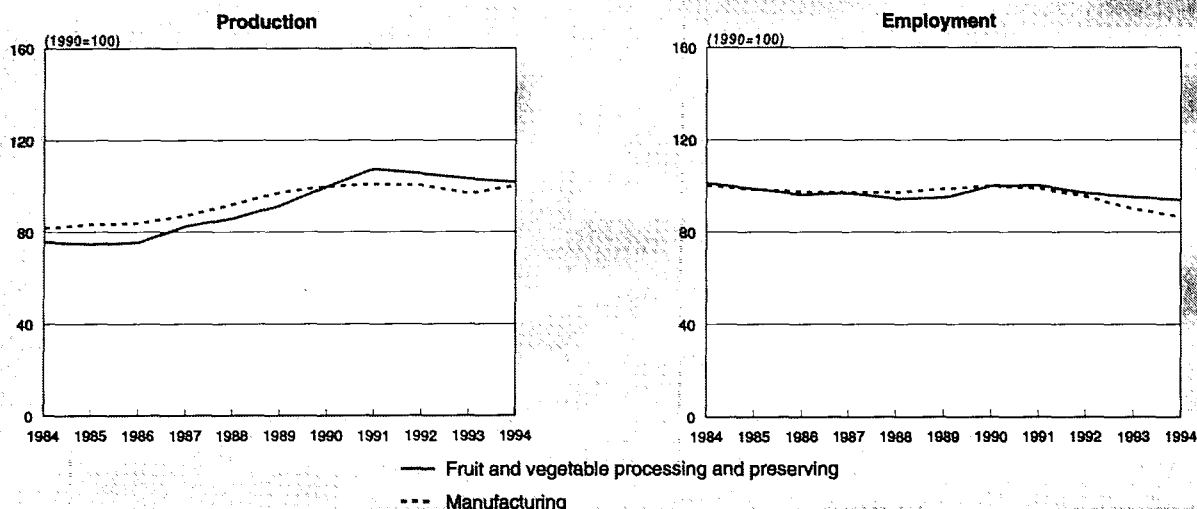
**Table 4: Fruit and vegetable processing and preserving**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 383	1 535	1 304	1 294	1 368	1 634	1 456	1 512	1 551	1 679	1 901
Extra-EU imports	2 463	2 676	2 356	2 470	2 842	3 028	3 221	3 659	3 638	3 261	3 815
Trade balance	-1 080	-1 140	-1 052	-1 176	-1 473	-1 393	-1 765	-2 148	-2 087	-1 582	-1 914
Ratio exports / imports	0.56	0.57	0.55	0.52	0.48	0.54	0.45	0.41	0.43	0.51	0.50
Terms of trade index	84.8	77.5	93.8	92.6	89.7	98.8	100.0	104.2	104.9	106.5	N/A

Source: DEBA



**Figure 3: Fruit and vegetable processing and preserving  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

as marmalades, Germany tops the value added gradings for EU countries, followed by France, while Italy and the United Kingdom are on the same level.

While all indicators, measured in real terms, show a positive growth rate between 1984 and 1993, there has been a recent tendency for internal and external Community demand (imports), and production to drop. At the same time, there has been a significant rise in exports.

Production in the sector rose until 1991, following substantially the general trend for the manufacturing sector as a whole. After 1991, there was a downswing, though the processed and preserved fruit and vegetable sector was affected later than others and less seriously than the manufacturing sector as a whole.

A comparison of employment figures between the two sectors shows how the annual drop in the number of workers in the fruit and vegetable processing and preserving sector was, between 1984-89, higher than that recorded for the manufacturing

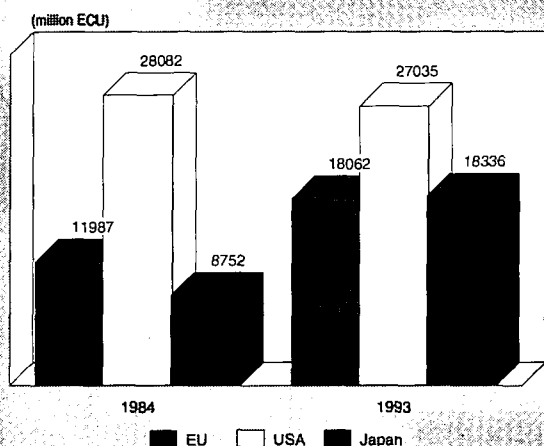
industry as a whole, while, in the period 1989-93, the number of workers who left the manufacturing industry as a whole was greater than that of the fruit and vegetable processing and preserving industry.

In 1993, in the tomato segment, there was a general increase in quantities produced inside the EU, except for France (-4.5 %). In Spain production went up 22 %, in Greece 13 % and in Portugal 12 %. Within the EU, the production of raw materials used for making tomato purée went up by 7 %, while that for peeled tomatoes rose by 23 % and that for other processings by 4.5 %.

**International comparison**

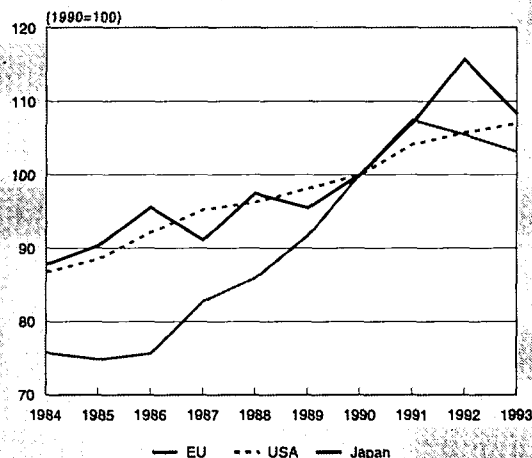
The production pattern of the sector being examined becomes more interesting when compared with that of the major production countries, in competition on world markets. While in 1984, US production, in terms of value, was over double that of Europe, and over three times that of Japan, in 1994,

**Figure 4: Fruit and vegetable processing and preserving  
International comparison of production in current prices**



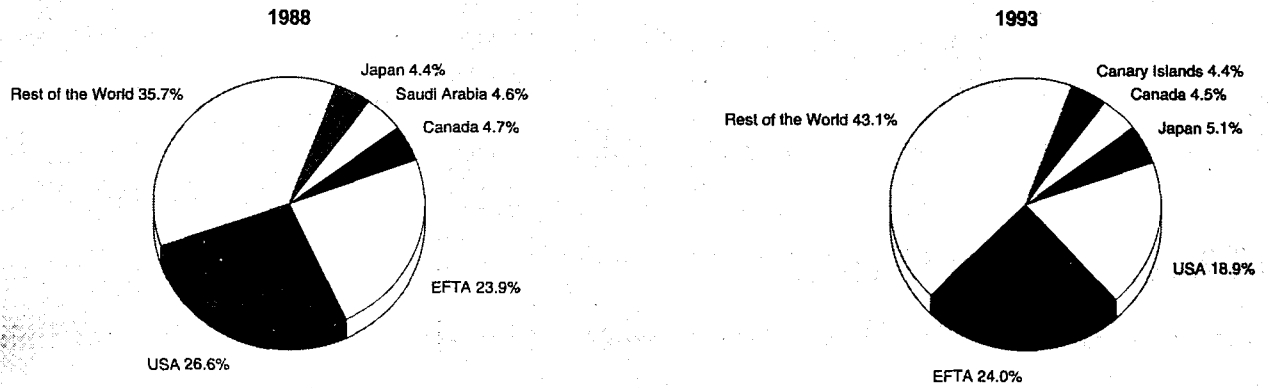
Source: DEBA

**Figure 5: Fruit and vegetable processing and preserving  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Fruit and vegetable processing and preserving  
Destination of EU exports**



Source: Eurostat

this situation changed, with a slight drop in production value for the USA compared to a 50 % growth in the EU and a 100 % growth in Japan.

The turnover indexes at constant prices reveal that the situation described above was realised through an increase in production which, in Europe, was concentrated between 1986 and 1987 and between 1989 and 1991, and in Japan between 1990 and 1992. It should be furthermore stressed that the loss of ground on the part of the USA compared to Japan and Europe centred more on the value of production than on the quantity produced, as is shown by the production indexes at constant prices.

It must be added as well, that in the canned-fruit segment, there was a considerable fall, in 1993, in the world production of canned fruit (peaches, pears and fruit salad), which went from 1 230 000 tonnes to 1 030 000 tonnes, with a drop of 16.3 % compared to 1992. This drop was caused mainly by a fall in production within the Community area (-23 %), which represents 65 % of world production, and was different for pears (-20 %), peaches (-16 %) and fruit salad (-9 %). In the countries outside the EU, production of canned fruits remained stable.

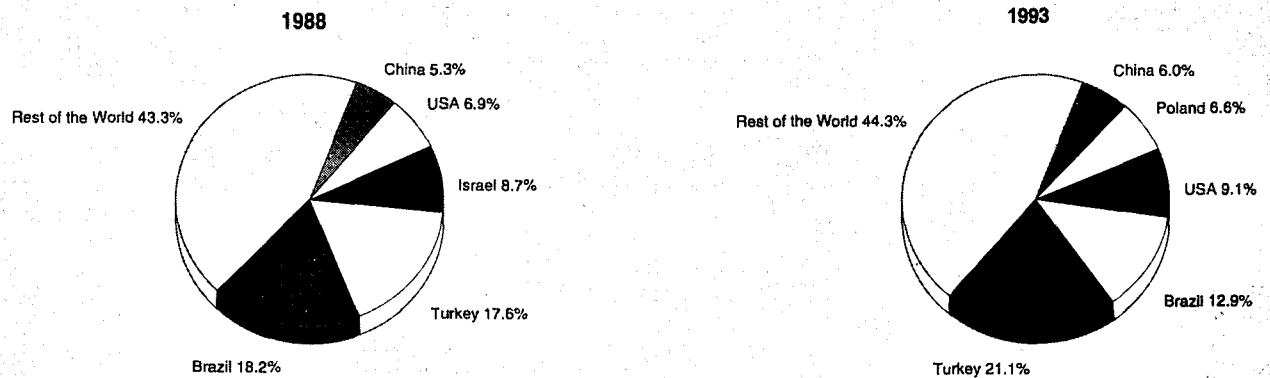
### Foreign trade

The trade balance of the Community remains in the red as regards trade of processed and preserved fruit and vegetables by about 8 % approx. of its own needs. During the course of the decade in fact, this adverse trade balance has steadily worsened due, above all, to a bigger growth of imports over exports outside the EU. Since 1991, the growth in exports, the reduction in imports and the improvement in the terms of trade have helped to reduce the trade deficit.

A closer look at the European exports by individual country and/or area of destination in value shows, after 1988, significant changes. The USA, in 1988 the main country of destination of European processed and preserved fruit and vegetable exports has reduced its share by 10 %. The leading export destination is currently the EFTA countries which, in fact, have merely maintained their 1988 share. Exports to Canada and other countries of the world have increased, while Saudi Arabia's share is no longer significant.

A similar comparison involving European imports shows the number one fruit and vegetable supplier to the EU to be Turkey which has ousted Brazil. This latter country's share dropped

**Figure 7: Fruit and vegetable processing and preserving  
Origin of EU imports**



Source: Eurostat

**Table 5: Fruit and vegetable processing and preserving  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	74.9	75.9	78.7	85.3	91.0	96.4	100.0	107.1	108.8	108.2
Unit labour costs index (3)	96.2	98.2	99.7	97.1	98.1	99.1	100.0	103.4	107.7	109.7
Total unit costs index (4)	94.0	97.0	95.9	94.1	95.5	97.7	100.0	104.0	104.8	101.8
Gross operating rate (%) (5)	8.75	8.17	7.95	8.34	8.03	8.75	8.22	8.51	8.17	7.73

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

by 5.9 %. US exports have also undergone consistent growth while Israel's have lost ground.

A structural analysis of trade outside the EU can be completed by considering the fact that Community exports have dropped, in value, in relation to production, and the same goes for imports in relation to consumption.

## MARKET FORCES

### Demand

The fruit and vegetable preserves sector includes tomato based products, vegetable preserves and canned vegetables. The consumption market of these products has reached maturity. Canned vegetables, and above all preserved fruits are permanently affected by the high consumption levels of fresh products and, in the first case, by the expansion of frozen products. With regard to tomato-based products, over the last decade, traditional products (peeled tomatoes and tomato concentrate) are in competition with more innovative products (pulp and purée). In the jam and marmalade sector, consumption is tied to breakfast and between-meal snacks, and the biggest growth rates have affected products with a strong 'natural' image.

Germany, with 50 litres per head is the biggest consumer of fruit juices, followed by the Netherlands (22 litres) and the United Kingdom (19 litres). France is the EU country with

the strongest growth rate. The reason for this is to be found in the aggressive marketing strategies employed over recent years, despite the fact that there has been no product innovation. The EU's favourite flavour is orange. Despite the differences between the various countries in terms of consumption occasions, the demand for juices is rising. This is particularly true with regard to 100 % products made from squeezed fruits rich in liquids and which are often also used to make long drinks and cocktails. The most important points so far as strengthening demand is concerned are purity and the health aspect. In the case of all juices, nutritional value is very important too, and consequently the possibility of these products having a real food function for the consumer. Generally speaking, there has been a strong demand in the baby foods sector. Nectars are produced essentially in Italy.

The overall demand for products in oil and pickled products, as well as other specialities, tends towards traditional products and, to a great extent, depends on the request for hors d'oeuvres and occasional between-meal snacks. Opportunities for the expansion of demand, which in many EU countries has reached a mature stage, are also tied to the increase in the number of occasions for eating these products and to de-seasonalisation. This is the road being followed by side dishes (vegetables) and pasta sauces.

### Supply and competition

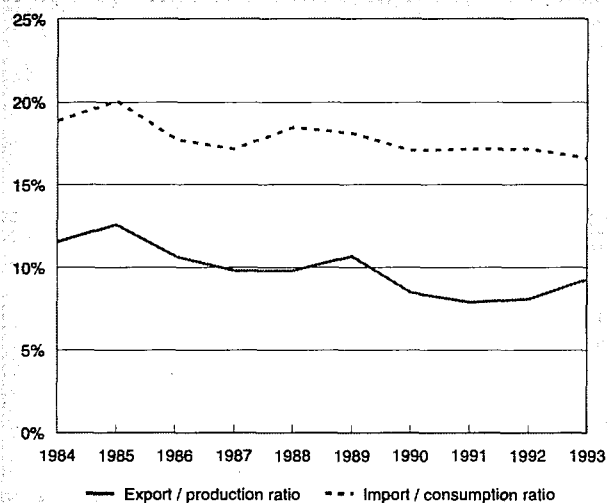
In terms of production costs, the processing of fruit and vegetable products is achieved more economically in developing countries or in countries like those of North Africa and Turkey, etc., because of lower costs associated to labour factor, and often, in the case of many products, the production of little differentiated producer goods tends to concentrate in these countries. The pressure imposed by fresh or processed vegetables from third countries (Eastern Europe, China, South America; chiefly countries with weak currencies) is expected to increase. The observance of new Community regulations concerning packaging will oblige companies to review marketing and distribution strategies and, unless they comply with such regulations, these companies will be considerably penalised, above all in trade between countries of the EU.

Generally speaking, the contractual position of farmers/growers serving the processing industry looks weak within the EU, even in the few areas where these are organised into groups; this is due in part to the strong pressure on prices from third country imports, but also to future surpluses in the supply of vegetables grown for the fresh-produce market. In the fruit preserve market, the amount of fruit imported from Eastern Europe is rising, to the detriment of EU products.

### Production process

Levels of technology affecting production processes within the sector are rising. In particular, the optimisation of processing cycles aims to keep down production costs, while proc-

**Figure 8: Fruit and vegetable processing and preserving  
Trade Intensities**



Source: DEBA

**Table 6: Fruit and vegetable processing and preserving  
Employment and production by Member State, 1993 (1)**

	Employment (units)	Production (million ECU)
EU	130573	18062
Belgique/België	5 453	1 102
Danmark	N/A	239
BR Deutschland	21 215	4 070
Hellas	9 943	873
España	26 586	1 527
France	17 006	3 449
Irèland	1 253	N/A
Italia	20 087	3 439
Luxembourg	N/A	N/A
Nederland	5 843	1 279
Portugal	3 169	143
United Kingdom	18 826	1 814

(1) Estimates.  
Source: DEBA

ess innovation aims to improve product quality standards, a critical success factor in all segments. In the field of tomato-based products, an important innovation was the introduction of mechanical harvesting, while other important future developments will involve research and selection of tomato varieties more suitable for the industry, in particular in relation to new derived products.

In the whole of the vegetable preserve sector, manual produce sorting operations are slow and highly labour intensive. Over recent years, innovative systems based on automatic high speed sorters or on optical sorting systems have become popular, drastically reducing the need for manual labour. The industrial processing of tomatoes can rely on consolidated technologies which have developed and improved over the years thanks to a number of factors like product innovation, aimed at offering final consumers better quality products and a higher service content and companies greater value added, and process innovation, aimed at reducing costs and energy consumption and perfecting the various treatments, especially heat treatment.

For both vegetable preserves and fruit preserves, the opportunities for product innovation are more restricted compared to those for tomato-based products and are mainly based on an expansion of product range. There has been little or no process innovation and this has been limited principally to management of production lines. The incidence of manual operations remains high, especially so far as medium-small enterprises are concerned, and with particular regard to sorting and cleaning. Work phases differ according to the product involved, though they all have a common basic structure. Particularly interesting product innovation has affected the processing cycle of dry legumes, with the introduction of a rapid legume rehydration process. Due to the high investment costs involved, still in the study stage is the adoption of a process for stabilising food products through the use of high pressures to eliminate the degradation resulting from heat treatment.

From a technological viewpoint, the production process for the preparation of jams and marmalades is fairly simple and does not permit obtaining significant production scale economies nor does it generate technological barriers at entry. The innovations introduced into the sector principally concern the adoption of control systems which increase the reliability and the reproduction capacity of those parameters which have a greater effect on product quality.

An innovation in the enzymatic inactivation of vegetables and fruit from which are obtained concentrated juices and purées is the use of hard vacuum which better protects the thermolabile compounds and colour, and offers advantages both in terms of the organoleptic characteristics of products and the reduction of broken grains, at equal drained weight.

In the field of the production of fruit in syrup or water, technological innovations have swung towards shorter production times, as well as better management of factories. Sorting and weighing are becoming particularly important factors in this field too. Depending on the type of fruit being treated, filling can be done manually and in an orderly manner (in the case of glass jars and for more prestigious product lines) or in a disorderly manner with the aid of high-speed machinery.

The fruit juice production process adopts different technologies for pulpy nectars and for 100 % juices. The former are produced starting with non-concentrated fruit cremogenates stored in large sterile tanks and, during production, are mixed with water and sugar to obtain fruit nectars. Like fruit juices, fruit nectars are made using two technologies and two different packagings: hot filling in bottles and cold filling in cartons. Cold filling gives better results compared to hot filling, but storing of products for medium-long periods is better in bottles than in cartons.

The production process of products in oil and pickled products starts with fresh products or pickled semi-worked products. There is a substantial reliance on foreign products especially when the quality/price ratio is good, as in the case of mushrooms and olives. Unlike other subsectors of the preserved product sector, e.g., canned vegetables, this subsector has undergone considerable innovation over recent years as is shown by the introduction of modified-atmosphere preservation which, together with improved product quality, represents a major success factor.

## INDUSTRY STRUCTURE

### Companies

The fruit and vegetable processing and preserving subsector is a very fragmented market, being characterised, on the average, by small and only few medium firms. Most of the small ones operate at a regional level as sub-producers for bigger companies. Only some of them and of medium sized firms occupy highly-specialised market niches. The very diversified multinational companies, operating on international markets are a minority. The main European enterprises in the fruit juice subsector are Stule (D), Dittmeyer (D), Wesergold/Riha (D), Hero (CH). In the vegetable preserves subsector Granini (D), Gerber Foods (UK), Conservé Italia (I), Bonduelle (F), Cecab d'Aucy (F), Heinz (USA) and Grand Metropolitan (UK) play a leading role. In the jam and marmalade subsector the major firms are: Hero (CH), Danone (F), Franz Zentis (D), May Holding (D), Chivers Brothers (UK).

### Strategies

In all the sub-sectors firms strategies are aimed at the reduction of production costs which broadly differ within EU countries (ex within Greece and Germany) and are higher in Europe than in extra EU competitors partly because of lower costs associated to labour. That is the main strategy pursued especially by small firms which cannot exploit scales or scope economies. Many of them produce for bigger companies or for big distribution chains. Some of them, as far as it concerns tomatoes and fruit, usually import concentrated juices from extra EU countries. Only few firms in fruit and vegetable processing and preserving subsector has adopted product diversification policies and, at the same time, has introduced new products, for example ready-to-use sauces, in line with the recent trends expressed by the market. Rare are the firms

**Table 7: Fruit and vegetable processing and preserving Acquisitions**

1993 Bidder	Country	Target	Target country
Hero	Switzerland	N/A	Nederland
Agrojel	France	N/A	España
Lompech Investissement	France	Larroche Freres	France
Pernod-Ricard	France	Etablissements R Foulon et Cie	France
Pomona	France	Agrofel	France
Orkla	Norway	BOB Industries	Sweden
Knorr Roman	España	Conservas Leyenda	España
Procordia	Sweden	Gamle Fabrik	Danmark
Albert Fisher Group	United Kingdom	Reddi-Made Foods	USA
Citrus Colloids	United Kingdom	Bulmer (Pectin business)	United Kingdom
Orchidwood Mushrooms	United Kingdom	Blue Prince Mushrooms	United Kingdom
Unilever	United Kingdom / Nederland	Bajai Hutoipari RT	Hungary
Unilever	United Kingdom / Nederland	N/A	Brazil
Yorkshire Food Group	United Kingdom	Del Monte Dried Fruit	USA
American Home Products	USA	Polaner Inc	USA
CPC (Maizena)	USA	Pfanni-Werke Otto Eckart	USA
1994 Bidder	Country	Target	Target country
Cidreeries du Cavados	France	Societe Jus de Fruits Reunis (In Receivership)	France
Delta Dairy	Hellas	Barba Stathis	Hellas
Conserve Italia	Italia	MAssa Lombardo Colombani	Italia
Christian Salvesen	United Kingdom	Tendafrost Frozen Foods	United Kingdom
Geest	United Kingdom	St Martins-Waltham Abbey	United Kingdom
Hillsdown Holdings	United Kingdom	Materne-Fruibourg (Danone)	France
Unilever	United Kingdom / Nederland	Cica	Argentina
Seagram	Canada	Deinhard & Co	BR Deutschland
ConAgra	USA	Universal Foods Corp.	USA
Dean Foods Company	USA	Curtice-Burns Foods	USA
Grupo Cabal	Mexico	Del Monte Foods Company	USA

Source: Nomisma

interested in ISO 9000 standards certification. Packaging too is playing an increasingly important role in product marketing.

The subsector of products in oil and pickled products allows major diversification policies ever for small sized firms, granting higher profit margins. Diversification was attained with the introduction for instance of sauces for pasta and rice, and vegetables. In 1993, within the fruit and vegetable processing and preserving sector, there were eleven acquisitions. Of these, four were carried out by French companies and six by UK companies. Of the six acquisitions carried out by UK companies, four involved companies outside the EU (USA, Hungary and Brazil). In 1994, the number of acquisitions by EU companies amounted to seven, of which four were carried out by UK companies. The concentration of the distribution system has represented and continues to represent in all countries one of the major problems for food companies and, in fact, much of the movement in the industrial set-up is caused by movements in the distribution system.

### Impact of the Single Market

The impact of the creation of the Single Market on the fruit and vegetable processing and preserving sector has been positive overall. It favoured international trade and competition inside the EU market increased.

Higher distribution costs were, however, generated by the approval of the packaging regulation. The reduction of barriers to imports from third countries with lower social costs are considered a priority for the industry.

### ENVIRONMENT

The industries in the sector require large quantities of water during the production process; most of this is used during the washing and swilling stages. Packaging ecology will represent a major topic in the future and enterprises will soon have to comply with recent regulations on recycling and re-utilisation of food containers.

### REGULATIONS

The common organisation of markets in the processed fruit (and legumes) sector is regulated by Reg. 426/86, ultimately amended by Reg. no. 1569/92. The production of processed citrus fruits and bananas on the other hand is covered by the fresh fruit CMO. The current system is based on the granting of aid with the aim of ensuring an adequate income to growers of fresh produce. This aid is granted on condition that the agreements between producers and processors are concluded before the growing season and that the processors pay the minimum prices fixed by the Commission. The products forming part of this system are processed tomatoes, pears and peaches in syrup and/or juice, prunes, dried figs and currants. Support measures also exist for the processing of pineapples and raspberries. The stabilisation mechanism involves cuts in aid to production whenever guarantee thresholds are crossed.

In the case of processed tomatoes, a quota system applies: Reg. no. 668/93 establishes maximum quantities for the Community of twelve in 6 596 787 tonnes.

For other canned vegetables or packed in glass jars, neither premiums nor quotas exist; only for canned mushrooms, including those temporarily preserved, do favourable import regulations exist, while for other products, there are no restrictions on imports. The fruit juice and nectar and vegetable sector is regulated by Dir. no. 75/726, relating to the harmonisation of the laws of member states, which has been periodically updated (Dir. no. 79/168; Dir. no. 81/487; Dir. no. 89/394; Dir. 93/77). The International Fruit Juice Association - AIJN - furthermore drew up in 1990 a "Code of Use" fixing physical, chemical and microbiological standards for orange juice, grapefruit juice, apple juice and grape juice. Special measures to foster the processing of certain citrus fruits are contained in Reg. 3119/93 while measures for promoting the marketing of lemon-based processed products are contained in Reg. 3338/93.

Up until now, the fruit and vegetable sector has not been affected by the CAP reform. However, following the GATT agreements, the Commission must reform regulations so these comply with the new clauses covering international trade. The Commission intends to take advantage of this forced clean-up to improve the overall operations of the CMO. On July 27 1994, the Commission approved the wording in the communication to the European Council and Parliament concerning "The Evolution and Future of EU Policy in the Fruit and Vegetable Sector". This official document will serve as the basis for discussions concerning the new common organisation. Despite some undeniable structural imbalances, the present market organisation provides an operational framework which answers the requirements and has proved its worth. All the positive features, market orientation, decentralisation of management and grouping of supply, as well as the central role played by producers' organisations should be reinforced. Therefore the Commission is in favour of reform proposals which would consolidate the positive features of the present CMO, while simplifying it and remedying any drift or weakness observed.

### Fresh produce

Intervention prices represent one of the main Community instruments able to affect the market. About 70 % of fruit production is subject to the intervention price mechanism. The varieties where intervention involves large quantities are peaches, nectarines, apples and oranges. In the 1988/93 season, almost 90 % of fruit and vegetable withdrawals was made up of fruit.

As far as import protection is concerned, the measure with the biggest impact is that of reference prices, which however only covers 20 % of fresh vegetables and main varieties of cultivated fruits.

Export refunds are only important for tomatoes, oranges, apples and some varieties of nuts. These are useful for counterbalancing part of the negative impact of currency devaluation in numerous third countries. In the banana sector, the common organisation of the market has been recently established, through Reg. no. 404/93

## OUTLOOK

Many factors bear favourably on the demand for products in the sector, and consequently the trends under way will continue: the health trends, the practicality of preserved fruit and vegetable-based products, the importance of large distribution networks. Import penetration is going to increase at least in volume, because of the higher competitiveness of third countries productions characterised by weak currencies and lower labour costs.

Furthermore, compliance with recent Community regulations on packaging will call for the reviewing of marketing and distribution strategies, keyed to a greater degree of recycling and the modification of currently used materials. The reform of Common Market Organisation will be the most important issue affecting next years' market structure.

Written by: NOMISMA

The industry is represented at the EU level by: Association of European Fruit and Vegetable Processing Industries (OEITFL). Address: Avenue de Cortenbergh 172, Bte 6, B-1040 Brussels; tel: (32 2) 735 8170; fax: (32 2) 736 8175.

# Processing of fishery products

NACE 415

Seafood consumption in the EU has shown a dramatic expansion over the last ten years. However, this expansion slowed down over the last two years due to the adverse economic conditions which affected the Union. The EU industry developed under the influence of large powerful agro-food companies. Since the supply of raw material of certain popular species by the EU fishing fleet does not satisfactorily meet industry requirements, large amounts of processed seafood are purchased in third countries, widening the negative balance of international trade. The market segment which shows the fastest growth is that of fish-based prepared dishes, matching the changing social habits of EU consumers.

## INDUSTRY PROFILE

### Description of the sector

Output of the fish and seafood processing industry can be divided into five major categories:

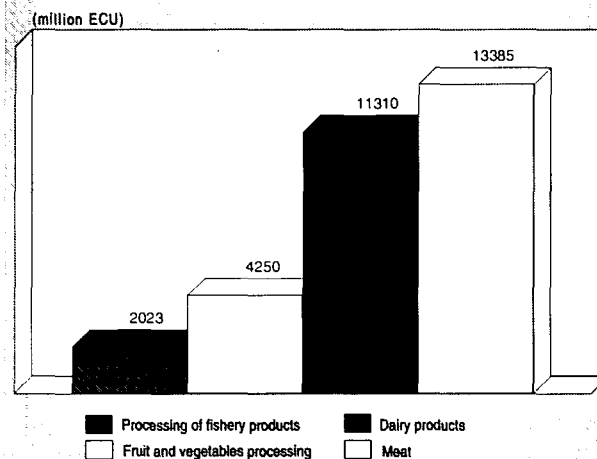
- frozen fish products (excluding whole fish), e.g. frozen fish fillets, which are partly processed items using basic raw seafood material, which can be either further processed into prepared dishes or consumed in that form (about 83 % of frozen fish fillets is imported from outside the EU);
- dried, salted and smoked fish, e.g. smoked salmon, salted cod, consumed without any further industrial processing;
- prepared or preserved fish, e.g. tuna cans, prepared dishes, surimi, which are basically value-added ready-to-eat items;
- aquatic invertebrates, frozen, dried or salted, e.g. cuttlefish fillets, frozen mussels, which can be either further processed into prepared dishes or sold to consumers in that form; and
- crustaceans, molluscs and other aquatic invertebrates, prepared or preserved, e.g. crab cans, shellfish salads, which are ready-to-eat items.

The fish processing sector is a rather concentrated industry with 75 % of the products being manufactured in five Member States: Germany, the UK, Spain, France and Denmark. This group accounts for 80 % of total EU value added, with the German fish processing industry showing the highest value added in 1993 with 23 %. The production of prepared or preserved fish dominates in most EU countries with the exception of Greece where smoked or salted seafood products (e.g. salted anchovies) are the main manufactured items, and Ireland and the Netherlands which both produce mainly frozen fish fillets.

### Recent trends

Apparent consumption of processed fishery products has shown a dramatic increase over the past ten years reaching 11.2 million ECU in 1993 compared to 6.4 million ECU in 1984. EU production has also experienced a significant increase of 59 %, although it has not kept pace with consumption. Thus, market operators have had to seek supply in extra-EU countries to meet expanding consumer demand as the 1984-93 average annual growth rate (8.5 %) of extra-EU imports demonstrates. Meanwhile, extra-EU exports have remained fairly stable averaging 2.1 % per year. Most end-products manufactured by the industry are sold on the EU market. Consequently, the trade balance deteriorated sharply over the 1984-93 period reaching a deficit of over 2.2 billion

Figure 1: Processing of fishery products  
Value added in comparison with related industries, 1993



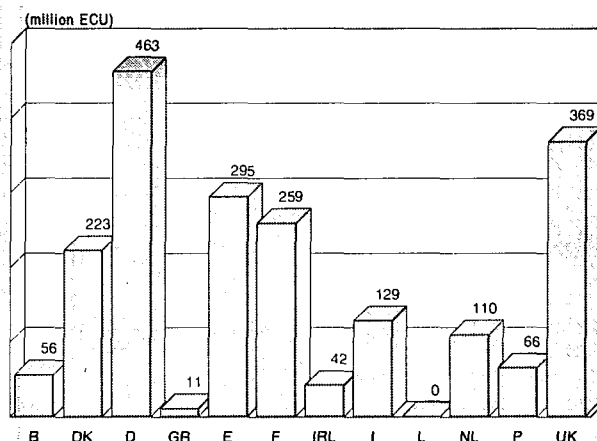
Source: DEBA

ECU with an export/import ratio of 26 %. In terms of employment, the fish processing sector shows primarily a decreasing trend over the past ten years, except for an upswing in 1988 and 1989.

Since 1991, most EU Member States have experienced adverse economic conditions and the development of the fish processing industry has been hampered by the drop in consumer demand. The ascending trend observed in apparent consumption since 1984 has levelled off since 1991 (the 1991-92 percentage change posted a negative figure while previous annual growth rates were over 6 %). This decreasing trend was confirmed over 1992 and 1993. In terms of external trade, the industry recovered during 1993 with extra-EU exports reaching an all time high after a marked depression in 1992. Concurrently, extra-EU imports confirmed the decreasing trend initiated in 1992.

Employment figures in 1993 indicate that the number of employees in the industry has decreased (11 600 jobs lost since 1989) as a consequence of the difficulties of smaller firms

Figure 2: Processing of fishery products  
Value added by Member State, 1993



Source: DEBA

**Table 1: Processing of fishery products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	6 445	8 682	9 610	10 289	11 266	11 252	11 220	11 796	12 100	12 400	12 700
Production	5 671	7 265	8 069	8 275	8 983	8 927	9 007	9 354	9 300	9 300	9 300
Extra-EU exports	579.3	653.9	663.5	701.5	771.2	721.1	787.2	877.9	930.0	980.0	1030.0
Trade balance	-774.0	-1 417.0	-1 541.0	-2 014.0	-2 283.0	-2 325.0	-2 213.0	-2 442.0	-2 800.0	-3 100.0	-3 400.0
Employment (thousands)	91.1	83.7	91.9	86.8	86.3	82.3	80.3	79.4	84.0	89.0	94.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Processing of fishery products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.43	2.93	4.86	2.91
Production	5.41	1.47	3.64	4.69
Extra-EU exports	0.69	3.92	2.11	7.12
Extra-EU imports	8.54	8.40	8.48	-1.12

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Processing of fishery products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	579	678	688	727	654	664	702	771	721	787	878
Extra-EU imports	1 353	1 523	1 734	1 900	2 071	2 204	2 716	3 054	3 046	3 000	3 320
Trade balance	-774	-845	-1 045	-1 173	-1 417	-1 541	-2 014	-2 283	-2 325	-2 213	-2 442
Ratio exports / imports	0.43	0.45	0.40	0.38	0.32	0.30	0.26	0.25	0.24	0.26	0.26
Terms of trade index	93.5	95.0	95.1	97.6	97.0	95.8	100.0	96.4	96.6	98.8	N/A

Source: DEBA

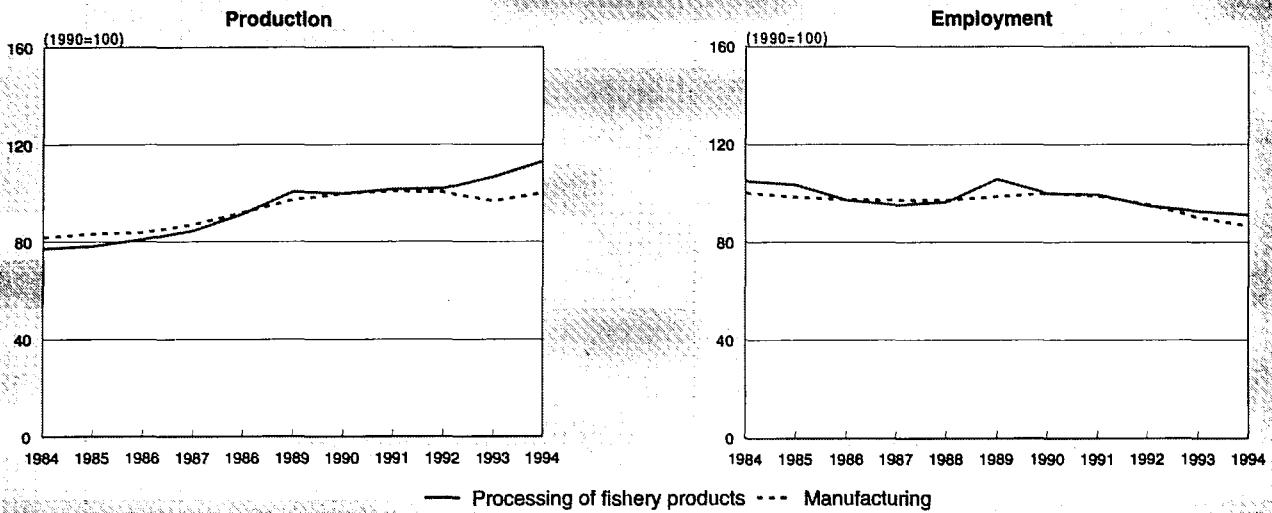
**Table 4: Processing of fishery products**  
**Breakdown of trade by major product line in value and volume**

(thousand ECU)	1988		1993	
	Extra-EU imports	Extra-EU exports	Extra-EU imports	Extra-EU exports
Frozen fish excluding whole fish	608 586	182 284	1 004 722	156 716
Dried, salted or smoked fish	551 250	71 862	N/A	N/A
Prepared or preserved fish	723 867	214 008	919 697	254 477
Aquatic invertebrates, frozen, dried or salted	1 364 559	184 699	1 559 441	152 936
Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved	415 488	76 798	451 628	58 480
(tonnes)				
Frozen fish excluding whole fish	289 885	57 294	454 336	61 905
Dried, salted or smoked fish	166 615	20 892	N/A	N/A
Prepared or preserved fish	247 866	68 644	367 755	134 272
Aquatic invertebrates, frozen, dried or salted	380 268	39 562	416 199	42 832
Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved	73 194	14 698	82 633	13 147

Source: Eurostat



**Figure 3: Processing of fishery products  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

having to compete on this rapidly evolving market, and of the industry strategy to realise economies of scale through mergers and take-overs.

**International comparison**

Figure 4 indicates that whilst the EU is doing better than the USA in terms of production of processed fishery products, it still lags far behind Japan. Japan, populated by the equivalent of one-third of the total EU population, is the world's biggest seafood market. Domestic demand for fishery products in Japan has expanded dramatically over the last few years, with consumption currently reaching more than 65 kg per capita per year, whilst EU consumption stands at 15 kg per capita. Changing social habits have boosted the emergence of prepared/ready-to-cook fish products, which now supplement, to a certain extent, traditional dishes based on whole fresh fish products.

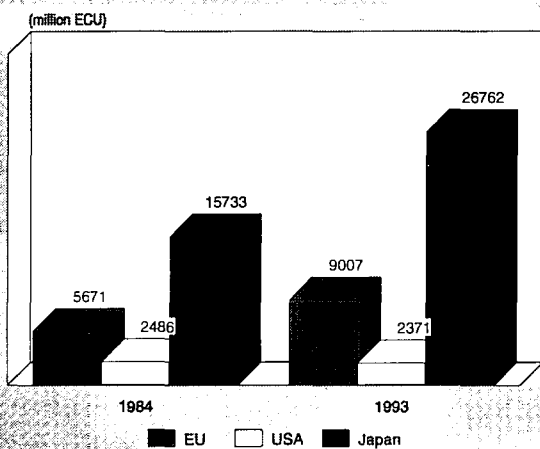
The countries of the ASEAN, led mostly by Thailand and the Philippines, emerge now amongst the top world producers

of processed fishery products. These countries take advantage of modern processing units manned by inexpensive manpower to manufacture high quality products at low prices on the world market.

**Foreign trade**

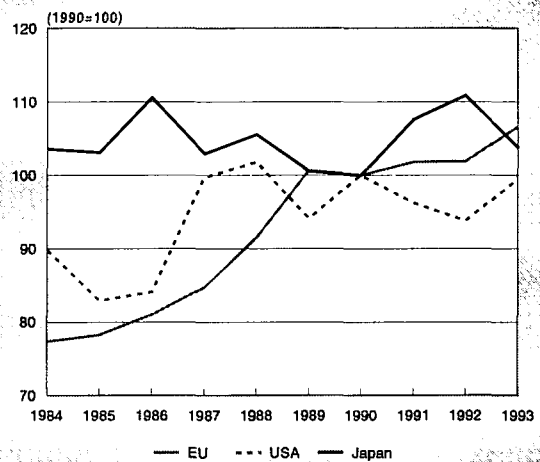
The ratio of exports/imports (26 % in 1993) shows that the EU is a net importer of processed fishery products. Few of the EU fishery landings are used by the fish processing industry because they are too costly, mostly directed towards the fresh market, and do not meet the industry needs of constant sources of calibrated supply of raw material throughout the year. In 1993 the two major imported items, in tonnes, were aquatic invertebrates, frozen, dried or salted (40 % of total extra-EU imports) and prepared or preserved fish (35 %) which are both lacking in the EU landings and more expensive when available than similar products purchased from third countries. These products are basically semi-processed items used by manufacturers as supply to the industry which further proc-

**Figure 4: Processing of fishery products  
International comparison of production in current prices**



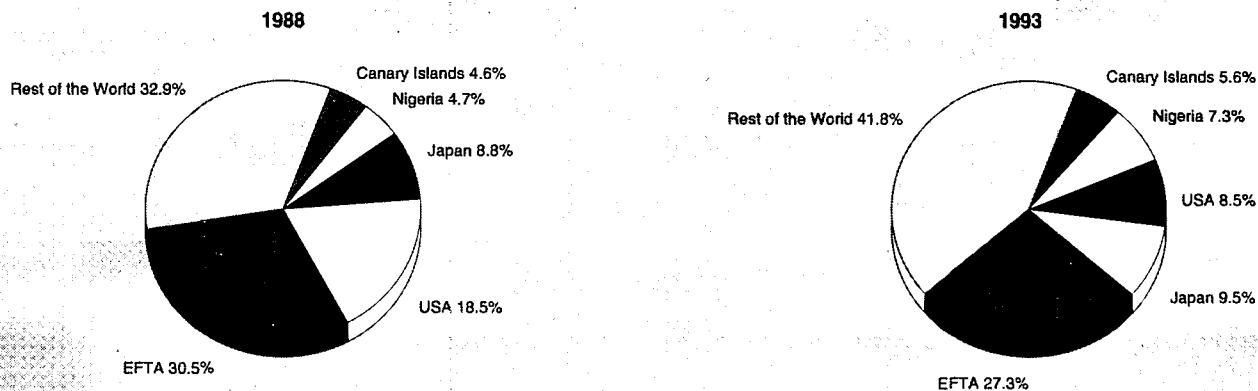
Source: DEBA

**Figure 5: Processing of fishery products  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Processing of fishery products  
Destination of EU exports**



Source: Eurostat

esses them into value-added items. Extra-EU exports are dominated by prepared and preserved fish (59 % of total extra-EU exports) and by semi-processed materials imported from third countries and re-exported after repackaging under a European brand.

The negative external trade balance is therefore structural and the situation is not expected to improve in the future. The EU fishery sector suffers from severe resource depletion and more non-EU countries are able to supply processed seafood products at EU quality standards and at attractive prices. An analysis of the sector shows that the trade balance improved slightly in 1993, but this was mostly due to a decrease in EU domestic consumption of fishery products. Consumer preferences have shifted towards cheaper meat products like poultry, for example.

The main suppliers of processed fishery products are Iceland and Norway (21.7 % of EU imports in 1993) which supply mostly frozen fillets of white fish (mainly cod, haddock, and saithe) and salted or smoked fish (smoked salmon from Norway). They are followed by Thailand (8.0 %), USA (5.7 %) and Morocco (5.0 %) for which the seafood canning industry is healthy and expanding, and countries like Argentina and other Asian countries which offer large quantities of processed

fish and shellfish (mostly cultured shrimps). The share of the other large seafood market (Japan) remains low in the EU supply (1.0 % in 1992).

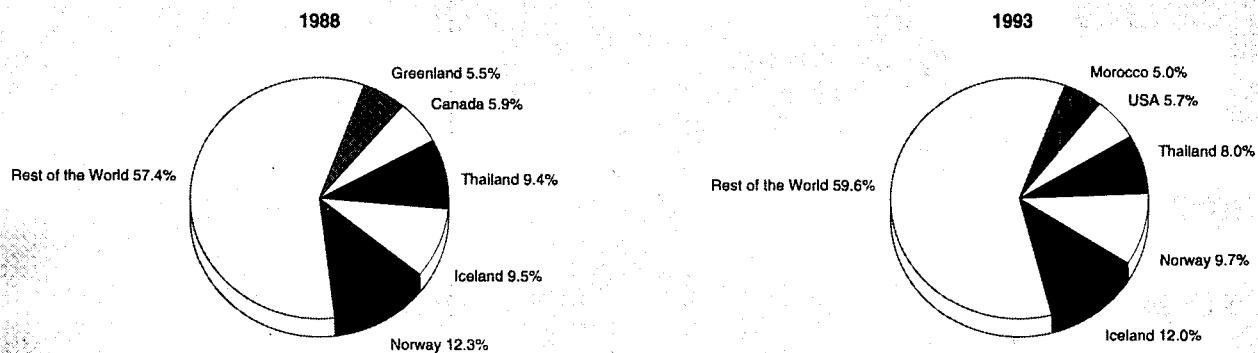
Individual EU Member States export their production of processed fishery products primarily to other EU countries. The main extra-EU clients are the EFTA countries (27.3 % of EU exports in 1993) which purchase ready-to-eat dishes and canned fish. The shares for the USA and Japan as destinations of EU exports (8.5 % and 9.5 %, respectively in 1993) are higher than their shares of EU imports.

## MARKET FORCES

### Demand

Demand for fishery products has grown dramatically over the past ten years due to a growing public awareness of the importance of fish as part of a healthy diet. In addition, the emergence of processed seafood has provided an alternative to the consumption of fresh fish, traditionally viewed in Northern Europe as a smelly product that is bothersome to prepare. This, combined with other factors relating to changing social patterns, has boosted the consumption of processed items, which rose from an average of 6.7 kg/head in 1983 to 9.8

**Figure 7: Processing of fishery products  
Origin of EU imports**



Source: Eurostat

**Table 5: Processing of fishery products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	73.7	75.6	83.3	89.1	94.9	95.1	100.0	102.4	107.6	115.3
Unit labour costs index (3)	99.0	103.5	97.2	94.2	95.8	97.3	100.0	105.3	105.2	100.0
Total unit costs index (4)	88.9	93.0	92.4	93.0	95.2	95.6	100.0	105.8	106.1	101.9
Gross operating rate (%) (5)	7.47	6.99	7.17	7.34	7.32	7.62	6.34	6.73	6.10	5.65

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

kg/head in 1991 in the EU (65 % of the average consumption of fishery products). However, the economic crisis which affected EU Member States over the last two years slackened this ascending trend, but an increase in consumption is anticipated to resume when the economy recovers.

The market for fish-based ready-to-eat meals is the most rapidly growing market in the EU, with the exception of Greece and Portugal where the purchasing power of customers is low. Reasons for this expanding market include: changing social factors, such as the growing number of working women, greater leisure time, more fragmented mealtimes within households, and the growing number of households with one or few members. The need for simple and ready-to-cook meals has consequently increased. The catering sector is also increasingly adding prepared or semi-prepared ready meals to their menus to meet client tastes and allow for savings in time, manpower and investment in kitchen equipment. Some giant agro-food firms such as Unilever (UK/NL) and Nestlé (CH) dominate this market segment and use their advertising power to attract more consumers.

The consumption of canned fish is on an increasing trend throughout the EU thanks to the marketing efforts of the leading firms which have adopted product differentiation policies through high quality standards and the introduction onto the markets of new forms of products such as tuna-based salads and elaborated mackerel-based preparations.

Lastly, the EU market for surimi seems to offer good prospects. It was estimated at 34 000 tonnes in 1990 and is expected to grow to 50 000 tonnes in 1994. France and Spain clearly appear as the leading markets in Europe for these products. Other major markets include the UK and Italy. The German market for this product is small as there is no traditional consumption of crustaceans in this country.

### Supply and competition

International competition in the EU processed seafood market is very tough. More developing countries are now capable of supplying quality products at low prices, dragging the EU industry into a restructuring phase. Since the EU industry cannot compete in terms of labour and other running costs, a great amount of research has been conducted to release alternative products of high quality standards, meeting EU customer requirements.

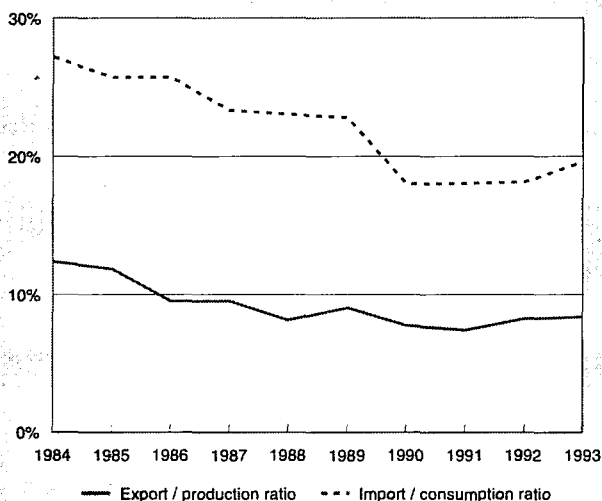
The EU industry has had to restructure through mergers and take-overs in order to allow for economies of scale and vertical and horizontal integration. As a result, whilst the EU industry was characterised by a large number of independent small-scale units in 1984, the processing industry now includes an increasing number of large agro-food firms or financial holdings with large financial resources. This policy has produced positive results on labour productivity of the sector.

Two of the most significant competitive variables for the processing industry are raw material availability and cost. Over the last three years, the average price of cod and haddock, which are widely used in the preparation of fish-based ready meals, rose by as much as 40 % due to a shortage in production (e.g. average price of imported cod rose from 1.06 ECU/kg in 1989 to 1.50 ECU/kg in 1992). This forced the industry to look for cheaper alternative species. As a result, only the most powerful firms with the financial and technical strength to test and promote new products (for instance based on Alaskan pollack or New Zealand hoki) were able to remain competitive in this market segment.

To secure sources of supply, the leading EU processing companies have increasingly set up joint-ventures in third countries, where resources are presumed abundant. This is, in particular, the case for Groupe Adrien (F) and Pescanova S.A. (E) in South America and Africa, and Pêche et Froid (F) and Compagnie Saupiquet (F) in West Africa and the Indian Ocean. Concurrently, the Community has signed 28 fishing agreements, principally with Scandinavian, North and South American, African and Baltic countries, enabling EU-registered vessels to operate outside Community waters.

In conjunction with the increase of the price of raw materials, the major producing firms have had to tighten their profit margins to remain competitive. Consequently, the 1992-93 period has witnessed a marked decrease of gross operating rates within the industry.

**Figure 8: Processing of fishery products**  
**Trade intensities**



Source: DEBA

**Table 6: Processing of fishery products  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.30	0.79
Danmark	8.04	7.42
BR Deutschland	0.51	0.54
Hellas	0.57	0.77
España	2.48	2.05
France	0.59	0.95
Ireland	1.42	2.04
Italia	0.43	0.46
Luxembourg	0.00	0.00
Nederland	N/A	1.16
Portugal	3.77	2.46
United Kingdom	1.63	1.20

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

### Production process

Production processes of fishery products are now characterised by a certain degree of automation. Although research still focuses on the definition of new processing machines to save manpower, a great amount of work is being devoted to extending the shelf-life and quality of the end-products.

The Individual Quick Freezing (IQF) process is now an established preservation technique which allows the processor to supply the customer with frozen seafood in small, ready-to-cook quantities instead of solid blocks which had to be cut or thawed prior to packaging or use. The benefits of IQF have led many companies to invest in this process, despite the high initial costs and the need for skilled staff. Another broad principle to extend shelf-life, by up to three weeks without freezing, is to apply temperature treatment after packing the raw material. This is done by using both vacuum packs and microwave pasteurisation. This technique is more economical as it entails energy savings with shorter time required for temperature treatment. Many processing plants throughout the EU are already using this means of conservation. Products preserved in this way are also much more convenient for consumers to microwave than frozen meals.

Intense product development has been taking place in the packaging industry. Notably, plastics have been developed with special properties such as thermal resistance, reducing the use of traditional aluminium containers.

### INDUSTRY STRUCTURE

#### Companies

A study carried out by the DGXIV of the EU Commission indicated that there were about 2 300 companies active in the fish processing sector in 1991. More than 55 % of them are concentrated in Italy, France, and Spain where the number of small-scale units remains high. Another 29 % of EU processing companies are located in the United Kingdom, Denmark and Germany. The number of employees in the processing of fishery products industry decreased by 8 % during the 1984-88 period, increased by 9.8 % between 1988 and 1989 and has steadily decreased since reaching 80 300 in 1993. Although no precise figures are available on the size of the firms, the survey of the European Commission indicated that the average number of employees per firm decreased from 50 in 1983 to 38 in 1991.

### Strategies

Motivated by the dramatic expansion of the EU market for processed seafood products, the two multinationals Nestlé and Unilever have performed mergers and take-overs to gather in their groups the most efficient fish processing enterprises. These two groups have, however, two different strategies: Unilever heavily invests in its subsidiaries, mostly located in the United Kingdom and Germany without conducting take-overs, while Nestlé performs buyouts of competitive enterprises dominating some promising market segments, especially in France. Besides these two leading agro-food groups, some holdings like United Biscuits (UK), Hillsdown Holdings (UK), Albert Fisher (UK), RT Holding Artlal (B), and IFM-Bongrain (F) have invested in the fish processing sector through take-overs of existing companies.

In 1992-93, these major agro-food groups slowed down their expansion strategies though. The new strategy has been to keep the subsidiaries in a healthy economic condition rather than to further increase the size of the groups. As a consequence, internal restructuring has led to shut downs or sale of non-profitable units, and suppression of jobs.

### Impact of the Single Market

The processing of fishery products' sector includes a wide range of products, so the impact of the creation of the Single Market differs across sub-sectors. In global terms, the effects of the Single Market were positive for consumer protection, thanks to the implementation of more severe hygiene measures and higher trade intensity. Another effect has been increased competition, even if the free movement of goods has created unfavourable circumstances for small and medium sized enterprises. Other problems are linked to the lack of harmonisation in the implementation of adopted legislation and to differences in customers' tastes.

The next priorities for the industry are the low sanitary inspection of the shellfishery products from third countries, especially from the Far East, and the agreement between the EU and Morocco in the sardines sector.

### ENVIRONMENT

Fishing has an undeniable impact on the environment. The most obvious illustration may be a decline in the actual level of fish stocks. Knowledge of changes in fishery stocks is the best gauge of the state of the marine population. Research into the impact of fishing on food chains is still at an early stage. But, increased efforts are being made not only to understand how and to what extent these human activities disturb the balance in the marine environment, but also to design and encourage the adoption of more selective fishing techniques.

The continued expansion of intensive aquaculture projects has also had an impact on the environment. The concentration of fish in a limited space and their intensive feeding can lead to substantial discharges into the surrounding waters. Even the escape of farmed fish, perhaps not indigenous to the area, can drastically upset the local ecological balance.

One of the main environmental issues related to the fish processing industry is connected with the occasional death of dolphins caught in tuna fishing operations. In 1990, the USA declared an embargo on raw tuna suspected to have been fished in association with dolphins. This embargo concerned primarily South American countries (particularly Mexico, Venezuela) whose vessels fish tuna swimming in association with dolphins in the Eastern Pacific. This led to a boycott of tuna cans manufactured in France, Italy and Spain, as these countries were buying raw material from South America. The embargo was lifted in 1992 for France when the French canning industry undertook to buy dolphin-safe tuna, with Spain and Italy only recently following. A secondary effect of this em-

bargo was that all the tuna that the South American countries could not sell to the USA was placed on the world market. Consequently, prices of raw materials on the international markets plunged steeply, drawing the EU tuna fleet into a major crisis from which it is only now slowly recovering.

## REGULATIONS

The two key regulations for the fishery product processing sector are:

- Council Directive N° 91/493/CEE of 22 July 1991 laying down the health conditions for the placing on the market of fishery products, completed by Council Directive 92/48/CEE of 16 June 1992 on the health conditions onboard certain fishing vessels. This key regulation harmonises practices within the EU and requires the hygiene standards of all establishments, where fishery products are prepared, processed, chilled, frozen, packaged or stored, to be approved by a competent authority. This Directive also applies to processing units of third countries exporting products to the EU to guarantee the safety of imported products at levels matching those of EU products.
- Council Regulation (CEE) N° 3759/92 of 17 December 1992 on the common organisation of the market in fishery and aquaculture products. This regulation focuses on marketing standards, producer's organisations, and prices of the products with special reference to the EU canning industry.

There are about 50 other regulations on: the name of the species to be used, import quotas, and minimum prices of imported raw material, which do not all specifically concern fishery products, but the larger food products sector. In 1994, the DGXIV of the EU Commission published an useful vademecum of EU regulations of interest for the economic operators of the fishery and aquaculture processing sector (ISSN 92-826-7860-1).

## OUTLOOK

The EU processing industry is suffering somewhat from the recession in which the EU has stepped into over the last two years. Globally, fish consumption is expected to further increase over the 1994-98 period and the industry should follow accordingly. Imports are expected to increase as EU waters will continue to deplete, propelling the industry to purchase raw materials in third countries. As exports will not show significant progress, due to the structural deficit of the EU in seafood products, the trade balance deficit will widen.

Written by: Cofrépêche

The industry is represented at the EU level by: EU Fish Processors Association (AIPCEE). Address: Avenue de Cortenbergh 172/6, B-1040 Brussels; tel: (32 2) 735 8170; fax: (32 2) 736 8175.

# Deep-frozen products

NACE 412.21, 414.1, 415.1

*Deep frozen foods have shown a very positive market trend, thanks to ready-prepared foods. Traditional products, though achieving the highest consumption levels, are distinguished by lower growth rates.*

*The biggest production in the various market segments is achieved by those countries with a high degree of specialisation in the corresponding fresh product sector, while traditional importing countries account for the highest consumption. From a structural viewpoint, the market is fairly concentrated to of a small group of multinational companies, but own-label sales are important as well. The remaining share is split up between numerous small or medium-sized firms.*

## INDUSTRY PROFILE

### Description of the sector

The deep-frozen food sector includes various products which have undergone a low-temperature preservation process. Such products include vegetables, meat, fish or pre-cooked and subsequently deep-frozen foods, including pizzas. The first are the traditional products of the sector, distinguished by a demand which has reached a stage of maturity, intended to substitute fresh products and to be used when and wherever the latter are not available. The second represent a newer segment with good development prospects, thanks to the high quality of deep-frozen foods as a result of improvements in deep-freezing techniques and changes in eating habits. These products have a greater service content than other frozen foods and replace equivalent fresh products, not so much because of seasonal variations, but rather because they represent elaborate products which can be prepared quickly. Such products have boosted value added in the sector in terms of services provided, among the highest in the entire food industry.

### Recent trends

Over the last ten years, the sector has undergone substantial growth, above that recorded for the manufacturing industry as a whole. In fact, while the latter grew by little more than 1 % in 1993, the former increased by about 3 %. Traditional products like deep-frozen vegetables or meat, except poultry, showed a slowdown in growth. On the other hand, more innovative foods (e.g. pre-cooked) are the prime movers of the sector (as well as frozen fish), though consumption levels

are below those of other products. The biggest growth was recorded in 1990, when there was a 6 % increase by volume.

In terms of value, the growth rate was higher, except in 1992 when there was a drop of approximately 2 % caused by a reduction of profit margins in countries like the United Kingdom, Spain, Portugal and Italy. In 1993, the cost of deep-frozen foods was the highest in Portugal and Italy due in part to fragmented distribution and supply.

The major producers in the sector in 1993 were the United Kingdom and Germany, with over 1 000 tonnes per year. These were followed by France, Spain, Italy and the Netherlands with smaller quantities. Generally speaking, the biggest production occurred in the segments of deep-frozen vegetables, potato-based products and deep-frozen meat. The production levels reached per market segment relate to the degree of specialisation achieved by the different countries and, in some instances, reflect the major deficiencies found on domestic markets. In the first case, the major producers are also important exporters, e.g. France, Germany and the United Kingdom for potato-based deep-frozen products, and Spain for deep-frozen meat and fish. In the second case, there is a tendency to import fresh products which are subsequently deep-frozen. For example, Germany and the United Kingdom make up for their cold climates - which do not favour fresh vegetables - by a high production level of deep-frozen products.

In the deep-frozen, oven-bake product segment (e.g. ready-made foods), the major producers are France and Germany. This, thanks to their well-developed sales and distribution structures.

### International comparison

Deep-frozen products are found in greater quantities on more developed food markets with advanced product distribution and management structures. In this regard, the USA is one of the most important producer and consumer countries in the world. There are many reasons for this. First and foremost is the wide extension of the market, which many years ago ensured the consolidation of the sector. Per capita consumption in the USA touches 50 kg against an average of 25-30 kg in Europe. Secondly, the development of particular forms of distribution on the one hand and the increase of microwave and freezers in the home on the other, have given a significant boost to the sector. In Japan, changes in family lifestyles resulting from an increasing proportion of women going outside of the home to work, have provoked an increase in the consumption of ready-prepared and frozen foods.

**Table 1: Deep-frozen products**  
**External trade by main product line**

(million ECU)	1988	1989	1990	1991	1992	1993
<b>Extra-EU exports</b>						
Fish	319	320	327	339	285	314
Meat	1 444	1 748	1 400	1 628	1 661	1 682
Fruits	16	15	15	19	18	17
Vegetables	32	35	34	29	27	30
Orange juice	18	16	18	18	12	9
<b>Extra-EU imports</b>						
Fish	1 195	1 180	1 463	1 608	1 559	1 378
Meat	465	562	534	518	536	559
Fruits	174	177	230	297	299	287
Vegetables	93	91	100	111	109	93
Orange juice	580	582	592	510	537	440

Source: Eurostat

**Table 2: Deep-frozen products  
Consumption in value by Member State**

(million ECU)	1989	1990	1991	1992	1993
Belgique/België, Luxembourg	N/A	400	336	358	398
Danmark	N/A	345	514	694	763
BR Deutschland	1 920	2 010	2 238	2 408	2 682
France	3 091	3 500	3 664	3 927	4 176
Hellas	N/A	N/A	N/A	N/A	N/A
España	1 946	2 178	2 347	2 490	2 424
Ireland	N/A	378	567	762	N/A
Italia	1 136	1 223	1 344	1 463	1 458
Nederland	N/A	389	431	481	546
Portugal	367	400	609	830	824
United Kingdom	4 817	4 669	4 785	4 612	4 394

Source: Euromonitor

**Table 3: Deep-frozen products  
Volume of consumption by Member State**

(thousand tonnes)	1989	1990	1991	1992	1993
Belgique/België, Luxembourg	156	171	141	148	157
Danmark	147	165	180	171	178
BR Deutschland	1 364	1 405	1 593	1 661	1 755
France	792	859	896	941	943
Hellas	78	83	88	93	98
España	511	549	654	580	600
Ireland	86	84	87	89	91
Italia	226	242	263	284	303
Nederland	234	243	254	264	273
Portugal	87	88	90	90	90
United Kingdom (1)	1 360	1 331	1 376	1 392	1 405

(1) Excluding frozen ready meals and pizzas.

Source: Euromonitor

**Table 4: Deep-frozen products  
EU consumption by main product in volume**

(thousand tonnes)	1989	1990	1991	1992	1993
Vegetables	1 193	1 227	1 264	1 272	1 315
Potato products	987	1 006	1 124	1 202	1 225
Fish	549	589	627	651	684
Meat	1 023	1 035	1 051	1 057	1 066
Bakery products	370	408	451	482	502
Ready meals (1)	507	551	597	635	671
Poultry (2)	621	586	621	654	683
Total (3)	5 250	5 402	5 735	5 953	6 146

(1) Excluding poultry-based ready meals for Denmark.

(2) Including poultry-based ready meals for Denmark.

(3) Excluding fruits and juices.

Source: Euromonitor

## Foreign trade

The EFTA countries, particularly the Scandinavian countries supply frozen fish. Significant foreign demand for deep-frozen products in 1988 came from Japan and the Middle East. While the USA also represented a good trading partner at that time, over recent years its share of EU imports has halved. Meanwhile, the role of Russia in this sector has become more significant.

Export flows have shown alternate patterns. From 1988 to 1993 there was an overall growth of 3 %. The steepest drops were recorded in 1989 and 1991: in the former due to a considerable fall in meat exports, while in the latter, the drop was generalised, but more significant for fish. In 1993, the highest export levels were touched by meat, followed at a distance by fish. As regards imports, the biggest growth rates were recorded up until 1990, after which the trend inverted



**Table 5: Deep-frozen products**  
**Volume of production by main products and Member State, 1993**

(thousand tonnes)	Vegetables	Potato products	Fish	Meat	Bakery products	Ready meals
EU	1 315	1 225	684	1 067	501	647
Belgique/België, Luxembourg	22	53	24	24	11	15
Danmark (1)	39	21	13	11	27	25
BR Deutschland	332	354	137	109	108	303
France	240	230	90	105	140	135
Hellas	15	55	11	2	10	3
España	152	64	180	49	42	24
Ireland	12	45	5	11	8	7
Italia	144	31	62	6	30	16
Nederland	25	87	16	97	10	18
Portugal	15	3	40	3	24	3
United Kingdom	319	282	106	650	91	123

(1) Excluding poultry-based ready meals.  
 Source: Euromonitor

and there was a downswing. The major imports in 1993 were fish and meat, though values were rather different.

## MARKET FORCES

### Demand

In 1993, the products most in demand were deep-frozen vegetables, potato-based products and meat, although the fastest growing markets, starting in 1989, were those of frozen fish and ready-prepared foods.

Within the EU, the biggest consumers (by volume) of deep-frozen foods are Germany and the United Kingdom, with quantities around 1.5 million tonnes per year, followed by France, Spain, Italy and the Netherlands. Per capita consumption shows a completely different picture, with Denmark in the lead with 34 kg, followed by Ireland, 26 kg, the United Kingdom, 24 kg and Germany, 21 kg. Spain and Italy have per capita consumption rates among the lowest in the EU.

The reasons for the success of deep-frozen foods are tied to the fact that they are practical and easy to use, i.e. they are a time-saving and always-available reserve; and the choice is vast at any time of the year. They are also very good value for money and have a high service content. Besides being eaten at main meals, deep-frozen products are also becoming

popular as snacks; this is especially true of deep-frozen oven-baked products and pizzas.

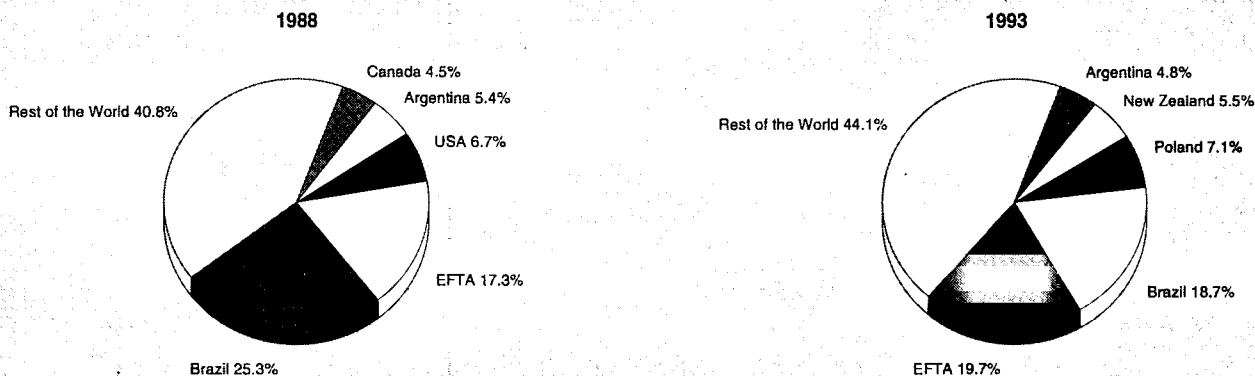
The distribution channels through which these products reach the consumer are numerous: large organised distribution networks, catering, discount stores, freezer centres and even home delivery. Organised distribution is a good vehicle for frozen products, inasmuch as it presents the best structures for the preservation of frozen foods, without interrupting the cold chain.

Because people have less time to spend in the kitchen, the demand for collective catering has risen and this has helped to boost the demand for deep-frozen products, in all segments. In some countries like Germany, France and Italy, home deliveries have increased considerably - thanks to the greater service content - with a consequent increase of prices.

In northern Europe, freezer centres are fairly common. These are retail outlets specialising in the distribution of foods preserved using cold techniques, where the variety is usually wider. Such specialisation often results in sales being completed by particular services such as home delivery.

The demand for deep-frozen products varies according to the country considered. In Spain for example, there is a clear consumer preference for unbranded products and this is a considerable obstacle to brand-name products. A weak link

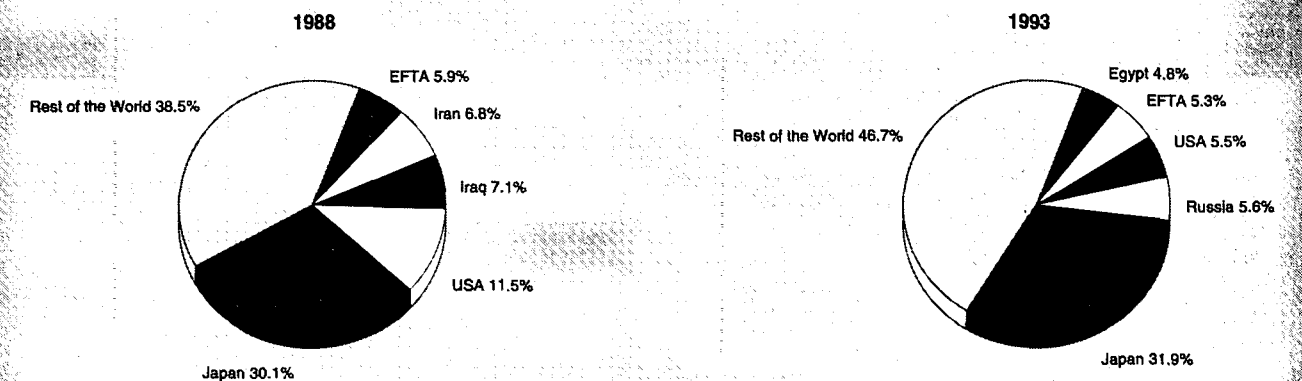
**Figure 1: Frozen-food products**  
**Origin of EU imports**



Source: Eurostat



**Figure 2: Frozen-food products  
Destination of EU exports**



Source: Eurostat

in the local system is supply and transport, which are still insufficient to manage deep-frozen products, despite the fact that this country is a major importer of such commodities.

The fastest growing segment in Denmark is ready-prepared food, above all chicken and pasta-based products. As far as deep-frozen meat is concerned, there is a progressive loss of demand compared to preserved meat, while the demand for vacuum-packed meat continues to increase.

In the United Kingdom, the deep-frozen food market continues to expand especially in relation to hamburgers and savoury cakes. The fastest growing sectors are high-quality vegetables and potato-based products.

#### Supply and competition

The deep-frozen food sector is still developing, and there is plenty of room for further expansion of supply as is evidenced by global annual investments of around 100 billion USD in structures for managing deep-frozen food within organised distribution networks. This figure is ten times greater than that for low-temperature treated commodities. The competitiveness of the industry is chiefly tied to the products which are deep-frozen particularly meat, fruit, vegetables and fish.

For many years the management of deep-frozen products represented an important entry barrier. In Germany and France, reorganisation and optimisation of this industrial cost were achieved, taking it out of the production chain. Additionally, computerised logistic systems integrated with other production and planning functions were developed. In some cases, however, the taking over of logistics by distribution has resulted in the appearance of new producers.

#### Production process

Freezing and deep-freezing are based on the same principle: turning water into ice so that bacteria cannot live and reproduce on the raw food product. The two processes are different, however. Freezing means achieving low temperatures slowly, so the ice crystals reach such proportions as to damage the preserved food cells and when defrosted, together with the ice, proteins, sugars and vitamins, which are removed. Through deep-freezing, low temperatures are achieved, but quickly, so the ice crystals are smaller and do not damage the food cells. Technological development in the sector is inclined towards the achievement of high-quality.

### INDUSTRY STRUCTURE

#### Companies

The industrial structure is characterised on the one hand by a number of multinational companies which cover about 70 % of the European market and operate at the same time in various other business markets. On the other hand, European production is fragmented into numerous small and medium-sized organisations with regional markets. France has the biggest number of producers (around 400). In 1992, there were about 90 in Germany, 135 in Spain, 90 in Denmark, 65 in Italy, and around 130 in the United Kingdom. Belgium has the smallest number of manufacturers (only about 15).

The Spanish deep-frozen food industry employed about 11 000 workers. Businesses are small or medium-sized, with an average of 96 employees. The production of deep-frozen foods is not yet very concentrated, with the top ten companies controlling about 45 % of the market. The five major foreign companies cover 15 % of the market.

The main multinational company is Unilever (UK, NL), which is the undisputed leader in nearly all subsectors, with over 50 % of the market in Italy, France, Spain and

**Table 6: Deep-frozen products  
Per capita consumption, 1993**

	Per capita consumption in volume (kg)	Per capita consumption in value (ECU)
Belgique/België, Luxembourg	14.8	39.5
Danmark	34.4	147.9
BR Deutschland	21.7	32.7
France	16.4	72.5
Hellas	9.5	N/A
España	15.3	66.4
Ireland	26.2	N/A
Italia	5.2	25.6
Nederland	17.9	35.4
Portugal	8.6	84.1
United Kingdom (1)	24.2	74.8

(1) Excluding frozen meals and pizzas.

Source: Euromonitor

**Table 7: Deep-frozen products Acquisitions**

1993 Bidder	Country	Target		Target country
Nestlé	Switzerland	Italgel	(cocoa)	Italia
Nestlé	Switzerland	Anonima de Alimentacion	(cocoa)	España
Nestlé	Switzerland	SAA	(miscellaneous food products)	España
Ducros	France	N/A	(fruits)	France
Pernod-Ricard	France	Etablissements R Foulon et Cie		France
Brake Bros	United Kingdom	Country Choice Food	(bakery)	United Kingdom
Hazlewood Foods	United Kingdom	Welten Snacks	(ready meals)	Nederland
Unigate	United Kingdom	Clifford Foods PLC		United Kingdom
Unilever	United Kingdom/ Nederland	Safra	(fruits)	France
Unilever	United Kingdom/ Nederland	Bajai Hutoipari RT		Hungary
Heinz Company	USA	Clorox Company	(fish)	USA
Dean Foods	USA	Birds Eye		USA
1994 Bidder	Country	Target		Target country
Nestlé	Switzerland	Anonima de Alimentacion	(cocoa)	España
BSN	France	Vivagel (Unilever)		France
Albert Fisher Group	United Kingdom	Rahbek Group	(fish)	Danmark
Christian Salvesen	United Kingdom	Tendafrost Frozen Foods		United Kingdom
Unilever	United Kingdom/ Nederland	Meniszez	(bakery)	France
ConAgra	USA	Universal Foods Corp.	(fruits)	USA

Source: *Nomisma*

Belgium. The second largest multinational company in terms of market share is Nestlé (CH), especially in the UK.

Other companies operating in the deep-frozen food sector at the international level and specialised productions in certain subsectors are Bonduelle (F), Cecab d'Aucy (F) and Grand Metropolitan (UK), which mainly operate in the vegetable subsector; and McCain (USA) which operates in the potato and potato-based product subsector. Dr. Oetker (D), Ross Food (United Biscuits UK) and Panzalin (F) - recently established through the joint venture between Danone and St.Louis - specialise in ready-prepared foods.

Two firms specialising in home delivery, which have been operating for some time in Germany and the Netherlands, are Bo\*Frost and Eismann.

### Strategies

17 acquisitions took place in the sector from 1993-94. These were promoted by large European groups. The growth strategy of these companies focuses on the consolidation of their market shares in the fastest growing segments, on higher service content and also on area markets with good development prospects, e.g. Spain and Italy, where consumption levels are below the Community average, but considerable growth is forecasted. This tendency to expand has spurred many medium-sized firms to establish co-productions or joint ventures with the aim of acquiring and expanding know-how, exploiting commercial and industrial synergies and widening the range of deep-frozen products, from vegetables to meat, and from fish to ready-prepared products. This phenomenon is particularly significant in France and the United Kingdom where there is a larger number of medium-sized firms.

Small companies adopt promotional or third parties' account policies. The large companies, on the other hand, revert to strategies based on product innovation, above all in the ready-prepared food subsector, through high market segmentation. Particular focus is put on regional specialities, ethnic cuisine and diet foods. A further element of segmentation is represented by packaging through the introduction of individually wrapped portions, as an effective response to the demand from more "promising" target consumers, i.e. youngsters and singles.

### Impact of the Single Market

The creation of the Single Market had a globally positive impact on this sector. However, while the common legislation is already accepted almost uniformly by all Member States, there are still some barriers regarding the monitoring of temperatures in means of transport, warehousing and storage of quick-frozen foodstuffs and the definition of procedures and methods of analysis for official controls. Other problems are linked to a lack of clear definitions, which gives problems to apply QUID (quantitative ingredient declaration).

The next priorities are to achieve more uniformity on the labelling and packaging standards, in particular with respect to the average weights and the indication of the preserving temperature. One also needs to reach agreement on the exact definition of deep-frozen products across the Member States.

### ENVIRONMENT

Manufacturers and planners must try to keep down energy consumption and thereby safeguarding the environment. Plant technologies must solve their effluent problem, which plays

a role in the destruction of the ozone layer. The harmful properties of CFCs represent a brake which must be taken into careful consideration.

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## OUTLOOK

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The future of the deep-frozen food sector will be characterised in general by less significant or in any event different growth rates for the various market segments, with the ready-prepared food and snack subsectors showing the highest growth rates.

From the point of view of industry's structure, the process of concentration by multinational companies will continue and focus on major-growth markets. Cost optimisation and the attainment of competitive advantages will be particularly important objectives for medium-sized firms.

Written by: NOMISMA

The Industry is represented at the EU level by: Fédération des associations des fabricants de produits alimentaires surgelés de la CEE (FAFPAS). Address: Avenue de Cortenbergh 172, B-1040 Brussels; tel: (32 2) 735 8170; fax: (32 2) 736 8175.

# Grain milling

## NACE 416

In terms of production, the milling industry has been fully independent for some years and is distinguished by a high level of finished-product stocks. In this way, the EU is able not only to meet internal demand, which has reached a wide-spread degree of stability, but also demand from abroad, which is much more lively. This continues to produce less need for foreign supplies (and a degree of production plant utilisation below maximum levels). Demand has reached the saturation point, which entails a restructuring process, consisting of: the closing down of small mills, which had become inefficient; the concentration of large industries, able to compete on the international level; and the integration with the industries in downstream sectors, in order to keep production costs low. Finally, almost all companies in the sector tend towards high-quality products, by means of production technologies which utilise selected grain mixtures.

### INDUSTRY PROFILE

#### Description of the sector

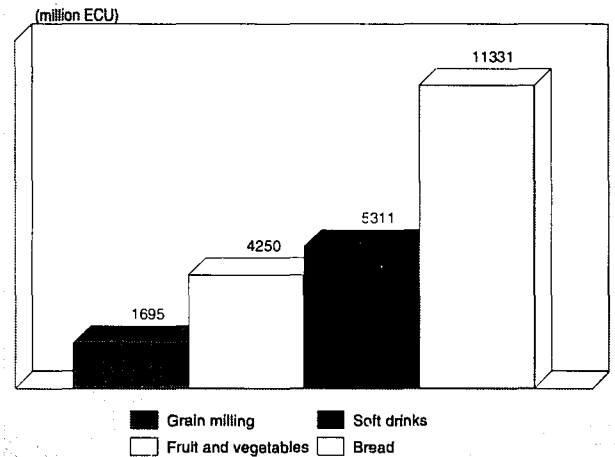
The milling industry comprises substantially homogeneous products, obtained by processing cereals. These can be divided up into the production of semolina, flour (wheat and corn, common and durum, rice) and bran; rusk manufacture; the hulling and grading of seeds and grains, especially of maize; and the manufacture of biological products, which represent a niche market. The milling industry is linked upstream with primary production and, at the same time, downstream, with the pasta-manufacturing sector and the bread-making and confectionery industries. Therefore, the products often represent commodities, and there is a very small margin of product differentiation, as the production process is highly standardised and has a low value added compared to other manufacturing industries. Among the Member States, the United Kingdom has the highest level of value added, immediately followed by France and Italy. Germany and Spain, on the other hand, present substantially similar and not particularly high levels.

#### Recent trends

In 1992/93, there was a significant drop in internal demand at current prices, and consequently in production, bringing the values of these indicators back down to approximately those recorded in 1985. Conversely, the foreign trade indicators, in particular of imports, rose considerably. Employment figures declined during the entire 1984-1993 period, with steeper drops in 1987/88 and 1991/92, as manual labour was in part replaced by less labour-intensive modern production technologies, as a result of the industrial restructuring of the sector.

The major indicators in the sector do not point to a particularly brilliant situation. The reasons for this are: a strong market production output capacity on significant finished-product and raw material surpluses, in particular of wheat; and a saturated internal demand, due on the one hand to a downward swing in the pasta industry since 1992 and to a growth in the bread-making and confectionery industry smaller than that of the previous year on the other. The biggest drops concerned durum wheat flour, while common wheat flour production remained stable. In the case of flours made from other cereals, the situation is rather different. Starting in 1992, there has been a strong downward swing in the production of soya flours, due to a considerable drop in cultivated areas. This has benefited maize production, though this product is distinguished by heavy imports from third countries.

Figure 1: Grain milling  
Value added in comparison with related industries, 1993

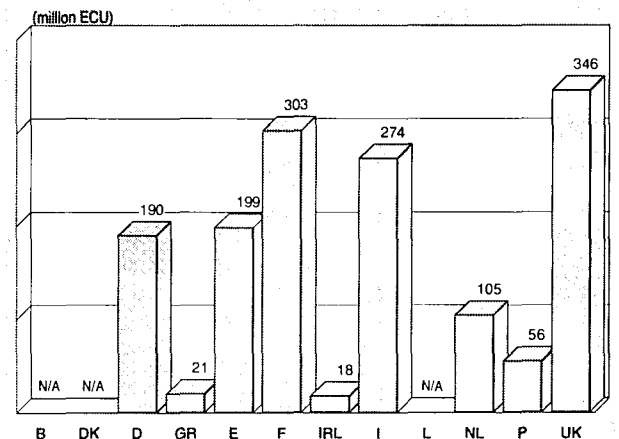


Source: DEBA

The production pattern, at constant prices, is fairly stable compared to that of the manufacturing industry, with a more substantial increase from 1988-1989 and a downward swing in the 1990s. Mean variations relating to foreign trade indicators are the most interesting: in 1984-89, imports fell by 34 %, with a drop of 80 % in 1988/89 alone. Conversely, between 1992-93 there was a big increase (around 10 %). Exports also fell during the 1984/89 period, but variations were less extreme. On the other hand, from 1989-93 there was a moderate growth, especially during the 1991/92 period. A variety of factors made 1989 a crucial year. In the first place, there was the considerable increase in import prices from 1987 to 1989 caused by the bad harvests in the major cereal growing countries. Secondly, internal demand was not particularly lively, so the need to look for greater supplies in third countries was discouraged.

The milling industry shows a greater production of common wheat flours in northern Europe, while southern Europe also produces durum wheat flour. The biggest producers in the

Figure 2: Grain milling  
Value added by Member State, 1993



Source: DEBA

**Table 1: Grain milling**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	9 845	9 840	10 375	10 091	10 467	10 113	9 593	9 372	9 380	9 480	9 580
Production	10 434	10 215	11 110	10 803	11 207	10 987	10 503	10 182	10 200	10 300	10 400
Extra-EU exports	1 164.1	660.8	797.8	764.0	790.2	919.8	966.8	876.6	880.0	870.0	860.0
Trade balance	589.4	374.6	735.5	711.8	739.7	874.0	909.9	810.1	820.0	820.0	820.0
Employment (thousands)	47.5	39.9	39.8	39.3	39.1	36.9	36.5	36.1	35.0	34.0	33.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DPI forecasts.

Source: DEBA

**Table 2: Grain milling**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.73	-1.87	-0.43	-2.25
Production	0.99	-1.24	-0.01	-2.66
Extra-EU exports	-5.06	6.60	-0.04	-6.24
Extra-EU imports	-34.16	-2.40	-21.57	9.49

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Grain milling**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 164	1 325	814	641	661	798	764	790	920	967	877
Extra-EU imports	575	546	336	225	286	62	52	50	46	57	66
Trade balance	589	779	477	416	375	736	712	740	874	910	810
Ratio exports / imports	2.0	2.4	2.4	2.8	2.3	12.8	14.6	15.7	20.0	17.0	13.18
Terms of trade index	91.9	104.9	100.1	92.6	76.5	93.3	100.0	84.6	87.9	86.9	N/A

Source: DEBA

**Table 4: Grain milling**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.1	85.8	86.0	89.1	93.8	100.4	100.0	102.6	105.8	104.3
Unit labour costs index (3)	87.2	86.6	91.5	91.7	94.3	94.0	100.0	105.4	110.0	112.7
Total unit costs index (4)	100.4	99.4	99.7	98.9	99.6	100.3	100.0	102.2	107.1	106.9
Gross operating rate (%) (5)	5.35	6.19	6.03	6.21	6.41	6.66	7.09	6.58	6.03	6.23

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

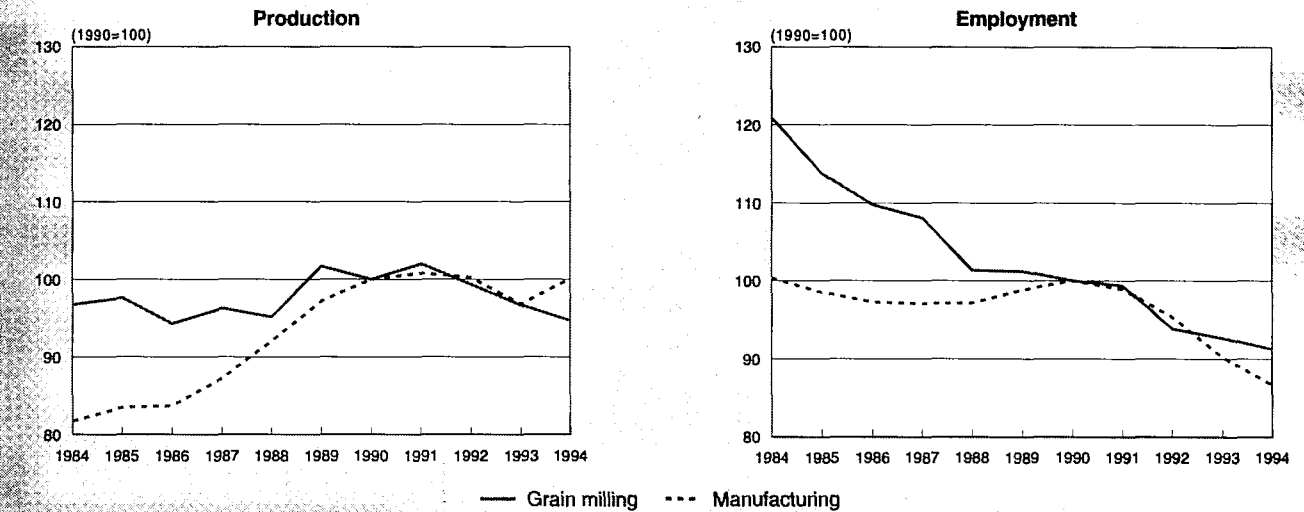
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3: Grain milling**  
Production and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: DEBA

Community in 1993 were France and Italy with virtually the same quantities, followed by the United Kingdom, Spain and Germany. Only France and Germany have contributed meaningfully to growth, while in Spain and Italy there has been a big downward swing. In Spain corn crops were smaller and of lower quality due to bad weather conditions. Italy cut export quantities, in particular to the former Soviet Union and Algeria not so much due to a fall in the demand from abroad as to internal provisions which froze insurance cover on credits to various countries. Compared to the other Member States, the excellent performances of Belgium and the Netherlands should be taken into consideration. In fact, these countries - though not in a position to produce particularly high volumes - have proved themselves capable of strong growth in the short term.

**International comparison**

Global production of flours did not change much between 1984 and 1993. The EU was the world's biggest producer of processed cereals, both in 1984 and in 1993, followed by the

USA and Canada. The deflationary patterns of the EU and the USA tended to be constant and quite similar, while in Japan there was a downward trend.

Maize and wheat-based products are mainly concentrated in the USA, wheat-based products in the EU, rice and minor cereal-based products in Asia and soya-based products in South America.

The trade of processed cereals throughout the world appears stable compared to the previous year, excepting the impressive growth of demand for flour in the USA. Anyway, a fall is expected due to the greater independence of some Asian countries in terms of production, coupled with the overall drop in demand, especially in the former Soviet Union (due to the ongoing economic and social changes there). The production of minor cereals and rice, of which China and India are the top producers and boast the highest crop yields, continues to increase. Since 1992, soya flour imports from Argentina and Brazil have been rising.

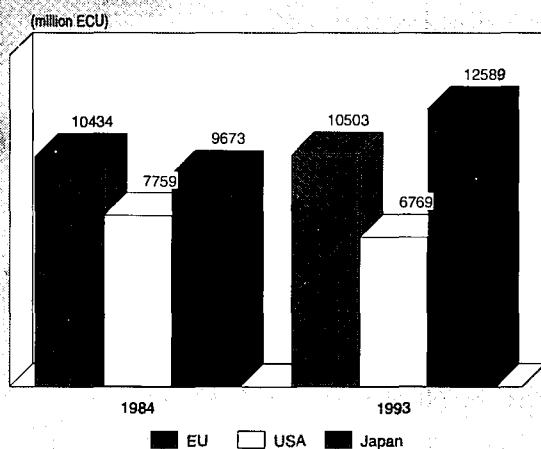
**Foreign trade**

The EU's flow of trade is marked by the clear predominance of exports over imports. The former go above all to the countries of North Africa, which took 40 % of the total in 1988. These are followed by the EFTA countries, where production potential is very low due to the lack of raw material, Cameroon and Syria. In 1993, the share of the North African countries rose considerably as the production levels in Algeria dropped sharply because of bad weather conditions. Also on the upgrade are flows towards the Middle East, with Syria as the biggest buyer.

In 1988, 35 % of EU imports came from the USA, followed by Thailand, Surinam, Uruguay, and India. In 1993, imports plummeted, despite the significant increase of quantities from Thailand, especially of processed rice, and the slight downswing of the USA caused by bad weather conditions. At that time, the main trading partners were completely different: in place of Uruguay, Surinam and India, we find Egypt, the EFTA countries and Australia.

During the 1984-93 period, the trade balance of the EU, at current prices, not only remained in the black, but actually tended to improve as well. The turning point, which occurred in 1989, after a period in which both imports and exports dropped at the same rate, can be attributed to the steep fall

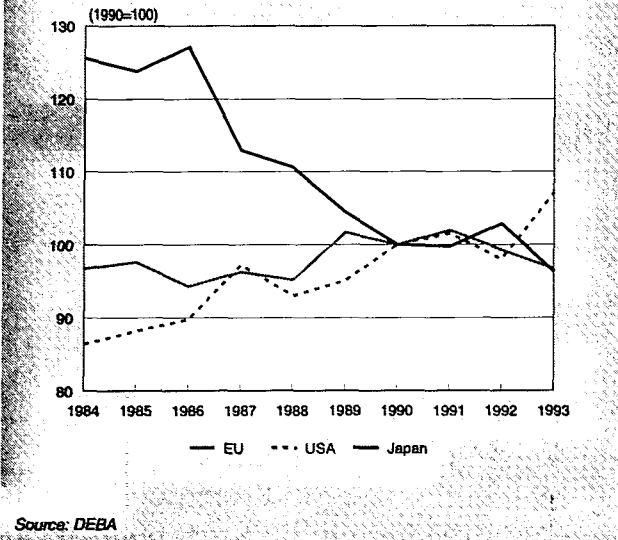
**Figure 4: Grain milling**  
International comparison of production in current prices



Source: DEBA



**Figure 5: Grain milling**  
International comparison of production in constant prices



**Demand**

Market needs, principally of secondary processing food industries, shape the activities of the milling industry both in terms of quality and quantity. With regard to quality, requests made by final processors affect supply policies concerning raw materials which have to respond to certain chemical-protein parameters. With regard to quantity, the pattern of the demand for flour-based products affects the degree of exploitation of production plants which tends to reach an optimum level in order to keep production costs down as much as possible. The optimisation of the exploitation rate of the production plants is the result of planning, whereby there is a regular flow of raw material over time. Purchasing policies therefore represent an important and critical factor not only in terms of quality standards, but also with respect to the productive efficiency of the sector.

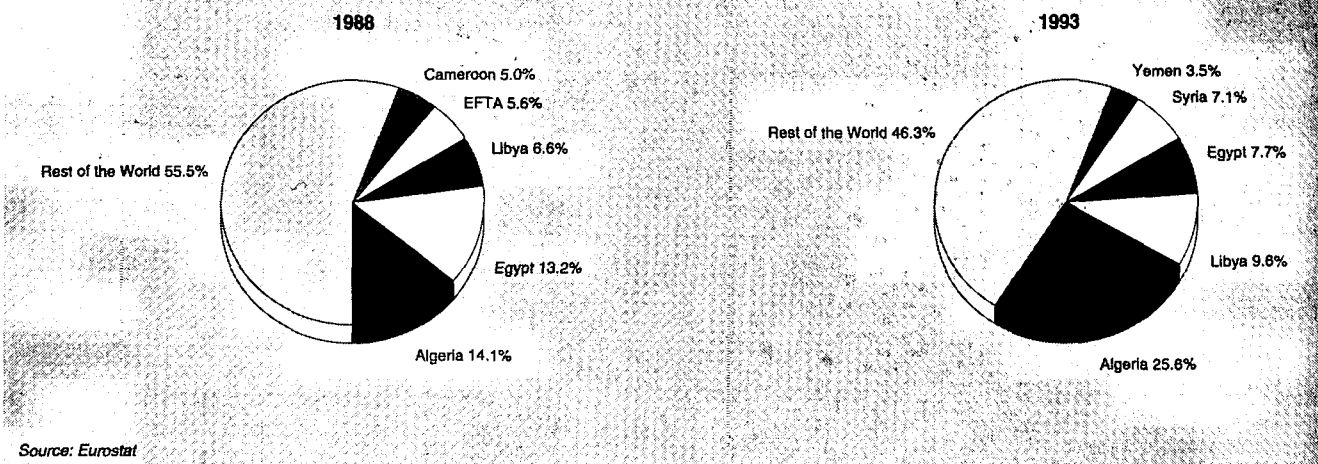
Durum and common wheat flour represent a primary input for the pasta industry; and common wheat flour is also used for bread-making (on an industrial and non-industrial scale) and in the confectionery industry. In the countries of northern Europe, this latter type of flour is used mostly by local pasta producers who exploit production techniques to obtain a product able to substitute for durum wheat pasta. Alongside this particular use of flour, there is also direct retailing, though this represents a very small share of the overall supply. Flour for domestic use is, in fact, in the maturity stage of its life cycle and demand for this product does not seem likely to pick up. This is explained by the fact that current eating habits prevalently favour pre-prepared products or products which require little preparation, which can be used more frequently. The demand for flour in the pasta and bread-making sectors in 1993 was higher in Belgium, Denmark, Spain and Italy. The share of flour for the confectionery industry was more or less the same in all countries, except Italy, where it was higher. Denmark and Germany consumed the largest amounts of flour for direct retailing.

While traditional flours are passing through a substantially stable period, the market has expanded for low-residue or completely biological flours. In fact, products of biological origin, riding the wave of recent health trends in food consumption, have gained in popularity in some northern countries, where they represent an already consolidated market niche. The demand for organic products has waned over the last few years in the United Kingdom, whereas in the Medi-

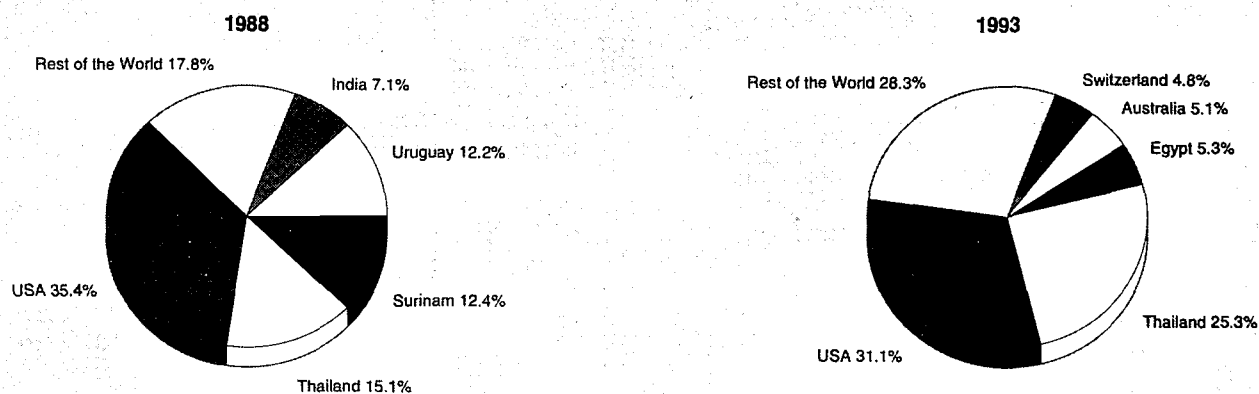
in imports. The export/import ratio thus went from 2.31 in 1988 to 12.81 in 1989 and consistently increased up to 1993, with a peak at 20 % in 1992. The countries most significantly behind this jump are Germany, France and the United Kingdom, while Italy shows the strongest counter-trend.

The internal market of the EU is chiefly dominated by Germany, France and the United Kingdom, and to a lesser extent by Belgium and The Netherlands. In particular, France exports the most to the other countries of the EU - which received similar shares from Germany - and to third countries, thanks to the generally high production levels of common wheat flours. This means that France, after winning the internal EU market, has sought new outlets abroad. Italy, and to a lesser degree, Spain, export considerable quantities to third countries as well. The terms of trade index reveals a very similar pattern to that of the trade balance and shows a recovery in 1989 due to a bigger increase in export prices over import prices.

**Figure 6: Grain milling**  
Destination of EU exports



**Figure 7: Grain milling  
Origin of EU imports**



Source: Eurostat

terreanean countries they are just beginning to spread. Health recommendations throughout Europe also have encouraged the greater consumption of bread.

### Supply and competition

The labour productivity index underwent substantial growth between 1984-1993, though production and employment figures tended to drop. This means that labour is not a marginal component of the production process, despite the large reductions in employment levels of the milling industry through the 1980s. In fact, there was a greater introduction of new production technologies and employment of capital assets during the 1980s, while over recent years things have levelled off. Production costs are fairly steady and very near the base year 1990 values. The biggest item of expenditure remains raw materials, though labour costs rose during the entire 1984/93 period with the most significant increases occurring in the 1990s.

The grain milling industry is distinguished by a strong fragmentation of supply, located principally in the major producing countries. A case in point is the bread-making industry, which is split up into a high number of smaller bakeries.

### Production process

Technological innovation in the sector involves the computerisation of the production process, through which it is possible to obtain a better quality product. Flours are obtained from a mixture of selected grains and treated at high-temperatures

during the drying phase. The automation of the production process results in the greater specialisation of the work force (with the subsequent higher labour costs), as the work chiefly involves the control of the production cycle.

The production process of biological flour is not much different from that of other flours in the processing stage: the biggest differences appear during storing. Storage time must be as short as possible because the raw materials are free of additives or preservatives.

Thanks to technological innovation in the sector, production capacity has increased, but the degree of plant utilisation, particularly with regard to common wheat flours, has not yet reached maximum levels. In France and Germany it varies between 70-80 %, in Italy it is around 60 % and in Spain it only touches about 40 %.

## INDUSTRY STRUCTURE

### Companies

The number of milling companies in the EU has dropped steeply over the last decade - especially in the early 1980s - in Germany, France, Italy and, to a lesser extent, in Spain. Currently, a large number of small milling companies exist, chiefly in the major producer countries (i.e. Italy, France), but also in Spain and Greece, where average production quantities were not more than 10 thousand tonnes in 1992. The

**Table 5: Grain milling  
Destination of flour consumed in home country, 1993**

(%)	Bakeries	Biscuits and rusk manufacturers, confectioners	Household flour	Other uses
Belgique/België	85.5	9.0	1.5	4.0
Danmark (1)	84.0	N/A	16.0	0.0
BR Deutschland	73.0	14.0	7.0	6.0
España	79.6	16.1	1.6	2.7
France (2)	65.7	17.5	5.3	11.5
Italia (3)	77.0	23.0	N/A	N/A
Nederland	64.6	15.0	0.3	20.1
United Kingdom	64.7	16.3	4.8	14.2

(1) Bakeries include biscuits and rusk manufacturers and confectioners.

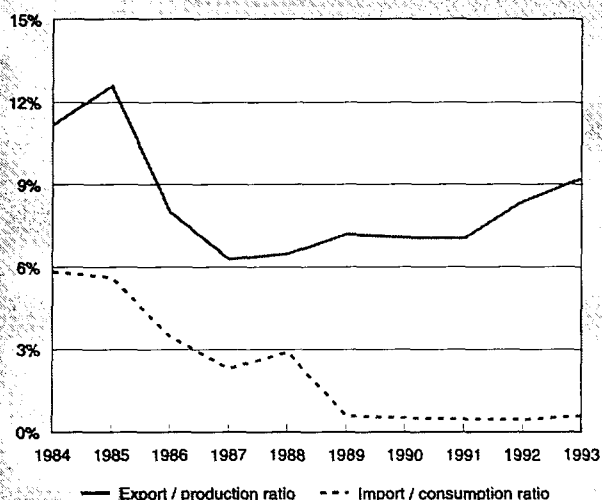
(2) Other uses include flour for mixtures sold principally in the other categories.

(3) Biscuits and rusk manufacturers and confectioners include household flour and other uses.

Source: National Milling Associations



**Figure 8: Grain milling  
Trade intensities**



Source: DEBA

large companies are situated in France, the United Kingdom, The Netherlands, Belgium and Denmark. The average production figures per mills are respectively 51 thousand tonnes in the United Kingdom, 28 thousand tonnes in The Netherlands, and 20 thousand tonnes in Belgium and Denmark, but only 6 thousand tonnes in France. Between 1991 and 1992, a 25 % growth was recorded in the average production figures per mill in Belgium. In the first group of countries very old traditions exist involving a fairly fragmented industrial structure, e.g. in France just less than half the milling companies in existence produced less than 10 thousand quintals of flour in 1991. In the second group on the other hand, a greater industrial concentration exists because of a larger number of high-technology production units.

Product specialisation ratios, calculated both in 1984 and 1993, were fairly high. In 1984, Portugal and Greece achieved the highest values, followed at some distance by Spain, Ireland, Italy and Denmark. In 1993 Greece achieved the greatest product specialisation of them all.

The major milling companies per country are: for Belgium, Ceres-Bruxelles-Gent N.V. and Molens van Deinze; for Ger-

many, Kampffmeyer Muhlen GmbH Hamburg, Wehrhahn-Muhlen OGH Düsseldorf and BM Bakermuhlen AG Mannheim; for France, Moulins Soufflet, Grands Moulins de Paris (GMP) and Euromill; for Luxembourg, Muller Frères and Nonnemillen; for The Netherlands, Meneba and Ranks Meel B.V.; for Portugal, National, Companhia Industrial de Transformação de Cereais and Germen, Moagem de Cereais; and, finally, for the United Kingdom, Allied Mills Ltd, Rank Hovis Ltd and Spillers Milling Ltd.

### Strategies

To recover competitiveness, producers are focusing on quality control and on minimising production costs. The former concerns all the stages of the production process, from storage to processing, right up to marketing. The latter is implemented above all through technological innovation, the closing down of small plants and raw material purchasing policies.

As in many other sectors of the manufacturing industry, policies are being adopted in the grain milling industry for the certification of the production process in conformity with ISO standards. Quality certification represents a further instrument to increase the competitiveness of enterprises. Quality certification is widespread throughout much of Europe, so that most of the mills in the United Kingdom and many in Germany are certified. In Italy, the first milling company to adopt production quality certification was Molino Seragni SpA, a firm capable of an output of 1 800 quintals a day (located in Lombardy), and in France Moulins Soufflet and Intermeunerie.

The location of plants also has strategic importance in relation to both upstream and downstream sectors. Plants are very often situated in raw material production areas, to keep down transport costs as much as possible; and near processing industries, especially pasta industries, with which a process of integration is under way (e.g. the pasta industry in Italy).

Besides this greater integration with industries downstream of the milling sector, policies of industrial concentration should be considered which, through mergers and acquisitions, lead to the creation of giant and multinational companies, engaged primarily in foreign trade. In 1994, in France one merger went ahead: that of Moulins Soufflet with Française de Meunière. Finally, in 1994, the United Kingdom Golsin Investment acquired Maria Mayor Gil of Spain.

### Impact of the Single Market

The impact of the creation of the Single Market on grain milling sector has been overall positive, even if small. It affected in particular the free movement of goods, and most of all stimulated consumer protection. The limited nature of

**Table 6: Grain milling  
Number of mills and total flour production, 1992**

	Number of mills (units)	Total flour production (thousand tonnes) (2)	Average production per mill (thousand tonnes) (2)
EU (1)	3 036	24 788	8.2
Belgique/België	55	1 157	21.0
Danmark	16	321	20.1
BR Deutschland	648	5 378	8.3
España	448	2 173	4.9
France	885	5 149	5.8
Italia	818	4 880	6.0
Luxembourg	4	40	10.0
Nederland	48	1 265	26.4
Portugal	37	600	16.2
United Kingdom	77	3 825	49.7

(1) Excluding Greece and Ireland.

(2) Excluding durum wheat and rye flour for Belgium, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom.

Source: National Milling Associations



**Table 7: Grain milling Acquisitions 1994**

Bidder	Country	Target	Target country
Soufflet	France	Societe Meuniere de Gestion et Participation	France
Toulousaine de Cereals	France	Vitaflor (in receivership)	France
Golsin Investment	United Kingdom	Maria Mayor Gil	España

Source: Nomisma

**Table 8: Grain milling Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	1.12	N/A
BR Deutschland	0.47	0.43
Hellas	3.95	4.33
España	2.23	2.13
France	0.85	1.10
Ireland	1.43	1.02
Italia	1.33	1.43
Luxembourg	N/A	N/A
Nederland	0.67	1.26
Portugal	4.01	2.59
United Kingdom	0.98	1.05

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

the impact is due to two factors. Firstly, the sector is characterised by a low international trade intensity. In fact, transportation and distribution of flour is very expensive, so grain processing take place regionally. Secondly, the sector had already been deeply influenced by the reform of the Community Agricultural Policy.

The harmonisation of legislation on additives which still represents an internal barrier to trade, is a priority for the industry.

### REGIONAL DISTRIBUTION

Traditional durum wheat growing regions are located in Italy, Spain, the United Kingdom, Portugal and Greece, while common wheat growing regions are in France and Germany.

In Italy, the highest concentration of common wheat and relative processing is in the Po Valley regions, while durum wheat is prevalent in the south. Rice processing industries are to be found chiefly in Piedmont while maize processing is mainly located in northern Italy.

In Spain, the major flour producing regions are Castilla y Leon, Andalusia, Murcia, La Roija, Castilla-La Mancha, Extremadura and Navarra. In Portugal, the big mills are located near the centre of consumption and near the coast, whereas common and durum wheat are produced in the interior.

In Germany, the main cereal producing regions are in the west (Bayern and Niedersachsen) and in the east (Mecklenburg-Vorpommern). Meanwhile, the main flour producing regions are near to the centre of consumption: Nordrhein-Westfalen and Niedersachsen/Bremen in the west, and Berlin and Brandenburg in the east.

The largest French plants are situated in Ile-de-France, while the regions with the highest number of plants are the Loire Valley, Brittany, Midi-Pyrénées and Rhône-Alpes. In the United Kingdom, the largest concentration of mills is to be

found in the port areas of England, while in Belgium the region with the biggest concentration is Flanders.

### ENVIRONMENT

In the past, large quantities of water were used to wash cereals during the production process. This environmental problem has been remedied by the use of pneumatic washing systems, which require smaller quantities of water. Consequently, no serious environmental problems related to the grain milling industry exist at the present time.

### REGULATIONS

In the cereal sector, the CMO (Common Market Organisation) came into force in June, 1967 and is controlled by Regulation 1766/92, which fixes prices, measures of intervention and measures relating to cereals, oleaginous and protein products of the McSharry plan. This reform came into force on 1 June, 1993; its main aim is to reduce the difference between Community prices of cereals and world prices, while supporting farmers through compensatory payments and stabilisation measures.

The cereals sector is influenced by the GATT Agreement, and particularly by the measures adopted with the Blair House agreement between the EU and the USA. Focal points are: measures relating to market access, domestic intervention, the setting of tariffs and export. Export subsidy expenditures are to be reduced by 36 % and the volume of subsidised exports by 21 % over the implementation period, using the years 1986/90 as a base. In this framework, direct compensatory payments introduced by the 1992 CAP reform are not included.

### OUTLOOK

With regard to supply, the forecast for future years shows that objectives of production cost reduction and product quality differentiation will guide strategic policies within the grain milling industry. Technological levels will be maintained more or less, and the process of industrial restructuring will slow down, though the possibility still exists that a number of production units will be closed down and the trend toward concentration will continue.

On the demand side, future growth in the sector will depend on food consumption trends in neighbouring sectors. The drop in bread consumption, despite increases in amounts produced at the industrial level, and the increased consumption of other flour-based products will be the chief factors likely to bring about the most important changes. However, given the stability of most indicators in these sectors, no particularly significant variations are envisaged.

Written by: NOMISMA

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# Industrial baking

## NACE 419

The baking industry has achieved substantial stability in terms of consumption, and a saturation of internal demand could present itself in the future. In fact, the demand for bread appears stagnant. Health considerations prevail which boost the market for wholemeal and biological products. The industry is increasing its degree of concentration in terms of production, mirroring the strategy taken in distribution. Companies are expanding through acquisition strategies, and the preferred sales channel is through modern, organised distribution networks. In this context, innovations relating to technology, products and packaging as well as marketing policies (notably advertising policies) acquire an ever greater importance.

### INDUSTRY PROFILE

#### Description of the sector

The industrial baking sector processes semi-finished products from other sectors of the food industry and turns out products for the final market. Besides bread and bread substitutes, these include biscuits, confectionery and other sweets.

Such products can be categorised in part by the occasions at which they are eaten: bread substitutes, e.g. crackers, rusks, breadsticks and toasting bread, which are eaten during main meals; biscuits and cereals, eaten at breakfast; industrial confectionery, still subject to only occasional consumption; and cakes, eaten on holidays and special occasions.

This sector has expanded in several directions. The development of bread substitutes is favoured by a drop in bread consumption and by the organoleptic and storage characteristics of such products. Breakfast products have undergone considerable expansion, especially cereals, which are now becoming popular in Southern Europe.

The economic clout of the sector, expressed in terms of added value, is one of the biggest of the entire European food industry. Germany offers the greatest contribution to value added and to the growth of the sector, as it is in a position to boost both production and employment. This country is followed in order of importance by the United Kingdom, Spain and France.

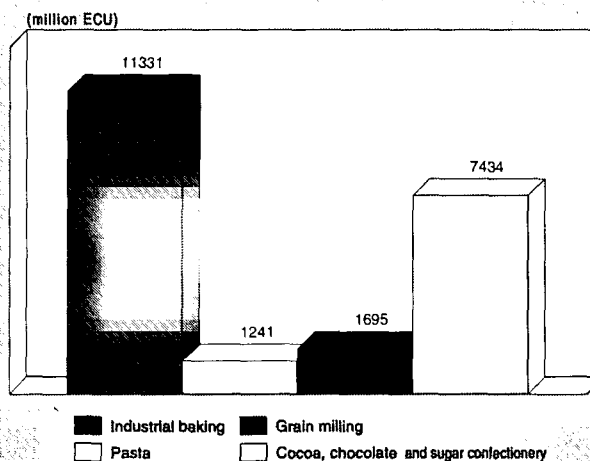
The main indicators in the sector went up between 1984 and 1993. During 1993-94, however, the growth rate slowed down a little. Internal demand is almost completely covered by internal production. In fact, the percentage of imports with respect to total demand was only 1 % in 1993, and there is consequently a tendency to export European products abroad. Unlike many other industries in the food sector, employment levels continued to rise between 1984 and 1993, going from 411 to 449 thousand.

#### Recent trends

The growth rates of principal indicators at constant prices are for the most part positive. Supply and demand are growing at the same speed and the pattern of foreign trade indicators is also positive. There was a considerable increase in demand from abroad which reached its apex in 1993 when the export share of total production was over 3 %, with a contemporaneous slide in the growth pattern of imports.

The anti-cyclical trend of the sector is underscored not only by the pattern of the main indicators, but also by a comparison with the manufacturing industry as a whole. Up to 1990, the production pattern in the bread sector was in line with that

Figure 1: Industrial baking  
Value added in comparison with related industries, 1993

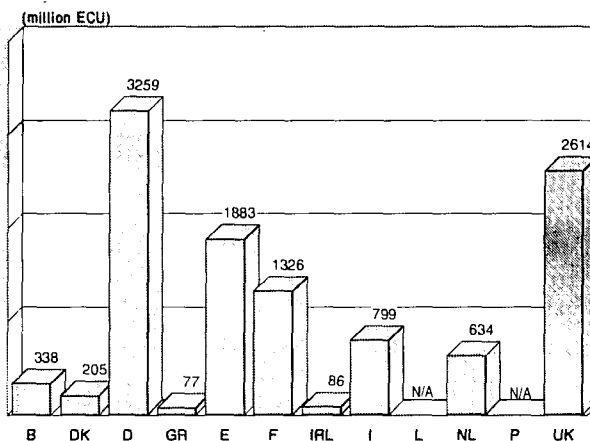


Source: DEBA

of the manufacturing industry as a whole: whereas the latter appears to have reached a certain degree of stability, the former continues to grow. Employment in the baking industry showed an almost exponential growth from 1985 to 1990, then, having reached an apex in 1991, there was a fall, but at a slower rate than that which affected the manufacturing industry in general. 1991 consequently appears to be a pivotal year, and the beginning of a less brilliant period for the industrial baking industry.

The strongest - yet still only moderate - growth in biscuit manufacturing over recent years occurred in France, Italy and the Netherlands, while the remaining EU countries showed a tendency to slow down their production. Of particular interest is the trend in France towards a rise in the price of bread, while in the United Kingdom and Portugal bread prices are going down. In the biscuit sector, there is a tendency for prices to rise in nearly all countries, especially Greece, while exceptions are found in the United Kingdom and the Netherlands. Price sensibility is particularly high in relation to

Figure 2: Industrial baking  
Value added by Member State, 1993



Source: DEBA

**Table 1: Industrial baking**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	15 809	19 695	21 926	23 389	25 881	26 393	26 805	27 564	27 720	27 950	28 180
Production	16 209	20 041	22 354	23 852	26 432	26 961	27 453	28 365	28 600	28 900	29 200
Extra-EU exports	482.3	506.1	611.7	651.6	750.7	779.8	875.1	1 037.2	1 170.0	1 270.0	1 370.0
Trade balance	399.6	345.9	427.7	463.6	551.8	567.9	647.4	801.4	880.0	950.0	1 020.0
Employment (thousands)	411.3	429.7	455.1	456.4	462.1	456.6	448.9	450.4	470.0	500.0	520.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Industrial baking**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.47	2.07	2.84	1.24
Production	3.41	2.21	2.88	1.48
Extra-EU exports	3.68	7.88	5.53	10.49
Extra-EU imports	13.83	5.22	9.92	6.43

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Industrial baking**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	482	564	543	511	506	612	652	751	780	875	1 037
Extra-EU imports	83	102	129	148	160	184	188	199	212	228	236
Trade balance	400	463	413	363	346	428	464	552	568	647	801
Ratio exports / imports	5.83	5.56	4.19	3.46	3.16	3.32	3.47	3.77	3.68	3.84	4.40
Terms of trade index	106.6	101.8	95.3	96.4	95.8	96.9	100.0	99.0	100.8	101.4	N/A

Source: DEBA

**Table 4: Industrial baking**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	90.8	92.2	93.3	93.8	95.8	97.1	100.0	103.8	104.1	107.4
Unit labour costs index (3)	82.3	86.0	86.0	87.5	91.1	95.9	100.0	104.4	110.2	109.6
Total unit costs index (4)	85.4	89.7	88.9	89.2	93.1	97.2	100.0	104.4	109.3	108.9
Gross operating rate (%) (5)	10.6	10.8	11.4	12.1	12.6	12.1	12.4	13.1	11.4	12.1

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

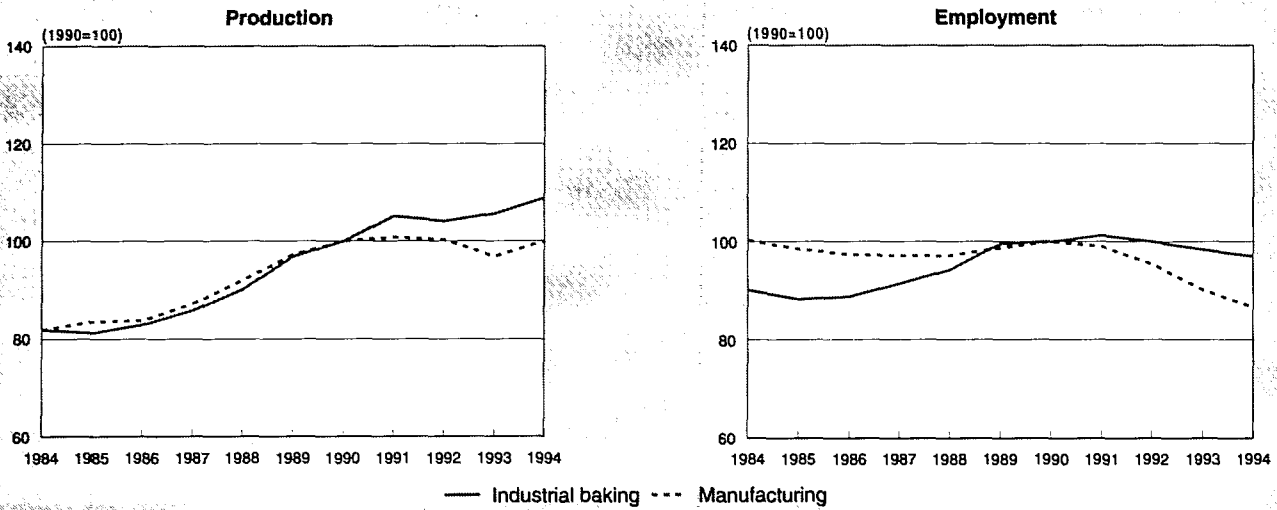
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Industrial baking**  
Production and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: DEBA

biscuit consumption. The recession, along with a drop in purchasing power, has made consumers more attentive to their choice of goods, which is shifting towards the lowest-cost products.

**International comparison**

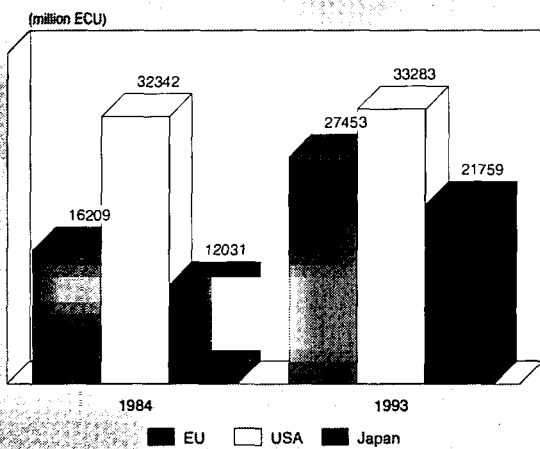
The major world producers in the 1984-93 period were the USA, followed by the EU and Japan. While the former maintained production values at current prices, the EU and Japan increased production considerably, thereby narrowing the gap with respect to the USA. This is explained by the fact that EU efforts have been directed towards achieving substantial independence in terms of production, and boosting exports in order to increase its share of world markets. In fact, even at constant prices, the EU experienced extraordinary growth which continued until 1991, after which the trend was interrupted and figures remained fairly stable up to 1993. Japan, despite its development performance, took a fairly 'closed-shop' attitude towards foreign imports, and showed extremely

low export figures. Therefore, the country manufactures prevalently for its domestic market, which is not very big, as bread is considered an 'exotic' product. Conversely, the USA significantly boosted its exports, as well as its industrial expansion process, towards both Europe and third countries. In fact, the USA market leader, RJR Nabisco, is involved in a series of acquisitions of factories in extremely diverse locations. Among the major world exporters are the EFTA countries, which mainly trade breakfast confectionery products and cereals.

**Foreign trade**

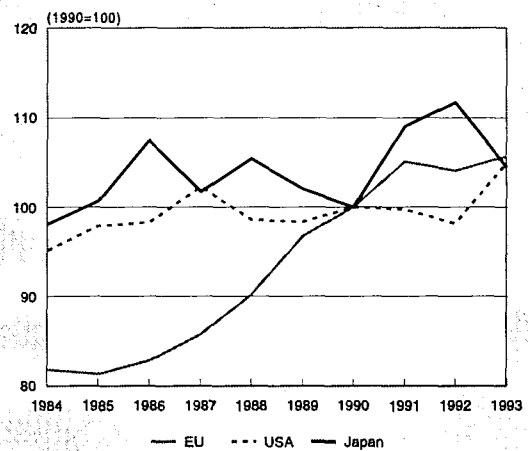
During the 1984-93 period, extra-EU imports more than doubled in volume terms, despite the fact that import penetration remained at marginal levels. Exports followed a similar pattern, but their percentage variation since 1984 was smaller. Starting in 1988, the trend inverted, with a growth of imports greater than that of exports.

**Figure 4: Industrial baking**  
International comparison of production in current prices



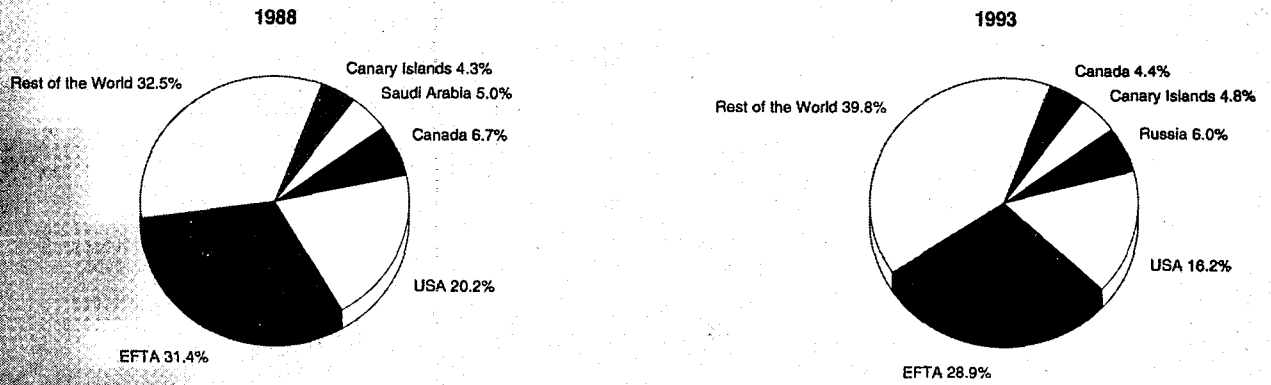
Source: DEBA

**Figure 5: Industrial baking**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Industrial baking  
Destination of EU exports**



Source: Eurostat

The trade balance was generally positive for the entire 1984-93 period. The main partners of the EU as far as exports are concerned have traditionally been the ex-EFTA countries, the USA and Canada, joined in 1993 by Russia. On the import side, the ex-EFTA countries represent the major EU partners, with an 84 % share in 1988 and an almost 73 % share in 1993.

With regard to trade within the EU, there has been a strong growth of both imports and exports (155 % and 149 % respectively), sustained mostly by the countries with the strongest economies. Many of the major producers have large import shares, often larger than their capacity to export. A typical example is France, which over recent years has reached an import share of around 22 %, the largest of all EU countries. Germany and the United Kingdom are also big importers. Among the main exporters is the Netherlands (with a share similar to that of Germany), which is much less dependent on foreign production.

## MARKET FORCES

### Demand

The biggest consumers of bread in terms of quantity are the Germans, with 5.2 tonnes, followed by the Italians and the French, with approximately 3.5 tonnes apiece. Relatively speaking, the United Kingdom and Spain have experienced the biggest drops over the five-year period, while there was an upswing in the demand for bread in Germany after 1990.

A preference for black bread exists in Northern Europe, and it is gaining in popularity in the south, where the demand for white bread has always prevailed. There are also significant differences in terms of bread use among Member States. The health concerns which have dominated food consumption over recent years have boosted the demand for biological bread. The distribution of freshly baked bread takes place above all through traditional channels, while industrial bread passes through the large distribution networks.

The market for bread substitutes like rusks and crackers is profiting from the drop in bread consumption. The advantages of such markets are: distribution through both large and traditional channels; innovation of packaging with individually

**Figure 7: Industrial baking  
Origin of EU imports**



Source: Eurostat



**Table 5: Industrial baking  
Turnover and employment**

(million ECU)	Turnover (1)		Employment (units) (2)	
	1992	1993	1992	1993
Belgique/België	192.9	195.6	5 242	5 261
Danmark (3)	92.8	93.5	1 320	1 320
BR Deutschland (4)	4 996.6	5 034.2	92 887	93 243
France	1 408.1	1 430.0	18 000	18 200
Ireland	N/A	203.0	9 300	9 300
Nederland	1 663.0	1 683.0	40 600	40 600
United Kingdom	3 310.7	3 387.0	44 000	44 500

(1) Baking industry.

(2) Employment in bread factories.

(3) Turnover figures are for ryebread only.

(4) Only for enterprises with 20 or more employees.

Source: AIBI

wrapped products offering greater freshness; and more occasions for consumption.

Among breakfast products, cereals are those which show the strongest growth, above all in countries like Spain (+242 %), Belgium (+149 %), Italy (+140 %) and France (+133 %), where consumption always has been fairly low. The market differentials which have contributed to this change in demand are high organoleptic qualities, a wide assortment and health considerations. For these reasons, the niche market for biological confectionery products has met with considerable success which is expected to continue into the future.

With regard to biscuits, the biggest consumption in 1993 was in the United Kingdom with 656 thousand tonnes, followed by Italy and France with 570 and 402 thousand tonnes respectively. The fastest growing markets in the sector are those of Germany and Belgium, thanks to diversification towards wholemeal biscuits and confectionery. Dry biscuits, on the other hand, have reached an advanced stage of maturity in all member countries, and this trend is not likely to change.

Further regional differences exist for biscuit consumption in terms of use and traditional eating habits: in Southern Europe, biscuits are eaten mainly at breakfast, while in the north they are eaten as a snack. The demand for confectionery products

is linked to typically regional products, distributed in part by supermarkets.

The market for mid-afternoon snacks is now showing some initial signs of slowing down. This can be attributed to a number of causes: economic recession, the consolidation of the market in a stage of maturity, adverse demographic trends and an increase in competition from products like yoghurt, ice cream and chocolate snacks. There is essentially one reason for consumer preference of these products: a nutritional need met by high-energy and quality products, keeping in line with the latest fitness trends.

Confectionery products which represent a highly specialised niche market (e.g. Christmas cakes) have shown positive patterns, due to a tendency towards product innovation which allows for much variety.

### Supply and competition

Labour productivity grew regularly over the entire period, as did the cost of labour per unit. The use of capital assets in processing was fairly consistent, and did not lead to a replacement or reduction of the work force, which remains an important production factor. The EU enjoys considerable productive independence, and consequently does not face a great deal of extra-EU competition.

**Table 6: Industrial baking  
Total production of biscuits and rusks**

(thousand tonnes)	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	181.0	204.8	216.3	218.3	207.7
Danmark	97.9	99.8	96.8	121.9	128.8
BR Deutschland (1)	410.5	444.9	553.9	615.0	593.8
Hellas (2)	41.0	41.0	45.0	50.0	50.0
España (3)	162.0	161.0	165.0	173.0	177.0
France (4)	579.0	593.8	611.0	626.3	636.6
Ireland (5)	21.7	22.3	22.5	23.7	22.8
Italia (6)	641.3	648.3	669.9	690.4	704.9
Nederland	345.4	356.7	370.2	393.2	407.9
United Kingdom (7)	924.2	909.3	922.9	952.6	955.0

(1) Pastry not included.

(2) Estimated.

(3) Estimates, 1990-1992.

(4) Includes fine bakers' wares and "viennoiserie"

(5) Only biscuits and wafers.

(6) Excluding gingerbread.

(7) Including crispbread; excluding rusk and toasted bread.

Source: Caobisco



**Table 7: Industrial baking**  
Per capita consumption of biscuits and rusks

(kg / capita)	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	13.7	14.8	15.4	15.3	14
Danmark	9.7	9.0	9.0	10.7	11.1
BR Deutschland (1)	6.0	6.1	6.9	6.9	7.1
España (2)	4.2	4.3	4.4	4.5	N/A
France (3)	12.1	12.5	12.6	13.0	12.8
Ireland (4)	11.0	12.4	12.7	13.6	12.1
Italia (5)	10.8	11.1	11.3	11.6	11.7
Nederland	17.4	20.2	18.2	18.2	19.6
United Kingdom (6)	15.3	15.0	15.0	15.5	15.3

(1) Pastry not included.

(2) Estimates, 1990 and 1991.

(3) Includes fine bakers' wares and "viennoiserie"

(4) Only biscuits and wafers.

(5) Excluding gingerbread.

(6) Includes crispbread but not rusk or toasted bread.

Source: Caobisco

Generally speaking, the sector shows a phenomenon of cannibalisation, inasmuch as, through diversification, new products have reached the market, in competition with each other (e.g. biscuits against confectionery, confectionery against mid-afternoon snacks, etc.).

Strong diversification exists on the bread market (e.g. durum wheat bread produced in certain areas of Southern Europe) and includes product innovation, with many products being of a regional nature. In the bread baking sector, efforts are centred on increasing the service content.

In the breakfast cereal market, which is distinguished by high value added, there is strong competition based on high product innovation and considerable segmentation. Such diversification policies have kept prices high for some time now. The introduction of new brands some years ago, in competition with the American leader Kellogg's, brought about a drop in margins.

In the industrial confectionery sector, strong scale economies exist during the manufacturing and marketing stages as well

as important entry barriers tied to high innovation and communication investments.

### Production process

In order to maintain constant quality standards in terms of flavour and thickness, production processes of bread substitutes and biscuits have been fully automated and subjected to scale economies. Furthermore, to ensure hygienic standards of production, manual labour is reduced to a minimum. The introduction of computerised production lines also has permitted lower production times which translate into greater flexibility, speed of response to market demands and product freshness. Packaging plays an important role, acting as a protective barrier to prevent product deterioration from dampness. For this purpose, one of the latest breakthroughs for bread and bread substitutes is modified atmosphere packaging.

## INDUSTRY STRUCTURE

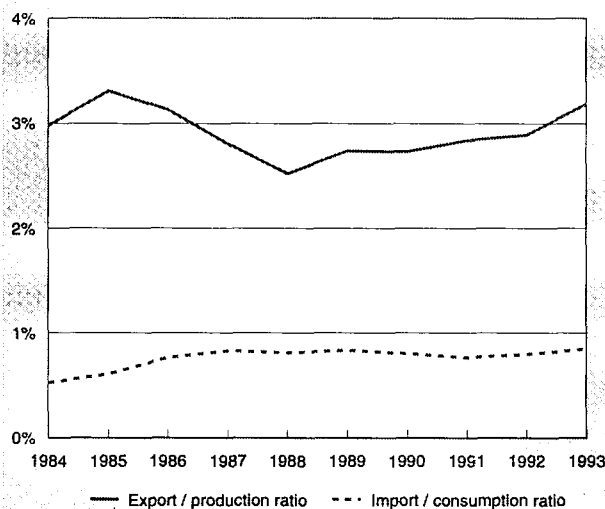
### Companies

The highest turnovers in the sector are in Germany, the United Kingdom, the Netherlands and France. From 1992 to 1993, turnovers rose slightly, while the number of people employed in the sector remained substantially stable. Only in Germany did this figure go up, and Germany is the country employing the highest number of workers in the sector. The Netherlands and the United Kingdom have fairly different turnover levels, as well as profoundly different production structures. The former has a turnover of 1 683 million ECU and high productivity, due to large facilities. The latter is distinguished by lower productivity, with a turnover of 3 387 million ECU and a work force of 44 500.

The highest production specialisation both in 1984 and 1993 was in Spain, where bread consumption is fairly high and where that of confectionery products is going up. This country is followed at a considerable distance by the Netherlands and Greece, which have similar values.

The structure of the sector is rather diversified in relation to product segments. The bread baking industry is still fairly fragmented with many small bakeries able to serve local areas. In some countries (e.g. Italy), this situation is caused by regulations which forbid the sale of products not baked in industrial ovens. In Germany and France on the other hand, it is possible to market unfrozen bread baked in distribution centres. This situation has permitted the expansion of the industry and the reduction of transportation costs, which have a big bearing

**Figure 8: Industrial baking**  
Trade intensities



Source: DEBA



**Table 9: Industrial baking Acquisitions**

1993 Bidder	Country	Target	Target country
Nestlé	Switzerland	Finitalgel	Italia
Kart Fazer Oy	Finland	Chyomos Oy	Finland
BSN	France	Britannia Brands	Hong Kong / Malaysia Singapore / New Zealand
BSN	France	Britannia Industries	India
Pâtisserie Saint-Nonore	France	Dessert Parisien (Pain Jaket)	France
Spanghero	France	MATT	France
Bahlsens Keksfabrik	BR Deutschland	Koncentraty	
		Spozywcz w Skawinie	Poland
Parmalat	Italia	N/A	Brazil
CSM	Nederland	Baukje Beheer	Nederland
Koninklijke Bols Wessanen	Nederland	Lijckx Beheer BV	Nederland
Orkla	Norway	Delicant	Finland
Galletas Ciro	España	Rio Productos Alimenticios	España
MBO	España	Ortiz	España
Allied-Lyons	United Kingdom	Krombach & Sohne	BR Deutschland
Claymore Group	United Kingdom	John Lees	United Kingdom
Grand Metropolitan	United Kingdom	Roush Products	USA
Hazlewood Foods	United Kingdom	Welten Snacks	Nederland
Northern Foods	United Kingdom	Bakkerij Vanderheul Assen	Nederland
Northern Foods	United Kingdom	Oakland Fast Food (Grand Metropolitan)	United Kingdom
Northumbrian Fine Foods	United Kingdom	Jesse Oldfield Ltd	United Kingdom
Unilever	United Kingdom / Nederland	Burton Son & Sanders	United Kingdom
Unilever	United Kingdom / Nederland	Meniszez	France
Unilever	United Kingdom / Nederland	Diamalt Backmittel	BR Deutschland
United Biscuits	United Kingdom	Derwent Valley Foods Group	United Kingdom
United Biscuits	United Kingdom	Bake-Line Products	USA
United Biscuits	United Kingdom	N/A	USA
Vincent Fine Foods	United Kingdom	Crossfiled Food Ltd	United Kingdom
West Trust	United Kingdom	Mexicana Quality Foods	Mexico
Campbell	USA	N/A	Australia
PET	USA	Sutherland Foods	United Kingdom
RJR Nabisco	USA	Royal Brands	España
Goodman Fielder	Australia	Smartindo Kencana	Singapore
Goodman Fielder Wattie	Australia	Standard Confectionery	Malaysia
<b>1994 Bidder</b>	<b>Country</b>	<b>Target</b>	<b>Target country</b>
Veno	Danmark	Laegaard Kager	Danmark
Brioche Pasquier	France	Beignet Heunet	France
Barilla (1)	Italia	Filizgida	Turkey
Vicenzi	Italia	Crippa & Berger	Italia
Koninklijke Bols Wessanen	Neth	H & C Cereales	France
Allied-Lyons	United Kingdom	N/A	USA
Grand Metropolitan PLC	United Kingdom	Rudi Foods Inc	USA
IMC Industries	United Kingdom	Red Mill Snack Food	United Kingdom
Unilever	United Kingdom / Nederland	Meniszez	France
United Biscuits	United Kingdom	Dalgety PLC (Dutch Savoury Snacks Bus.)	Nederland
United Biscuits	United Kingdom	ZPC San	Poland
United Biscuits (1)	United Kingdom	Fazer Biscuits Ltd	Finland
KKR & Co	USA	Borden Inc	USA
RJR Nabisco Holdings	USA	N/A	Kazakhstan
RJR Nabisco Holdings	USA	Tabacalera	España
RJR Nabisco Holdings	USA	Terrabusi	Argentina
Goodman Fieldersnacks	Australia	N/A	Singapore
Players Group Ltd	Australia	N/A	Australia

(1) Diversified company.  
Source: Normisma

**Table 8: Industrial baking  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.87	0.81
Danmark	1.04	1.06
BR Deutschland	0.65	0.80
Hellas	0.64	1.18
España	2.03	2.14
France	0.63	0.77
Irlande	1.52	0.76
Italia	0.74	0.68
Luxembourg	0.56	0.52
Nederland	1.17	1.21
Portugal	1.74	N/A
United Kingdom	N/A	N/A

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

on the final cost of bread which is not otherwise expensive to manufacture.

The biscuit and bread substitute industries are in the hands of multinational companies and medium-sized firms operating at the national level. The breakfast cereals industry is strongly concentrated into both European and non-European multinationals.

Among the biggest multinational companies are: Unilever, Nestlé, Danone and Barilla in the confectionery sector; Barilla and Danone also operate in the bread substitute sector. In France, the principal firms in the confectionery sector are Danone, Patisserie St-Honoré; in the United Kingdom, the main companies are Unilever, United Biscuits and Allied-Lyons. In Italy, where concentration levels are fairly high despite the strong presence of local bakeries, the biggest company is Barilla. Finally, in Germany, the largest producers are Balhsen, Convent and Piasten for biscuits. In the breakfast cereals sector the European leader is the American firm, Kellogg's. In the bakery sector, the French leader is Jacquet and in the United Kingdom it is Rugenberger.

### Strategies

The growth of industrial baking companies occurs mainly through mergers and acquisitions. In 1993, thirty acquisitions took place which emphasise the strategies aimed at consolidation on the EU market and an ever greater expansion towards third countries. The high number of acquisitions in the United Kingdom can be attributed to a gradual process of industrial concentration by multinational companies.

The multinational companies in the sector, which often operate in several business markets, take advantage of a series of competitive factors like production know-how; new and completely automatic transport systems which permit just-in-time (JIT) distribution and thereby increase product freshness at retail outlets; and massive investments in communication and advertising.

Big efforts have been made to revitalise the biscuit sector through production differentiation policies based on high market segmentation and a wider range of goods on the market, in order to increase opportunities for consumption. At the same time, the presence of high scale economies in production has induced companies to manufacture under distributor brands in order to continue to promote production volumes.

In the industrial confectionery sector, companies have tried to favour greater penetration of products among families through modern distribution and the use of packaging which

makes consumption easier. In the biscuits segment, the principal innovations concern packaging, through individually wrapped products.

Manufacturers of cakes for holidays or special occasions are trying to escape from the seasonal nature of their products and to extend their product ranges to increase sales. Thus, they are tending towards diversification into related segments. The smaller companies, on the other hand, achieve better efficiency through subcontracting. The bread substitute sector also is distinguished by strong product innovation, while the bread-baking sector is less marked by product diversification.

### Impact of the Single Market

While the free movement of persons is not very important for the bakery sector (because the business is mainly concentrated at national level), the free movement of goods had a great impact, increasing trade, favouring product internationalisation, especially for fine bakery, and widening the range of products at disposal for consumer.

The general degree of competition inside the EU market increased due to a rise in import penetration characterised also by cheap products of low quality.

Too high sugar cost is perceived, especially for the fine bakery sector, as a constraint to competition inside the market. The reform of the sugar Common Market Organisation (CMO) and the reduction of export tariffs in non-EU countries are thus seen as the next priorities for the industry.

### ENVIRONMENT

The main environmental problems of the industrial baking sector relate to the extensive use of packaging which contributes to the increase of solid urban wastes that are not easy to recycle. In this regard, companies will be subject to strict regulations concerning the composition of packaging materials, aimed at favouring recycling.

### OUTLOOK

The industrial baking sector is nearing saturation of internal demand and consequently consumption in the main segments will tend to increase only marginally, if at all. Consequently, possible adjustments to the market situation are restricted to the ongoing product innovation to stimulate the curiosity of the buyer, communication, greater segmentation and the quest for new and unexplored markets and consumption opportunities.

Companies will therefore continue to grow not only in the EU, but also through acquisitions of factories in third countries. Competition within the EU is therefore likely to sharpen. The most lively markets will remain those of wholemeal products and breakfast cereals, as these are seen as extremely healthy and highly nutritional, and of biscuits and mid-afternoon snacks. For the latter, the polarisation between premium price products and distributor brand products will gain importance.

Written by: NOMISMA

The industry is represented at the EU level by: Association Internationale de la Boulangerie Industrielle (AIBI). Address: In den Diken 33, D-4000 Düsseldorf; tel: (49 211) 65 30 86/88; fax: (49 211) 65 30 88; and Association des Industries de la Chocolaterie, Biscuiterie et Confiserie de la CEE (Caobisco). Address: Rue Defacqz, Bte 7, B-1050 Brussels; tel: (32 2) 539 1800; fax: (32 2) 539 1575.

# Sugar

## NACE 420

Consumption figures for the sector are fairly stable within the EU, while production, in spite of slight fluctuations caused by weather conditions, is tending to increase as is reflected by the degree of self-sufficiency of the EU which, in 1993, reached 111 %. As far as production structures are concerned, the sugar industry comprises 84 companies operating generally on highly concentrated domestic markets. The approval of the GATT treaty provides for a reduction of 21 % of volume and 36 % of export subsidies by 2000 (based on the 1986-90 reference period).

### INDUSTRY PROFILE

#### Description of the sector

Around the world, sugar is made from sugar cane in tropical regions and regions south of the tropics, while sugar beet is the chief source of sugar in the temperate zones. The EU produces sugar almost exclusively from the processing of sugar beet. (Small areas of land planted with cane sugar exist only in the south of Spain).

The EU sugar industry is engaged in the production and refining of sugar (NACE 420). More specifically, this involves the extraction, purification and crystallisation of the sugar juice from sugar beet and molasses, as well as the refining of cane sugar. Also included in this sector is the manufacture of candied fruits. Additionally, the sugar industry is related to the production of ethyl alcohol, which is discussed in more detail in the chapter on alcohol and spirits.

France, Germany and Italy are the biggest sugar producers in the EU. In 1993, they accounted for about 65 % of the production of white sugar. The main indicators relating to the sugar sector show a fairly stable internal demand, though insufficient to guarantee the absorption of achieved production.

Due to a strictly regulated quota system, the EU has a surplus equal to only 11 %. This difference is exported to third countries under the quota regulation system. The quantity of sugar produced beyond the quota must be exported to third country at the world price.

Apparent consumption indicates substantial stability, though variations do exist between the years taken into consideration. Sugar production, on the other hand, is affected by weather conditions throughout the year. The surface of cultivated hectares can be adapted to the level of stocks.

1992 was a particularly good year, with the production of about 16 million tonnes of white sugar. In terms of exports, the largest volumes of trade occurred in the period 1984-1987, when the peak value of the decade was reached. This was followed by a slight downswing, though figures still tended to grow.

#### Recent trends

The area of land planted with sugar beet increased only slightly between 1984 and 1993, while the production of sugar has been increasing steadily since 1987. During the 1992/93 season, cultivated areas equalled 1 983 thousand hectares, with a drop of 6 % compared to 1984 figures. Of particular interest was the drop in Spain, which fell to 37 %. This can be attributed to the progressive adjustment of Community quotas.

The average growth rate of sugar production in the EU was approximately 1.2 % in the 1985-90 period. Production yields vary considerably between the EU countries, ranging from the average yield of 10 000 tonnes per hectare in France to figures of just under 6 000 tonnes in Italy, Spain and Ireland. The particularly efficient French beet-growing sector makes this country the top European producer of sugar, despite the fact that, since unification, Germany has the biggest cultivated land area. Big variations also exist within each Member State.

#### International comparison

The EU is the world's biggest producer of sugar. It is followed by India, China and Thailand. In Asia, most of the sugar produced is consumed on the domestic market, making this geographic area the biggest consumer of sugar. Then come Brazil, Mexico and Cuba. In Brazil, a greater balance exists between exports and domestic consumption, while Mexico and Cuba are more export-oriented.

Finally, the heaviest demand, after Asia and Europe, exists in the countries of the former Soviet Union. Currently, about two-thirds of the sugar produced in the world is made from sugar cane, while the remainder, which is on the upgrade, is made from sugar beet.

The biggest producers of cane sugar are, in order of importance: India, Brazil, Cuba, Mexico, Australia and the United States. Meanwhile, the major producers of sugar beet are the EU, the former Soviet Union countries, the United States and China (80 % of production).

On the global market, the 1993 season showed a gap between supply and demand equal to 300 000 tonnes. The 1994 season seemed to duplicate this situation. The reasons for this can be found in the drop in production in high-potential areas such as India, China, South Africa, Thailand and Cuba, due to adverse weather conditions. An exception to this pattern is Cuba, where the drop in production stems from the economic and social crisis existing in that country.

The EU shows a counter-trend, and in 1993 production actually increased. However, world prices should increase only slightly, considering that, for the time being, supply is guaranteed by stocks accumulated in previous years. The world price of sugar had remained fairly low on all world markets in 1992 also.

#### Foreign trade

The major importing countries of EU sugar are the OPEC countries, the EFTA countries and countries of the former Soviet Union. It is important to point out that the Community imports 1.3 million tonnes of sugar every year from Africa,

**Table 1: Sugar**  
**Main indicators (1)**

(thousand tonnes white sugar)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
Apparent consumption	10 855	10 686	10 890	10 790	11 068	10 859	10 831	11 231	11 700	11 972	11 703
Production	15 100	12 253	13 588	13 645	14 123	13 210	13 942	14 375	15 872	14 690	16 037
Exports (2)	2 782	3 112	3 052	2 982	3 194	3 462	3 158	2 565	2 742	2 807	2 914

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10.

(2) Quota A & B.

Source: CEFS, EU Commission DG VI

**Table 2: Sugar  
Areas under beet (1)**

(thousand hectares)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EU (2)	2 098	1 905	1 936	1 886	1 899	1 841	1 835	1 866	2 088	1 985	1 983
Belgique/België	130	120	123	125	118	111	114	113	113	106	105
Danmark	76	72	74	73	69	67	69	66	66	65	65
BR Deutschland (3)	429	403	423	415	399	384	386	459	620	575	552
Hellas	41	38	28	43	44	28	34	49	44	39	50
Espaa	260	249	209	178	195	182	190	172	168	162	163
France	533	462	501	464	421	420	417	427	459	435	439
Ireland	34	36	36	35	38	37	33	32	33	33	32
Italia	257	222	217	225	277	283	272	298	270	277	288
Nederland	137	117	129	131	137	128	123	124	123	123	119
United Kingdom	201	186	196	197	201	200	197	194	192	170	170

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10.

(2) Excluding Luxembourg and Portugal, which do not produce sugar beet.

(3) Including former East Germany in 1990/91, 1991/92 and 1992/93.

Source: CEFS

the Caribbean and the Pacific (ACP); from the overseas countries and territories (PTOM); and from India. And, it is forced to export a similar quantity of white sugar produced within the Community, the proceeds of which are taken charge of by the European Agricultural Guidance and Guarantee Fund (EAGGF). Over the last few years there has been a growing trend towards the transport of refined sugar to developing countries without local refineries.

## MARKET FORCES

### Demand

The demand for sugar inside the EU comes mainly from the food, chemical, pharmaceutical and animal feed industries. Over recent decades, the search has been intensified for other alternative uses of sugar, as the demand for sugar has been affected by the popularity of low-calorie sweeteners.

With regard to the food industry, sugar is prevalently used to make fruit juices, candy, chocolate, syrups, soft drinks,

jams and marmalades. The pulp of the sugar beet and molasses, a by-product of the sugar industry, goes to make animal feed. Molasses is also employed in the distillation, fermentation and production of citric acid.

Within the EU, about 30 % of production goes for direct retailing, though big differences do exist between the various countries considered. In particular, the figure goes from 44 % in Italy and 47 % in Portugal to 15 % in Holland.

### Supply and competition

The EU has the biggest production yields (7.5 tonnes/ha) compared to the USA (6 tonnes/ha) and the former Soviet Union (2.5-3 tonnes/ha). Within the EU, there are significant differences in terms of competitiveness between producers. In north-west Europe for instance, weather conditions enable using sugar beet varieties, giving higher yields and big energy savings during processing.

**Table 3: Sugar  
White sugar production (1)**

(thousand tonnes)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EU	15 100	12 253	13 588	13 645	14 123	13 210	13 942	14 375	15 872	14 690	16 037
Belgique/België	1 105	782	839	943	938	804	925	956	1 030	892	893
Danmark	537	346	547	530	499	388	506	487	544	468	411
BR Deutschland (2)	3 303	2 507	2 894	3 155	3 192	2 731	2 762	3 072	4 301	3 909	4 042
BR Deutschland from molasses	9	19	19	19	19	19	19	20	19	19	19
Hellas	296	296	298	218	287	182	216	387	287	274	355
España	1 144	1 240	1 074	903	1 020	1 005	1 187	954	953	849	944
France - Metropolitan	4 446	3 562	3 957	3 953	3 410	3 649	4 045	3 968	4 357	4 060	4 345
France - DOM (3)	309	263	300	296	305	303	328	198	245	252	289
Ireland	222	197	222	174	186	223	195	214	226	213	223
Italia	1 180	1 244	1 275	1 244	1 719	1 718	1 480	1 729	1 458	1 509	1 869
Nederland	1 130	743	934	915	1 239	979	989	1 140	1 232	1 046	1 192
Portugal	9	9	5	4	5	2	2	3	2	2	2
United Kingdom	1 419	1 062	1 323	1 211	1 323	1 226	1 307	1 267	1 237	1 216	1 472
Share of world production (%)	15	13	14	14	14	13	14	15	16	16	16

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10.

(2) Including former East Germany in 1990/91, 1991/92 and 1992/93.

(3) DOM: Départements d'outre mer (French overseas departments) are Guadeloupe, Martinique and Réunion.

Source: CEFS

**Table 4: Sugar  
International comparison**

(%)	Production 1991	Exports 1990	Consumption 1989
Europe	18.7	25.8	16.5
EU	13.5	23.7	11.9
Africa	7.3	8.2	7.8
North America	5.9	1.8	8.0
USA	5.9	1.7	7.0
Central America	13.0	29.5	6.0
Cuba	6.5	24.0	0.8
Mexico	3.4	N/A	3.8
South America	12.7	9.3	11.1
Brazil	7.8	5.2	6.9
Asia	31.4	13.7	36.8
China	7.0	2.1	6.7
India	11.2	N/A	10.3
Thailand	3.6	8.1	0.9
Former Soviet Union	7.8	0.5	12.8
Oceania	3.2	11.2	1.0
Total	100.0	100.0	100.0

Source: UN Commodity Yearbook, FAO Production and Trade Yearbooks

### Production process

Sugar processing involves the extraction, purification and crystallisation of juice. The production process is seasonal, concentrated in a period of three months - from August to October in Italy (45 to 80 days) and from September to December in Northern Europe (70-113 days in Holland, France, Germany, up to 114 days in the United Kingdom). Over the last 20 years, the concentration of activities in a dwindling number of plants has given rise to improvements in production efficiency and allowed the tripling of production per plant at the Community level. Significant improvements also have been recorded in terms of sugar beet yields per hectare, though differences still exist in terms of quality of raw materials, harvesting season and processing across Europe.

### INDUSTRY STRUCTURE

#### Companies

The sugar industry is strongly concentrated within individual domestic markets. Generally speaking, these markets are made up of a couple of large companies and a series of enterprises having only one production facility. In 1992, the top six Euro-

pean producers covered about 50 % of the EEC quotas, with peaks of 54 % for the top three producers in France and 83 %, again for the first three producers, in Italy (ISI and Eridania have been considered on an aggregate basis).

In Germany, one company, Sudzucker, controls about 40 % of German production and 75 % of Belgian production. Currently, there are 183 sugar refineries operating inside the Community, which belong to 84 sugar manufacturing companies. Following the closure of plants and acquisitions on the part of competitors, virtual production monopolies exist in the smaller countries. This is the case of Ireland, Denmark and Greece. In the United Kingdom and Holland, the entire domestic market is controlled by two companies. The high concentration in the sector is mainly attributed to the high economies of scale in the production and storage of sugar.

The number of sugar processing facilities has been on the downgrade for the entire 1982-93 period. The biggest drops have affected Italy, which has reduced the number of plants by about 50 %, Belgium (48 %), Holland (40 %) and Ireland (50 %). It is important to highlight the significant restructuring process under way in Germany, begun after 1990 with the annexation of the former DDR.

**Table 5: Sugar  
Number of sugar factories (1)**

(units)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EU	233	225	220	218	214	207	194	190	184	201	183
Belgique/Belgié	15	15	15	14	14	14	12	12	11	11	9
Danmark	6	6	6	6	6	6	6	6	5	5	4
BR Deutschland (2)	48	48	47	46	44	42	38	38	37	60	52
Hellas	5	5	5	5	5	5	5	5	5	5	5
España	30	29	27	25	25	24	24	24	24	24	22
France	57	57	56	55	54	54	52	50	50	48	48
Ireland	4	4	4	4	4	3	3	2	2	2	2
Italia	45	38	37	40	39	37	33	33	31	29	25
Nederland	10	10	10	10	10	9	8	8	7	7	6
United Kingdom	13	13	13	13	13	13	13	12	12	10	10

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10.

(2) Including former East Germany in 1990/91, 1991/92 and 1992/93.

Source: CEFS



**Table 6: Sugar Acquisitions 1993**

Bidder	Country	Target	Target country
Saint-Louis/Sucrerie Coop de Corbeille-en-Gatinais	France	Sucrerie Raffinerie de Chalon-sur-Saone	France
Sucreries et Distilleries	France	N/A	Czech Republic
Tate & Lyle	France	South Johnstone	Australia
Tate & Lyle/St. Louis	France	Juhocukor	Slovakia
Vermandoise de Sucrieries	France	Sucrerie de Thoury	France
Sudzucker	BR Deutschland	AGRANA Beteiligungs	Austria

Source: Nomisma

These cutbacks involved sugar refineries with production outputs below 5 000 tonnes of beet per day, while the number of larger plants (above 12 000 tonnes) increased. Differences between the various countries are significant: in Holland four plants out of six exceed this size, while in Italy, Denmark, Greece, Ireland, Spain and the United Kingdom, no refineries larger than this exist.

### Strategies

The strategies adopted by the enterprises in the sector aim at achieving greater production efficiency through the concentration of activities in a smaller number of plants; the selection of more qualified varieties of raw materials (especially in the countries of Southern Europe); the improvement of production quality through the introduction of ISO 9002 quality certification mechanisms; the search for lower energy-consumption; and environmentally safe production processes. The high economies of scale in the production of sugar are also leading to a gradual increase of concentrations through the acquisition of enterprises in the sector operating on the same domestic market and also on that of Eastern Europe. In 1994, four operations were successfully brought to a conclusion, mainly by French firms allied with other European enterprises. Little differentiation exists between the products made by the major enterprises in the sector, particularly raw cane sugar.

### Impact of the Single Market

The creation of the Single Market had almost no impact on the sugar sector.

The very limited nature of the impact is due to two factors. Sugar is a basic raw material which is used as an input by many other sectors, but the trade intensity of the sector is

very low. In fact most of the EU countries are self sufficient producers and sugar firms are mostly concentrated on domestic markets. On the other hand, the European sugar industry has already been regulated by a Common Market Organisation since 1968.

Finally, the sector is highly concentrated, not only on domestic markets, but also at European level. The market structure is substantially oligopolistic and, since the beginning of the nineties, no relevant changes in competition has been observed.

### REGIONAL DISTRIBUTION

The consumption of sugar in the EU was fairly stable between 1982-1993 at around 11.8 million tonnes; the EU share of world consumption did not vary much either, remaining at around 11 %. The biggest consumers are the United Kingdom, Germany, France and Italy, all with pretty uniform levels.

The main destinations of the products of the sugar-manufacturing industry are industry and direct retailing. The industrial sectors which use sugar and its by-products are the chemical industry, the food industry and the animal feed industry. The highest volumes of sugar employed in the food industry in 1992/93 were to be found in Germany, France and Italy. With regard to direct retailing figures, over the 1982-93 decade, the highest per capita consumption was recorded in Belgium and Denmark, with 47 kg, followed by Holland and Ireland with 39 kg and 38 kg respectively. The EU average per capita consumption remains on the whole fairly stable at around 33 kg, with minimum levels of 31 kg recorded in 1992/93.

It should be emphasised that France and Italy produce mainly for intermediate industrial uses of sugar, while Germany and the United Kingdom produce mainly to meet the demand for

**Table 7: Sugar Per capita consumption trends (1)**

(kg/capita)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EU	33.7	33.1	33.7	33.3	34.2	33.6	33.4	34.2	34.4	35.2	31.5
Belgique/België	37.1	38.5	37.9	38.3	36.4	37.1	37.4	41.9	41.1	41.9	47.5
Danmark	39.7	39.0	39.0	39.8	37.7	37.9	37.4	37.7	41.2	42.0	N/A
BR Deutschland (2)	35.6	34.7	36.1	35.2	34.8	34.9	34.6	35.2	34.9	34.8	33.7
Hellas	29.5	30.6	31.4	31.8	30.6	32.0	29.9	31.9	28.7	29.6	30.6
España	27.1	26.2	23.9	25.7	25.8	24.3	26.4	27.8	27.8	29.1	28.7
France	34.9	34.1	33.9	33.4	35.8	34.0	34.2	34.6	33.5	35.5	33.6
Ireland	39.8	39.7	38.8	38.6	38.0	38.3	37.0	37.6	38.1	38.0	38.0
Italia	26.7	25.7	28.9	26.8	26.6	25.9	26.6	27.3	28.0	28.3	28.3
Nederland	38.3	38.3	38.5	39.1	37.6	36.1	35.0	35.6	39.1	38.5	38.9
Portugal	29.1	30.3	34.2	30.1	31.0	29.8	31.0	29.8	31.0	30.3	29.4
United Kingdom	41.0	40.2	40.1	40.5	41.7	39.2	38.1	37.4	35.7	39.7	37.7

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10.

(2) Including former East Germany in 1990/91, 1991/92 and 1992/93.

Source: CEFS

**Table 8: Sugar**  
**Total sugar consumption (1)**

(thousand tonnes)	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
EU	10 855	10 686	10 890	10 790	11 068	10 859	10 831	11 231	11 700	11 972	11 703
Belgique/België	379	393	387	392	378	385	386	434	433	479	490
Danmark	203	200	199	204	194	198	202	198	212	218	223
BR Deutschland	2 193	2 127	2 203	2 148	2 155	2 168	2 152	2 254	2 788	2 800	2 719
Hellas	289	301	310	316	305	320	323	326	314	314	315
España	1 043	1 009	925	1 002	1 013	1 052	1 049	1 116	1 132	1 147	1 138
France	1 938	1 915	1 907	1 892	2 074	1 996	1 995	1 993	1 956	2 082	1 980
Ireland	140	140	137	137	134	138	134	133	134	134	134
Italia	1 519	1 465	1 649	1 534	1 528	1 494	1 539	1 584	1 627	1 641	1 639
Nederland	549	551	556	569	576	555	539	556	591	582	591
Portugal	294	306	345	304	313	301	314	308	301	299	289
United Kingdom	2 308	2 278	2 271	2 293	2 398	2 252	2 198	2 329	2 212	2 276	2 185
Share of world consumption (%)	12	11	11	11	11	10	10	10	11	11	11

(1) Year runs: 1st October to 30th September; 1982/83 to 1985/86 EC 10. White sugar equivalent  
Source: CEFS

sugar for direct retailing. Currently, the major enterprises, operating prevalently on the single domestic markets, are: Eridania Beghin-Say (936 million ECU in 1992 and 10 % of the European market), Tate and Lyle Sugars (650 million ECU in 1992 and 7 % of the market), Sudzucker, British Sugar (1 023 million ECU in 1992, 11 % of the EU market), Danisco, Ebro, Hellenic Sugar (208 million ECU and 2 % of the EU market) and Général Sucrière (973 million ECU in 1992 and about 10 % of the EU market).

## ENVIRONMENT

The sugar-manufacturing industry is actively seeking solutions to the considerable environmental problems related to it. These involve: the emission of fumes into the atmosphere, the reduction and recycling of solid waste (earth and calciums), and the reduction and treatment of industrial waste (industrial water). The noise level of plants is also taken into account. Altogether, the environmental measures taken by the European sugar industry have decreased the level of polluting emissions by 30 % in the last 10 years.

## REGULATIONS

The common organisation of markets in the sugar sector came into force in 1968. Sugar production is regulated by a quota

system, to guarantee the price and placing of limited quantities corresponding to quotas A and B. Quotas A and B represent the quantity of sugar, fixed for each Member State, which can be sold directly to companies of the Community and/or worldwide. All production above this quantity, C quota, cannot be marketed in the EU, but must be exported, without returns, on the world market.

However, a measure is envisaged to soften the effects of annual variations in production. This allows for the possibility to carry over a quantity of B or C sugar - up to 20 % of the production of quota A - to the quota A production of the subsequent year, keeping the sugar stored for 12 months.

Since the 1986/87 season, sugar producers bear the entire responsibility of financing the placement of exports, through production contribution from growers (60 %) and manufacturers (40 %) as listed below:

- a basic tax of 2 % on the intervention price for A and B sugar quotas;
- a tax of 37.5 % on the intervention price for B sugar quotas; and
- a complementary levy, to be paid if needed.

Each year, the Community fixes two categories of prices: that for sugar beet and that for sugar. For the former, the

**Table 9: Sugar**  
**Consumption 1992/93**

(thousand tonnes)	B	DK	D	GR	E	F	IRL	I	NL	P	UK
Total consumption	489.6	223.1	2 719.1	315.5	1 138.0	1 980.0	134.0	1 639.5	591.0	289.2	2 185.0
Feedstuffs	2.3	0.5	.0	2.8	.0	.0	.1	.0	1.0	.0	N/A
Chemical industry	1.6	12.1	35.4	.3	20.0	24.0	.5	12.0	31.0	1.6	N/A
Human consumption	485.7	210.5	2 683.7	312.4	1 118.0	1 956.0	133.4	1 627.5	559.0	287.6	N/A
of which:											
Direct	124.2	49.3	600.3	119.4	388.0	557.0	49.4	726.8	89.9	124.2	N/A
Industrial	361.5	161.2	2 083.4	193.0	730.0	1 399.0	84.0	900.7	475.1	163.4	N/A
Total consumption (kg/capita)	47.5	N/A	33.7	30.6	28.7	33.6	38.0	28.3	38.9	29.4	37.7
Human consumption (kg/capita)	47.2	40.6	33.4	30.3	28.2	33.1	37.8	28.2	36.8	29.2	N/A
of which:											
Direct (kg/capita)	12.1	9.5	7.5	11.6	9.8	9.4	14.0	12.6	5.5	12.6	N/A
Industrial (kg/capita)	35.1	31.1	25.9	18.7	18.4	23.7	23.8	15.6	31.3	16.6	N/A

Source: CEFS

base price is fixed as well as the minimum price for sugar beet to be processed into sugar A and B. For sugar, it fixes the indicative price for white sugar (indicatively 5 % above the intervention price); the intervention price for white sugar for deficient areas (currently Spain, Italy, Portugal, United Kingdom and Ireland) and for raw sugar; and finally, the threshold price for white sugar, raw sugar and molasses, to guarantee preference for the Community product.

For the sugar produced in Spain and Portugal, the realignment of prices was implemented beginning on 1 June, 1992 and 1 January 1993 respectively. These provide for transitory measures to support adjustment.

Emphasis should be placed on the adoption of Regulation 133/94, whereby the Council, besides regulating the 1993/94 season, introduced provisions concerning inulin syrup, a sweetener extracted from chicory, produced above all in Northern France, the Netherlands and Belgium. This sweetener, an alternative to sugar and isoglucose in some confectionery sectors, results in a lower consumption of sugar or isoglucose in the Community, with the consequent effects on the quantities of sugar for export at the expense of Community producers.

The coming into force of the GATT agreement for the sugar sector is expected for July 1, 1995. The accord mainly will affect exports, which have to be reduced by 21 % in terms of quantities or/and by 36 % in terms of value of global refunds, compared to the average quantities exported during the 1986-90 period. Thus, the implementation of the GATT agreement could lead to a slight reduction of the A and B quotas.

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## OUTLOOK

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An increase of research efforts to find lower energy-consuming production technologies, thereby reducing production costs, is expected. For the same reason, an intensification is expected of acquisitions, especially of enterprises operating on respective domestic markets and on those of Eastern Europe. Further, an increase is expected in competition on Community markets following the drop in exports after the approval of the GATT treaty. Finally, an intensification of efforts to find alternative uses for sugar and its by-products in the detergent, pharmaceutical, chlorine and paint industries, etc., is anticipated.

Written by: **NOMISMA**

The industry is represented at the EU level by: **European Committee of Sugar Manufacturers (CEFS)**. Address: Avenue de Tervuren 182, B-1150 Brussels; tel: (32 2) 762 0760; fax: (32 2) 771 0026.



# Cocoa, sugar confectionery and ice cream

## NACE 421

Industry globalisation and concentration continues to be the dominating trend in the cocoa, sugar confectionery and ice cream industry. In Europe most production is concentrated around a handful of major multinationals which supply a wide range of products. The most important sector is that of cocoa-based products, thanks to changes in eating habits favouring snacking, while the traditional seasonal nature of cocoa-based products and ice creams is tending to disappear, as these become associated with multiple-use functions. If the current trends towards healthy eating continues, they will, generally speaking, have a strong impact on the industry in the future.

### INDUSTRY PROFILE

#### Description of the sector

The cocoa, sugar confectionery and ice cream industry comprises a wide range of products showing steady growth in the international market as well as generally high margins. Cocoa includes final products derived from the processing of chocolate such as chocolate bars, pralines and boxed assortments. Sugar confectionery includes sweets like chewing gum, pastilles, jellies, nougats and toffees. Finally, ice cream, for which different regulations defining content exist within the EU, includes products manufactured from milk, butter or cream, which may or may not contain vegetable fats or oils, depending on the country where it is made.

The industry has a value added of 7 434 million ECU, most of which is contributed by Germany, the United Kingdom and France. The larger markets absorb most cocoa-based products, which represent over 70 % of the sweets sold in the United Kingdom and 60 % in France.

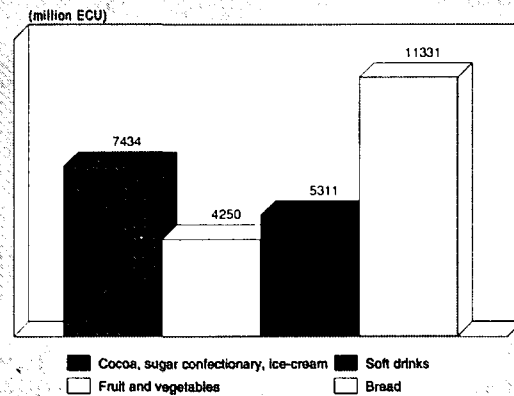
#### Recent trends

The main economic indicators show a growth in production and consumption in real terms concentrated between 1987 and 1991, with a fluctuation in the two subsequent years. A substantial stabilising of growth is projected for the coming years. The balance of payment figures were positive for the entire decade under consideration with a faster growth rate between 1988-90 and 1991-93. This pattern was sustained by a large increase in exports over recent years and by a contemporaneous drop in imports in value terms. Employment figures dropped on the whole, particularly since 1986.

As far as sugar confectionery products and cocoa-based products are concerned, Spain and Germany experienced the biggest consumption growth rates between 1988 and 1994, while there was a fall in the United Kingdom and overall stability in Italy and France. France also showed a big increase in the consumption of ice cream, which augmented its market share in value terms by 50-60 % in most EU countries except Italy, the United Kingdom and Greece.

Production growth rates, which are not particularly strong overall, show a drop between 1992-93. This decline was steepest for apparent consumption, which was negative at that time. A small growth in production can be attributed to exports outside the EU which grew over the period by 21 %. Between 1984 and 1993, the importance of exports for the balance of

Figure 1: Cocoa, sugar confectionery and ice-cream Value added in comparison with related Industries, 1993



Source: DEBA

trade increased considerably and is currently three times the value of imports.

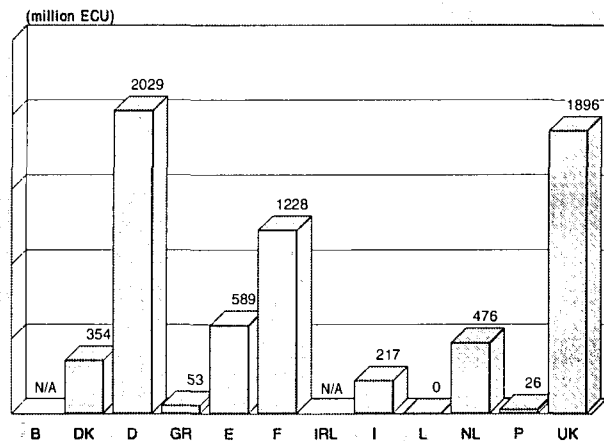
#### International comparison

At current prices, the EU is the number one producer of cocoa-based products, sugar confectionery and ice cream in front of the USA and Japan. Between 1984-93, the USA experienced a drop in production value due to a gradual fall in prices, a pattern not experienced in the EU or Japan. In fact, these countries are distinguished by a strong growth rate which has caused production to double in Japan and to increase by about 68 % in the EU. Conversely, Japan experienced a drop in imported products in 1993 equal to 6.4 %.

#### Foreign trade

The industry is mainly concentrated on the European market. Nonetheless, foreign trade is also significant, as is evidenced by the level of imports, which is around 2.5-3 %, and exports, which reached around 6-8 %.

Figure 2: Cocoa, sugar confectionery and ice-cream Value added by Member State, 1993



Source: DEBA

**Table 1: Cocoa, sugar confectionery and ice cream**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	15 422	17 687	18 254	20 522	22 605	21 734	22 113	23 160	23 650	24 130	24 680
Production	16 088	18 364	19 075	21 458	23 556	22 883	23 531	25 084	25 800	26 500	27 300
Extra-EU exports	1 244	1 150	1 311	1 466	1 495	1 693	2 062	2 606	2 900	3 100	3 400
Trade balance	666	677	821	936	951	1 149	1 418	1 924	2 150	2 370	2 620
Employment (thousands)	175.9	166.0	165.3	177.0	179.0	166.6	163.3	163.1	160.0	158.0	155.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Cocoa, sugar confectionery and ice cream**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.96	2.68	2.28	-0.21
Production	1.96	3.17	2.50	1.01
Extra-EU exports	2.01	11.18	5.99	21.95
Extra-EU imports	2.32	8.69	5.10	18.29

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Cocoa, sugar confectionery and ice cream**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 244	1 359	1 230	1 144	1 150	1 311	1 466	1 495	1 693	2 062	2 606
Extra-EU imports	578	625	542	495	473	490	531	544	544	644	682
Trade balance	666	734	688	650	677	821	936	951	1 149	1 418	1 924
Ratio exports / imports	2.15	2.17	2.27	2.31	2.43	2.67	2.76	2.75	3.11	3.20	3.82
Terms of trade index	75.3	72.1	79.3	83.2	88.8	94.9	100.0	102.8	104.1	103.9	N/A

Source: DEBA

**Table 4: Cocoa, sugar confectionery and ice cream**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.1	85.7	88.6	88.8	93.4	96.2	100.0	105.0	107.1	110.4
Unit labour costs index (3)	91.6	94.3	93.4	96.5	97.8	100.3	100.0	104.7	106.5	108.6
Total unit costs index (4)	98.2	102.9	100.3	99.9	99.6	99.5	100.0	104.5	105.9	107.2
Gross operating rate (%) (5)	7.8	7.4	10.0	10.3	11.1	12.1	12.4	11.4	11.7	12.3

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

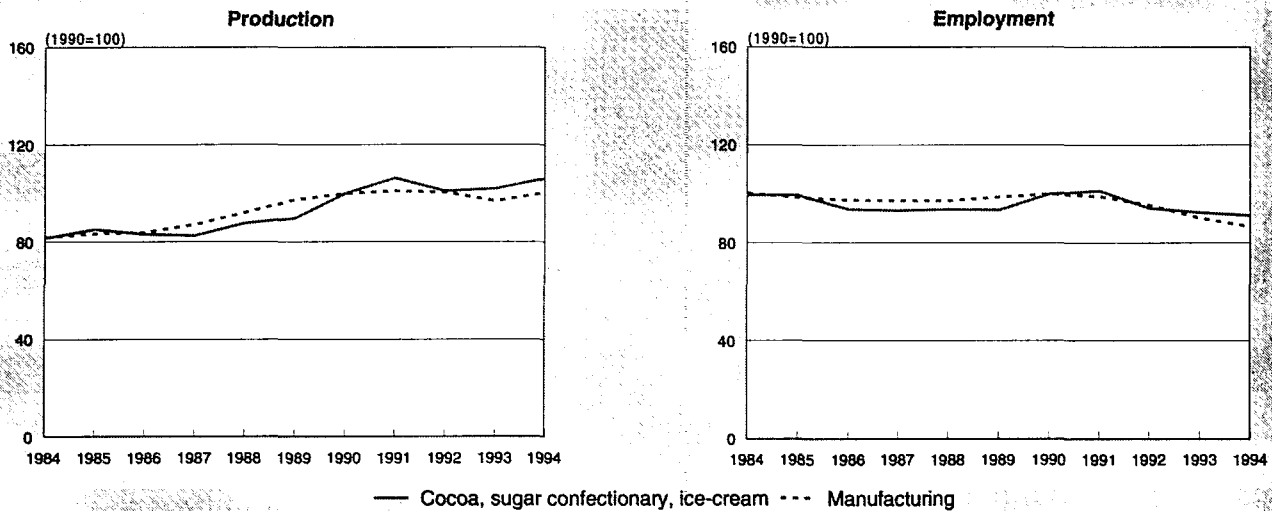
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Cocoa, sugar confectionary and ice-cream  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

In 1988, exports outside the EU went prevalently to the EFTA countries, the USA, Canada, Japan and the Canary Islands. Since then, the evolution of export structures has led to a reduction in the shares of the USA and the EFTA countries and the emergence of Russia and Poland.

Meanwhile, imports in 1988 chiefly came from the EFTA countries, the major African cocoa-growing countries and Brazil. From 1988 to 1994 there was a consolidation of imports from the EFTA countries, a reduction of those from the Ivory Coast and Ghana and the appearance of Malaysia and the USA.

In 1993, cocoa production fell to levels substantially below those of the early 1990s, causing a general increase in world prices. This situation essentially was advantageous to the 13 major producer countries which account for 90 % of cocoa production. Among the most important are the Ivory Coast, Brazil, Ghana and Malaysia.

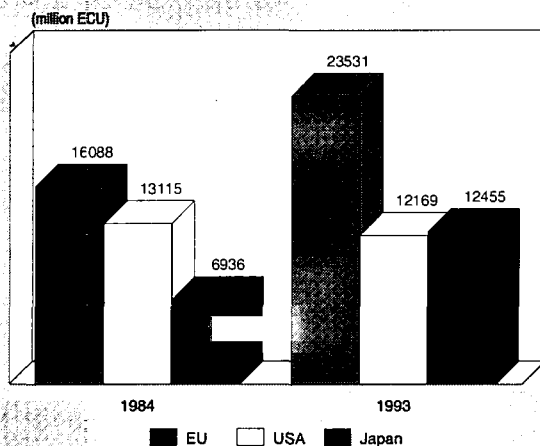
## MARKET FORCES

### Demand

The industry as a whole shows extremely diversified consumption habits within the EU. Despite this, the consumption of sugar confectionary and cocoa products has, in general, gone up over the years following the big changes taking place in eating habits throughout the EU. In particular, shifting meal patterns have created trends in eating such as snacking and 'grazing', which have increased confectionary and cocoa product sales. The cocoa-based product market is also strongly affected by seasonal variations, with higher sales rates during the winter months and major holidays (Christmas and Easter).

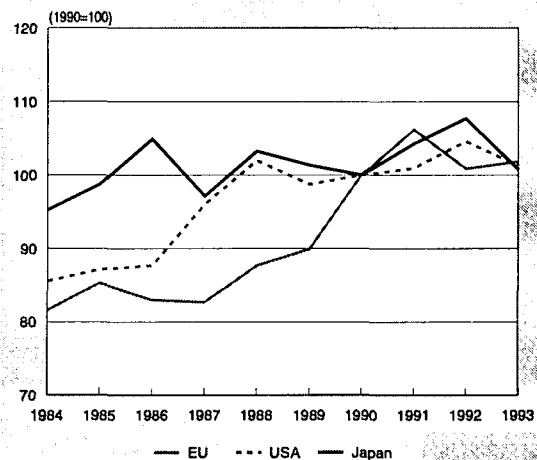
In the sugar confectionary segment, chewing-gum consumption is higher in France and Italy than in the United Kingdom and Germany, where a higher proportion of caramel and toffee is eaten. The markets which have recently evidenced the biggest growth rates are made up of products with reduced sugar

**Figure 4: Cocoa, sugar confectionary and ice-cream  
International comparison of production in current prices**



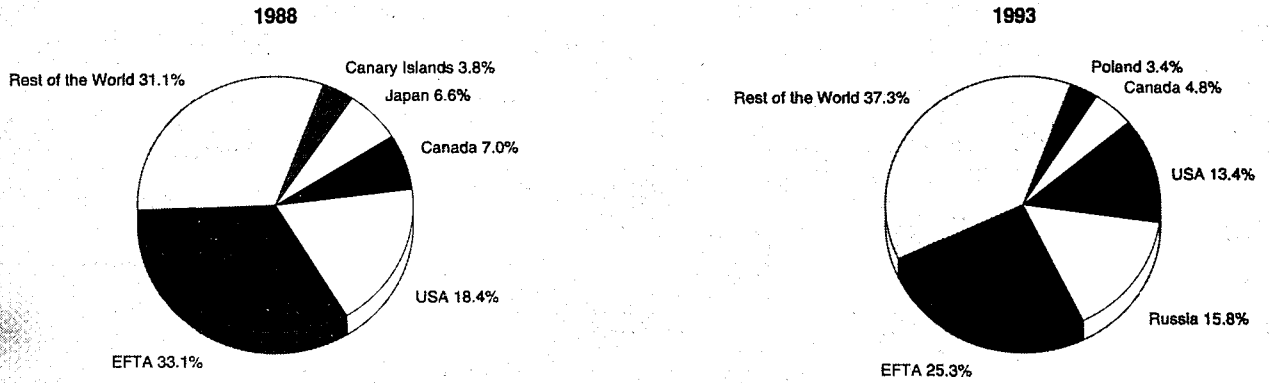
Source: DEBA

**Figure 5: Cocoa, sugar confectionary and ice-cream  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Cocoa, sugar confectionary and ice-cream  
Destination of EU exports**



Source: Eurostat

content, based on artificial sweeteners. This trend predominates especially in the gum market.

Ice cream is very much a seasonal product in many EU countries, though in more advanced consumption markets (e.g. France) ice cream is being promoted as a dessert to be eaten at the end of meals all the year round.

General trends in EU food consumption in the north and south underline the peculiarities of the demand in the sector, which is concentrated in terms of apparent consumption in Germany (7 458 million ECU in 1993) and the United Kingdom (5 253 million ECU in 1993). Taking a closer look, and considering per capita consumption for individual sectors, we notice that consumption is generally higher in the northern countries of the EU. For example, the per capita consumption of chocolate is between 6.4 and 8.2 kg a year in Germany, the Netherlands, the United Kingdom, Ireland, Belgium and Denmark, while it is below 2 kg in Italy and Spain.

Sugar confectionery presents the same characteristics, with France, Italy and Spain having a per capita consumption equal to about half (2.2-2.8 kg) that of the northern countries of the EU. The range of the per capita consumption in the ice cream segment goes from 13 litres per year in Sweden to 5.7 litres per year in France.

### Supply and competition

The industry of cocoa, sugar confectionery and ice cream shows a progressive increase in productivity within the sector, with growth rates superior to those affecting labour costs. Over the years, there also has been a drop in total unitary costs with a consequent increase of the gross operating rate. In fact, from 1984, this indicator went up without interruption until 1990, and after a drop in the two following years, returned to 1990 values in 1993.

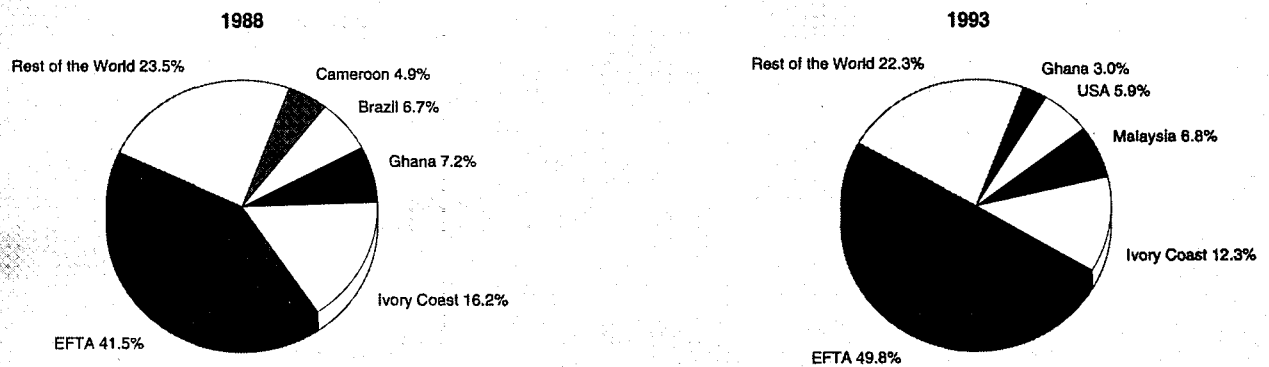
### INDUSTRY STRUCTURE

#### Companies

Cocoa, sugar confectionery and ice cream is an industry distinguished by high concentration of a handful of multinationals. In this market, the presence of small enterprises is tied to the existence of market niches relating to seasonal and/or holiday products.

In the segment of cocoa-based products, there is a high degree of concentration in the United Kingdom where, in 1992, 83 % of the market was controlled by three companies (Cadbury, Nestlé and Mars). On other EU markets, market shares held by major multinationals tend to be lower, as is evidenced in

**Figure 7: Cocoa, sugar confectionary and ice-cream  
Origin of EU imports**



Source: Eurostat

**Table 5: Cocoa, sugar confectionery and ice cream  
Production of chocolate and finished chocolate confectionery products**

(thousand tonnes)	1986	1987	1988	1989	1990	1991	1992
EU (1)	1 644.7	1 715.3	1 750.5	1 838.1	2 036.7	2 170.2	2 170.4
Belgique/België	88.1	93.5	97.6	107.3	120.0	124.0	132.2
Danmark	20.9	22.0	24.3	23.1	24.5	30.0	27.3
BR Deutschland	413.1	435.8	471.7	486.3	593.6	681.5	676.4
Hellas (2)	15.6	15.6	15.6	15.6	17.2	18.5	19.5
España	96.2	110.0	111.9	111.0	123.1	126.4	118.6
France	266.3	267.9	279.4	282.8	276.0	317.9	332.4
Ireland	22.4	25.0	26.3	28.1	29.9	27.5	29.7
Italia	84.5	87.5	101.1	154.3	161.6	161.6	170.4
Nederland (3)	174.0	185.5	186.0	188.0	219.5	211.0	186.4
United Kingdom (4)	463.7	472.6	436.6	441.6	471.3	471.8	477.5

(1) Excluding Luxembourg and Portugal.

(2) 1987 value for 1988.

(3) Estimated for 1988.

(4) Excluding biscuits and waffles covered in chocolate for 1988.

Source: Caobisco

**Table 6: Cocoa, sugar confectionery and ice cream  
Production of sugar confectionery (1)**

(thousand tonnes)	1988	1989	1990	1991	1992
EU (2)	1 291.6	1 327.9	1 395.1	1 457.4	1 480.3
Belgique/België	48.2	59.3	66.2	64.4	64.0
Danmark (3)	33.9	38.2	39.2	44.4	49.7
BR Deutschland	387.5	411.9	443.6	474.5	474.8
Hellas	10.2	10.2	11.3	12.4	13.0
España	82.0	85.0	88.6	95.1	108.5
France	148.9	149.9	156.6	158.4	163.9
Ireland	18.0	17.7	19.7	21.8	23.6
Italia	119.9	120.9	116.7	121.4	123.5
Nederland	115.9	115.0	125.0	139.8	134.0
United Kingdom	327.1	319.8	328.2	325.2	325.3

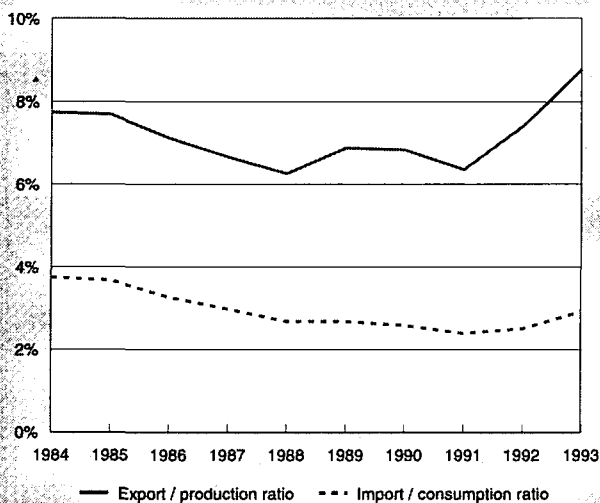
(1) Excluding candied fruit.

(2) Excluding Luxembourg and Portugal.

(3) Excluding chewing gum.

Source: Caobisco

**Figure 8: Cocoa, sugar confectionery and ice-cream  
Trade intensities**



Source: DEBA

Italy where, in 1992, the top three companies (Nestlé, Ferrero, Jacob Suchard) held 60-65 % of the market of chocolate bars. In France, Cadbury, Nestlé and Jacob Suchard cover about 60 % of the chocolate market. The situation is different in Germany, where about 35 % of chocolate blocks and bars are marketed under distributor brands.

The sugar confectionery sector shows a much higher degree of fragmentation, and a larger role is played by smaller, local manufacturers, often operating in specific niche markets. The highest levels of concentration are to be found in Italy, where the top three companies cover about 50 % of the market. In France and the United Kingdom, the market shares of the top three manufacturers in 1992 amounted to 55 % and 45 % respectively. In Spain and Germany, these figures are considerably lower (approximately 30 %). The most important companies operating in the sector are Wrigley (USA), Nestlé (CH), Cadbury (UK), Jacob Suchard (CH) and Mars (USA), which together control about 35 % of the EU market.

Finally, the ice cream sector also shows high levels of concentration. Unilever and Nestlé are the leading multinationals in the sector, covering about 55-60 % of the market in the major consumer countries.

**Table 7: Cocoa, sugar confectionery and ice cream**  
**Per capita consumption of chocolate and finished chocolate confectionery products**

(kg/capita)	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	6.9	6.9	7.4	7.2	7.6
Danmark	5.8	5.6	5.7	6.6	6.7
BR Deutschland	6.9	6.8	6.6	6.9	6.4
España	1.7	1.2	1.9	1.5	1.5
France	4.4	4.6	4.3	4.7	4.8
Ireland	5.9	6.0	6.4	6.7	6.6
Italia	1.7	1.8	1.8	1.9	1.9
Nederland	6.2	6.4	6.8	7.7	8.2
United Kingdom	7.0	7.1	7.4	7.4	7.4

Source: Caobisco

**Table 8: Cocoa, sugar confectionery and ice cream**  
**Per capita consumption of sugar confectionery**

(kg/capita)	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	3.9	4.8	5.1	5.1	4.9
Danmark	4.9	5.3	5.2	5.7	6.4
BR Deutschland	6.4	6.5	5.5	5.6	5.3
España	2.1	2.2	2.3	2.0	2.3
France	2.6	2.6	2.6	2.7	2.8
Ireland	5.9	5.9	5.8	5.8	5.8
Italia	2.2	2.3	2.2	2.2	2.2
Nederland	4.5	5.2	5.7	5.6	5.7
United Kingdom	5.1	5.0	5.1	5.1	5.2

Source: Caobisco

**Table 9: Cocoa, sugar confectionery and ice cream**  
**Industrial ice cream production by country**

(million litres)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	1 373.9	1 402.7	1 518.5	1 556.1	1 730.9	1 980.3	2 025.3	2 135.3	2 194.1	2 152.0
Belgique/België, Luxembourg	78.3	80.3	110.0	110.0	150.0	160.0	112.5	171.0	155.2	120.2
Danmark	39.8	40.8	52.0	49.4	54.4	57.9	58.0	70.4	88.0	90.3
BR Deutschland	295.0	306.0	330.5	325.3	356.4	381.8	435.4	538.7	543.0	500.0
Hellas	41.4	44.1	44.1	44.4	42.1	48.8	48.0	46.0	46.0	46.0
España	97.9	104.0	116.4	130.7	146.8	160.6	168.7	172.0	164.6	160.2
France	192.2	192.9	209.2	212.2	228.2	270.6	291.5	289.2	304.9	328.4
Ireland	25.6	23.3	23.3	24.4	24.0	27.8	29.4	31.8	32.2	33.2
Italia	213.8	225.5	223.3	227.7	298.0	317.3	322.4	332.2	332.2	347.7
Nederland	40.0	40.0	48.9	48.0	52.0	82.0	86.0	90.0	98.0	98.0
Portugal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	28.0	28.0
United Kingdom	350.0	346.0	361.0	384.0	379.0	473.5	473.4	394.0	402.0	400.0

(1) Excluding Portugal for 1984-1991.

Source: Euroglaces

## Strategies

The industry was characterised by a high number of acquisitions during the 1993-94 period: 28 operations took place involving mainly multinational companies, which aimed at widening markets towards the East European countries and consolidating positions already won on domestic markets.

The high degree of concentration of distribution circuits which distinguishes European markets has increased the purchasing power of retailers so that margins in these countries average

between 8-12 % compared with the USA, where a fragmented structure allows for higher margins of 15-16 %. These discrepancies in margins have ensured that most USA multinationals have been more contented to concentrate their activities in domestic markets, while EU multinationals have been interested in acquisitions and commercial agreements in the USA. Looking at things from a growth perspective, no trend towards greater or less specialisation within the EU can be

**Table 10: Cocoa, sugar confectionery and ice cream Acquisitions**

1993 Bidder	Country	Target	Target country
Kraft Jacobs Suchard	Switzerland	Kaunas	Lithuania
Lindt	Switzerland	N/A	Italia
Nestle	Switzerland	Goplana	Poland
Nestle	Switzerland	Dreyer's Grand Ice Cream Inc	USA
Huhtamaki	Finland	Procordia (European Confectionery Operations)	UK
Karl Fazer	Finland	Chymos	Finland
Chocolaterie Cantalou	France	Cheval Blanc	France
Girki	France	Lorraine Glaces	France
Koninklijke Bols Wessanen	Nederland	Luijckw Beheer	Nederland
Cadbury Schweppes	United Kingdom	Productos Stani SAIC	Argentina
Claymore Group	United Kingdom	John Lees	United Kingdom
Hazlewood	United Kingdom	N/A	United Kingdom
Unilever	United Kingdom / Nederland	Roma International	Poland
Unilever	United Kingdom / Nederland	Kraft General Foods (ice cream business)	USA
Hershey Foods Corp.	USA	Heinz Italia	Italia
Philip Morris	USA	Republika	Bulgaria
Philip Morris	USA	Kaunas CF	Lithuania
Philip Morris (KJS)	USA	Olza	Poland
Philip Morris	USA	Terry's (United Biscuits)	United Kingdom
Russel Stover Candy Co.	USA	Whitman's Chocolate (Trademark & Related Assets)	USA
Tootsie Roll Industries	USA	Warner-Lambert Co	USA
Warner-Lambert	USA	Cachou Lajaunie	France
1994 Bidder	Country	Target	Target country
Kraft Jacobs Suchard	Switzerland	Chorzele	Poland
Kraft Jacobs Suchard	Switzerland	Poiana Produce Zamaroase	Romania
Lindt & Spruengli	Switzerland	Ludwig Hofbauer	Austria
Nestle	Switzerland	Malt Chika	Bulgaria
Nestle	Switzerland	Warncke (Unilever)	BR Deutschland
Nestle	Switzerland	Anonima de Alimentacion	Espana
Nestle	Switzerland	SAA	Espana
Ostkommerz Holding	Switzerland	Pomorzanka	Poland
Carletti	Danmark	Brdr Christensen	Danmark
Teofilo Sanson	Italia	Gelati Sanson	Italia
Ferrero	Italia	N/A	Portorico
Ferrero	Italia	N/A	USA
Cadbury Schweppes	United Kingdom	Bouquet d'Or	France
Cadbury Schweppes	United Kingdom	Industrias Dulciora	Espana
Tudor Dairies	United Kingdom	Loseley Dairy Products	United Kingdom
Unilever	United Kingdom / Nederland	Safrai	France
Unilever	United Kingdom / Nederland	Helados Tio Rico	Venezuela
E J Brach Company	USA	Brock Candy Company	USA
Philip Morris	USA	Poiana-Produse Zaharoase	Romania
Philip Morris	USA	Lyons Tetley	United Kingdom
Pacific Dunlop	Australia	Meadow Gold Investment Co	China

Source: Nomisma

seen, though the variations of indices for Greece (+62 %), Denmark (+40 %) and Italy (+31 %) seem significant.

To promote growth in the cocoa market, manufacturers have introduced single and mini portions and emphasised their high nutritional value. Also evident in this market is the availability of increasingly more sophisticated confectionery, as manufacturers seek to differentiate their products and gain value added on basic lines. At the same time, competition has brought prices down in many markets. This trend was particularly strong in 1993, when along with competitive pressure, there was a drop in the purchasing power of consumers in many EU countries, which highlighted the importance of price to

purchasing decisions and the increase in the price of cocoa on the international market.

The industry on the whole is distinguished by a high rate of product innovation as is shown by the presence in the United Kingdom of a very low concentration of brands, in contrast with the generally large market shares controlled by the major multinationals. In the ice cream segment, the strategies adopted to promote sales are based on a growing segmentation of markets, anxious to meet the preferences of children, families and singles alike.

**Table 11: Cocoa, sugar confectionery and ice cream  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.40	N/A
Danmark	1.47	2.07
BR Deutschland	1.04	1.01
Hellas	1.00	1.62
España	0.85	0.93
France	1.09	0.90
Ireland	N/A	N/A
Italia	0.16	0.21
Luxembourg	0.00	0.00
Nederland	1.69	1.57
Portugal	0.43	0.23
United Kingdom	1.33	1.49

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

### Impact of the Single Market

The creation of the Single Market had a globally positive impact on the cocoa, sugar confectionery and ice creams sectors. In particular it stimulated trade intensity and has increased competition inside the market. Also mergers and takeovers activities has been more intense after the implementation of the Single Market.

However, internal barriers still remain. In particular they are linked to a lack of common interpretation of the labelling and packaging legislation. The high sugar cost is also perceived as a heavy constraint to competition.

External barriers are linked to high tariffs on EU exports. The reform of the sugar Common Market Organisation (CMO) and the reduction of tariffs on EU exports are priorities for the industry.

### REGULATIONS

The basic directive which lays down the rules and definitions for cocoa and chocolate products (i.e. their composition and manufacturing specifications and the names which shall be used in trade) is Directive 73/241. This directive is the subject of a draft proposal within the framework of the revision and rationalisation of the vertical directives initiated at the summit meeting held in Edinburgh in December 1992, with the aim of limiting the texts of the directives to the elements essential for the free movement of goods in the EU.

Directive 93/102 on food labelling for categories of additives affects the sector inasmuch as it removes the need for the qualifier 'artificial' to accompany the term 'sweetener'. Trade in products in conformity with the directive is to be ensured by January 1, 1995; prohibition of trade in products not in conformity will apply as of June 30, 1996.

With regard to the ice cream sector, a European Code of Practice was agreed to by the industrial manufactures in 1991, in order to maintain fair competition and to ensure circulation of the products. Mention also should be made of Directive 91/238, already implemented in all Member States, which provides for the exemption from the lot marketing of individual portions of ice cream, and also Directive 89/395, which exempts ice cream products from the date marking.

### OUTLOOK

A general increase is expected in the consumption of cocoa products, sugar confectionery and ice cream over forthcoming years in most EU countries. The products which will show the greatest growth rates are those with a low-calorie content and high nutritional value. An increase of acquisitions is expected, aimed mainly at consolidating positions on single domestic markets and finding new market outlets.

Written by: NOMISMA

The industry is represented at the EU level by: Association of the Ice Cream Industries of the EC (Euroglaces). Address: rue Fondary 51-53, F-75015 Paris; tel: (33 1) 45 79 80 75; fax: (33 1) 45 79 61 29; and Association des industries de la Chocolaterie, Biscuiterie et Confiserie (Caobisco). Address: rue Defacqz 1, Bte 7, B-1050 Brussels, tel: (32 2) 539 1800; fax: (32 2) 539 1575.



# Compound feed

## NACE 422

In the compound feed sector, industrial production rose slightly in 1993 with a tendency for production and apparent consumption at current prices to level off at previous year values, while exports underwent a significant upswing. In the sector of animal feed for livestock farms, price-based competition ate away at the profit margins of companies; in some weaker-currency countries, profitability was also affected by the cost of raw materials. With regard to pet food, the picture is different: though percentage-wise it counts for only a small share of the total sector by volume, it represents about 17 % of the total value. It is a very attractive segment then, dominated by just a few large multinational companies and with strong barriers to entry.

### INDUSTRY PROFILE

#### Description of the sector

This sector's activities include the production of compound feed for livestock farms, such as feed for poultry, pigs, dairy animals, meat cattle and other animals (horses, rabbits, fish, sheep and goats), as well as the pet food subsector, which makes products for domestic animals. The final products in the animal feed subsector are complete feeds (including milk-substitute feeds for calves), and complementary feeds, such as integrators and premixes (i.e. a combination of vitamins, mineral salts and amino acids which can be mixed with cereals and grains), while the pet food subsector is divided into dry and wet feeds.

The major producers of compound feed in the EU are France and Germany, which are also the principal producers of meat. Spain and the Netherlands are the main producers of pig feed, milk-substitutes and dry pet food.

#### Recent trends

In 1993, apparent consumption and production at current prices stabilised at around the previous year's figures, continuing a levelling-off trend, which has seen only slight fluctuations since 1990. In the 1984-90 period, patterns were fairly differentiated. In fact, in 1986 internal indicators dropped compared to previous years, while between 1986 and 1989, there was an upswing - with peaks of 9 % in 1989 - which stopped in 1990.

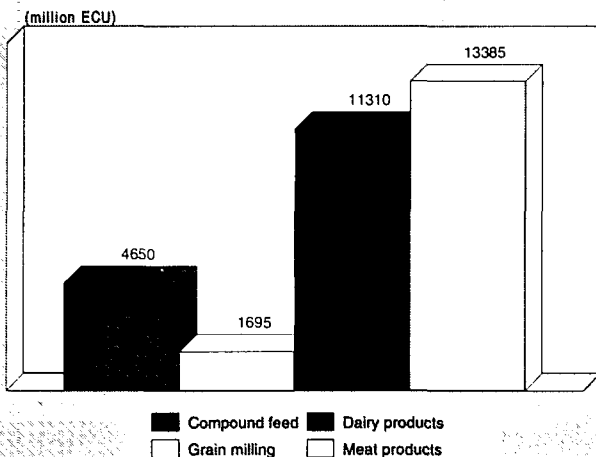
The trade balance shows an initial downswing phase up to 1987, followed by a two-year period of slight growth and a strong growth trend starting in 1991, with the 1993 balance exceeding that of 1984. Exports thus rose while employment figures dropped by 2.3 %.

The Member States which contribute most to the value added in the EU are France, Germany and the United Kingdom.

In 1993, there was a 2.7 % increase in industrial compound feed production compared to the previous year. Pig feed grew at rates above that of the sector as a whole (4.1 %), while there was a 2.0 % increase for cattle feed and an increase of less than 1 % for poultry feed. Pet food also grew in line with the average for the sector.

There were significant differences in production growth rates between the different countries. The major producer (France) grew by 6.7 %, while some of the minor producers underwent even stronger growth (with a peak of 11.7 % for Ireland). Spain was the only country which presented a significant fall, equal to 4.0 % (Source: FEFAC)

Figure 1: Compound feed  
Value added in comparison with related industries, 1993



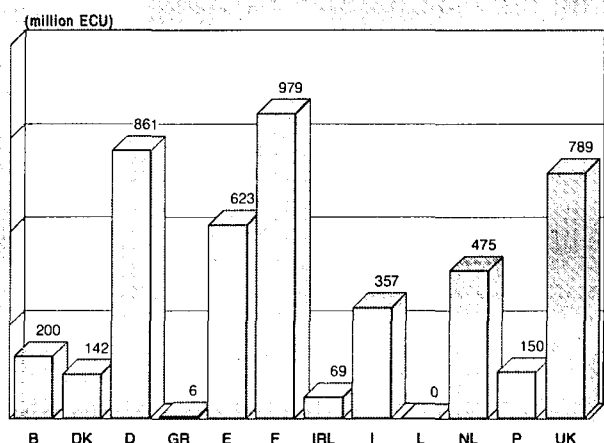
Source: DEBA

The 1984-89 period was marked by average real annual growth rates of production and apparent consumption equal respectively to 3.6 % and 3.9 %. In that same period, a high average real annual growth rate affected imports from countries outside the EU (9.35 %) while there was a drop with regard to exports to countries outside the EU (-2.19 %).

The 1989-1993 period showed average growth rates of production and consumption equal to around 1 %, while exports and imports grew by 9.43 % and 3.84 % respectively, much different from those recorded in the 1984-89 period. Generally speaking, average growth rates of production and apparent consumption and exports to countries outside the EU during the entire 1984-93 period showed very similar figures, near 2.6 %. With regard to imports from countries outside the EU on the other hand, the average growth rate equalled 6.9 %.

Starting in 1986, production of compound feed at constant prices showed a positive growth trend (except for 1991). Compared with the trend shown for the entire manufacturing industry, growth in the animal feed sector is higher overall, excepting the 1985-86 and 1990-91 periods.

Figure 2: Compound feed  
Value added by Member State, 1993



Source: DEBA

**Table 1: Compound feed**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	25 226	26 248	28 663	28 047	28 091	28 695	28 589	28 407	28 890	29 350	29 800
Production	25 652	26 400	28 825	28 162	28 318	29 018	29 088	28 874	29 400	29 900	30 400
Extra-EU exports	914	733	825	748	864	1 048	1 177	1 259	1 400	1 500	1 600
Trade balance	426.4	152.7	162.6	115.2	227.8	322.3	498.9	467.2	510.0	550.0	600.0
Employment (thousands)	92.4	89.8	90.4	91.7	91.0	89.2	87.2	86.4	86.0	85.0	85.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Compound feed**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.90	1.10	2.65	1.57
Production	3.60	1.31	2.58	2.01
Extra-EU exports	-2.19	9.43	2.81	9.25
Extra-EU imports	9.35	3.84	6.86	-5.38

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Compound feed**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	914	798	718	620	733	825	748	864	1 048	1 177	1 259
Extra-EU imports	488	499	521	509	580	662	633	637	725	678	792
Trade balance	426	299	198	111	153	163	115	228	322	499	467
Ratio exports / imports	1.87	1.60	1.38	1.22	1.26	1.25	1.18	1.36	1.44	1.74	1.59
Terms of trade index	76.9	87.3	94.1	94.6	86.1	89.3	100.0	96.1	96.9	100.9	N/A

Source: DEBA

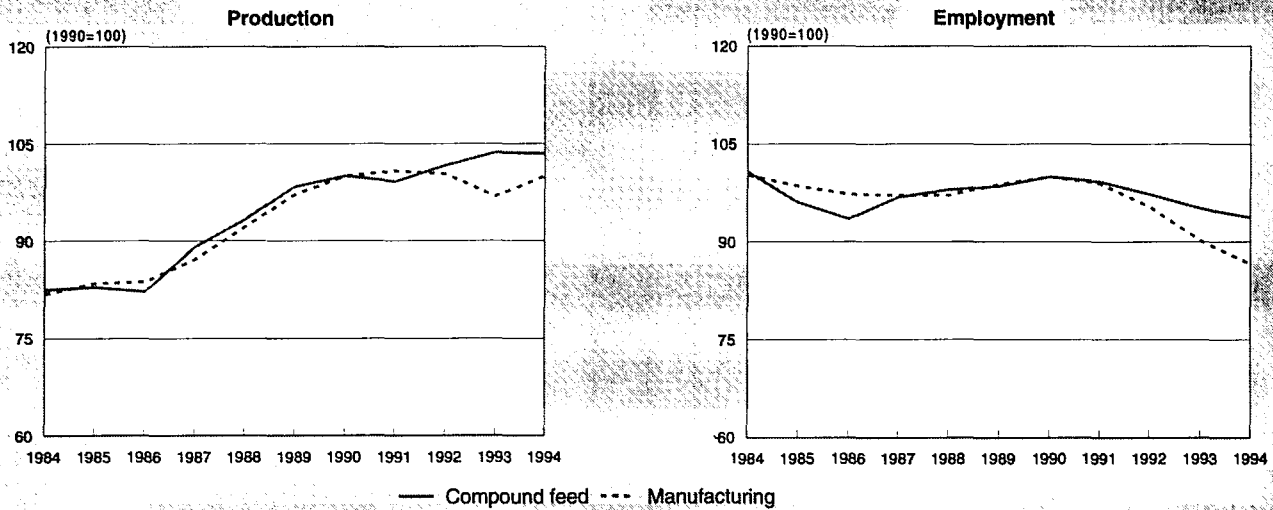
**Table 4: Compound feed**  
**Cereal consumption by the animal feed industry**

(million tonnes)	1990	1991	1992	1993	1994
EU (1)	35.39	34.47	34.42	33.29	38.47
Belgique/België	0.68	0.64	0.65	0.69	0.86
Danmark	1.40	1.23	1.34	1.69	1.77
BR Deutschland	7.51	5.73	4.95	4.77	5.40
España	6.40	7.85	7.75	7.44	7.01
France	6.09	5.70	6.06	5.85	7.59
Ireland	0.56	0.62	0.72	0.72	0.79
Italia	5.80	5.80	5.90	5.50	7.68
Nederland	2.15	2.13	2.42	2.02	2.40
Portugal	0.79	0.90	0.95	1.04	1.12
United Kingdom	4.01	3.87	3.68	3.57	3.85

(1) Excluding Greece and Luxembourg.

Source: FEFAC

**Figure 3: Compound feed**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

Looking at employment patterns in the two sectors we have the following picture: from 1984 to 1986, the fall in the compound feed sector was greater than that of the manufacturing industry as a whole; from 1986 to 1988, there was a growth in the compound feed sector and a drop in the manufacturing industry; from 1988 to 1990, growth was recorded in both sectors; and from 1990 to 1994, there was a drop in the employment rate in both sectors, although it was greater for the manufacturing industry.

**International comparison**

In an international comparison of production at current prices, the EU confirmed its lead role and, at the same time had shown improved figures over 1984 by 1993. On the other hand, the USA and Japan underwent a slight drop in production in 1993 compared to 1984.

An analysis of production at constant prices shows a substantially similar pattern for the EU and the USA, while the

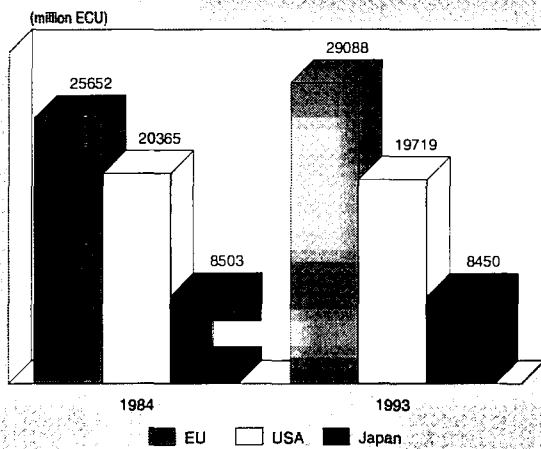
trend in Japan was considerably different. Both the EU and the USA, though each experiencing consistent growth overall, vied for and won the lead role in different years over this period. The EU had a slightly stronger growth rate compared to that of the USA in 1984, in 1988-89 and in 1992. Meanwhile, Japan experienced a steep drop in its growth rate between 1984 and 1987 - from 150.6 to 96.9 - and a slight upswing from 1987 to 1989, after which the growth rate fell gradually.

**Foreign trade**

The balance of trade figures were active from 1984-93; after a drop in exports greater than that in imports in 1990, the 1991-93 period was marked by the strong growth of exports over imports. The export/import ratio underscores this trend, passing from 1.18 in 1990 to 1.74 in 1993, thus approaching the ratio recorded in 1984.

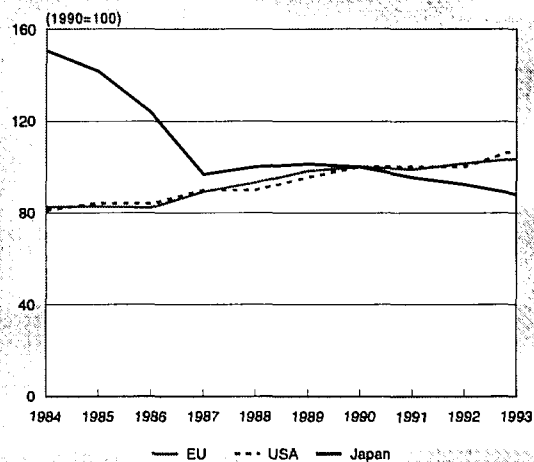
In 1993, almost one-half of European exports of animal feed went to the former EFTA countries, Libya, the USA, Poland

**Figure 4: Compound feed**  
**International comparison of production in current prices**



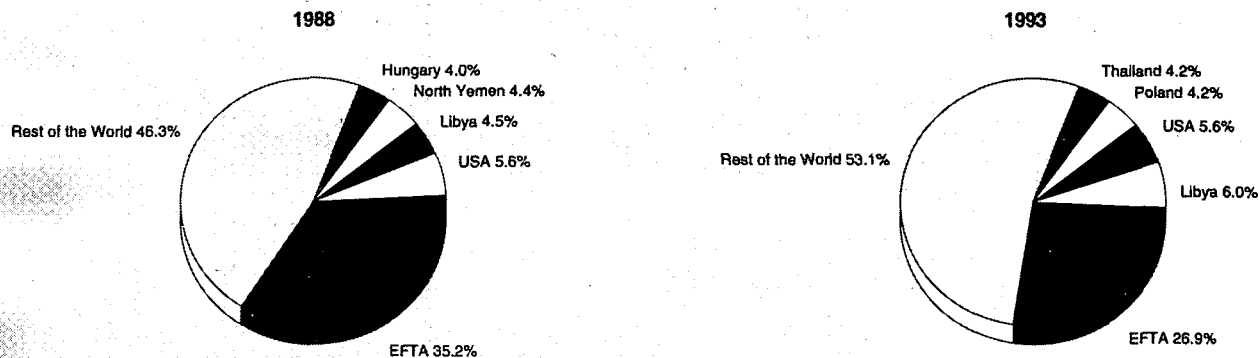
Source: DEBA

**Figure 5: Compound feed**  
**International comparison of production in constant prices**



Source: DEBA

**Figure 6: Compound feed  
Destination of EU exports**



Source: Eurostat

and Thailand. Compared to 1988 there was an eight per cent drop in exports to the EFTA countries in 1993 and a slight increase in Libya's (1.5 %), enough to allow it to surpass the USA. The rest of the world's share also went up.

As far as imports are concerned, there was a radical geographic swing as regards EU trading partners. In 1988, more than a third of EU imports came from Chile, but in 1993, the importance of this country fell drastically, to under 10 %. Thus, in 1993, the USA took the lead, with more than one-third of all EU imports. Other countries which have increased their shares were the EFTA countries, Peru and Thailand (which, along with other Asian countries, e.g. China and Indonesia, supplies manioc).

The export/production ratio showed a decline from 1984 to 1987, after which the trend reversed. Maximum growth was recorded in 1993 (4 %). Generally speaking, the import/consumption ratio presents a slight growth trend, interrupted by levelling-off years in 1987, 1990-91 and 1993.

## MARKET FORCES

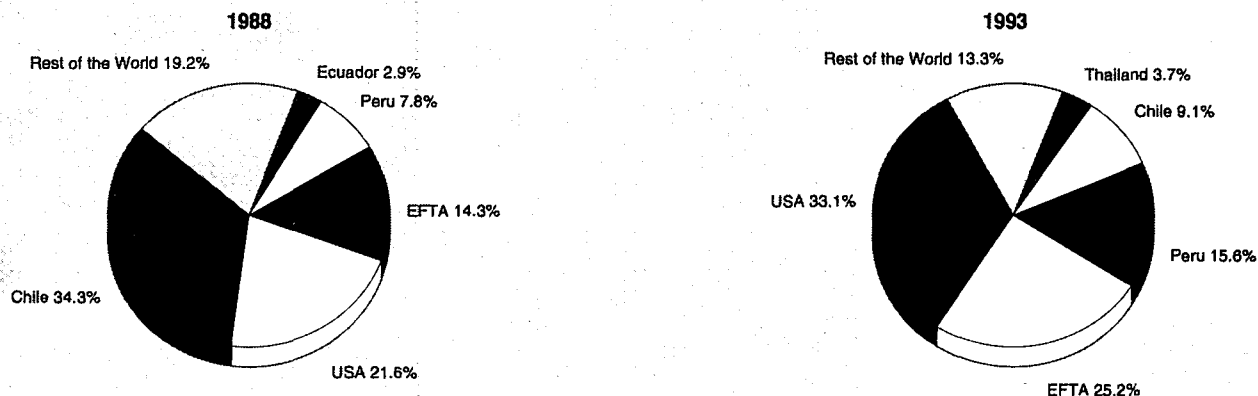
### Demand

Demand in the compound feed sector has fallen off slightly, continuing a trend which has been underway for some years now. The drop in the cattle sector, also affected by production limitation measures such as the Common Agricultural Policy (CAP), was not offset by increases in the pig and poultry feed sectors.

Active on a final market which is rather sensitive to price, the compound feed industry is extremely keen on the use of cost-advantage raw materials. In some cases, however, in order to maintain competitiveness, the industry has to partially internalise raw material price increases, acting as a deflationary factor. A case in point is Italy, a country where, despite a hike in the price of fodder grains (particularly maize) of around 13 % (1993 compared to 1992), the prices of industrially-manufactured compound feed increased by 8-9 %.

The principal raw materials employed are cereals, which represent 30 % of consumption, cakes and meals (25 %) and the by-products of the food industry (15 %). The biggest cereal consumers are Spain and Italy. The Netherlands, although

**Figure 7: Compound feed  
Origin of EU imports**



Source: Eurostat

**Table 5: Compound feed  
EU industrial consumption of raw materials (1)**

(thousand tonnes)	1988	1989	1990	1991	1992
Cereals	30 644	32 504	33 495	33 994	34 018
Manioc	6 324	6 113	5 727	5 995	5 565
By-products from food industry	16 490	15 714	15 463	16 326	17 861
Oils and fats	1 550	1 791	1 984	2 007	1 991
Cakes and meals	25 802	25 796	26 281	27 147	27 748
Pulses	N/A	4 342	5 383	3 297	3 089
Animal meals	2 528	3 112	3 124	1 791	1 748
Dairy products	1 499	973	1 058	3 004	2 876
Dried forage	2 558	1 946	3 360	5 416	5 296
Minerals, additives, vitamins	2 033	2 456	2 312	2 352	2 406
All others	10 309	7 906	6 977	8 684	7 299
Total	99 737	102 653	105 164	110 013	109 897

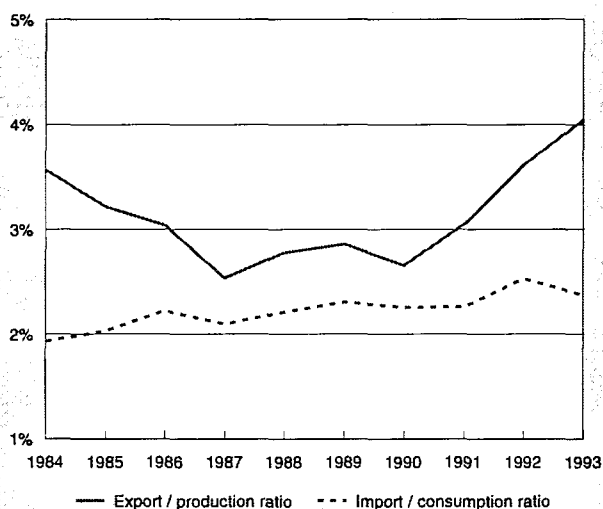
(1) Excluding Greece and Luxembourg.  
Source: FEFAC

**Table 6: Compound feed  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	81.9	86.3	87.9	92.0	95.3	99.9	100.0	100.0	104.5	109.1
Unit labour costs index (3)	90.2	92.6	93.9	94.2	95.1	96.7	100.0	108.5	109.5	106.5
Total unit costs index (4)	110.9	106.7	102.2	97.4	101.6	103.0	100.0	104.0	102.0	100.2
Gross operating rate (%) (5)	5.89	6.53	6.39	6.59	6.58	7.11	6.94	4.83	6.17	6.21

(1) Some country data have been estimated.  
(2) Based on index of production / index of employment.  
(3) Based on index of labour costs / index of production.  
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.  
(5) Based on (value added - labour costs) / turnover.  
Source: DEBA, Eurostat

**Figure 8: Compound feed  
Trade intensities**



Source: DEBA

among the major producers of compound feed, uses relatively little, as manioc is preferred.

With regard to the pet food sector, demand is sensitive not only to price but also to perceived quality and brand name. The rise in social importance of pets makes this sector particularly interesting. On the major European markets (the United Kingdom, France, Germany and Italy), there was a 19 % volume increase and a 28 % value increase over the 1988-1993 period. Significant increases in demand could occur on national markets, e.g. Italy, where the penetration rate of pet food is still far below the European average.

### Supply and competition

The EU is the number one producer of animal feed, followed by the USA (at current prices). In 1993, compound feed production in the EU amounted to 115 011 million tonnes, of which 36 % was pig feed, 30 % cattle feed and 28 % poultry feed.

Pet food production accounts for about 3 % of compound feed production. What makes this segment particularly important is that the value of pet food production accounts for about 17 % of the overall value.

The labour productivity index underwent stable growth from 1984 to 1993, with the exception of 1991, when there was no variation. Labour costs also show a steady upswing, excepting 1992 and 1993. The gross operating rate went up

**Table 7: Compound feed  
Production by livestock class**

(thousand tonnes)	1991 (1)	1992 (1)	1993 (2)
Cattle feed	34 997	33 536	34 201
Pig feed	38 094	39 359	40 956
Poultry feed	30 741	31 456	31 724
Other	6 318	6 488	7 043
Total	110 150	110 839	113 924

(1) Excluding Greece and Luxembourg.

(2) Excluding Luxembourg and including former East Germany.

Source: FEFAC

slightly from 1984 to 1989, with a steep fall in the subsequent two-year period, and an upswing in the 1992-93 period.

## INDUSTRY STRUCTURE

### Companies

The animal feed sector for livestock farms is highly fragmented, with very few large companies and numerous small-capacity firms located in the areas with large concentrations of farms, so as to keep transportation costs low. Such fragmentation can be exemplified by the fact that the leader firms (e.g. Provimi-Group Béghin Say and the French group Cargill) have a market share of several percentage points.

There were 4 157 production facilities in the EU in 1993, about 1 % less than the previous year. Italy is the country with the least-intensive concentration of production structures. In fact, this country has 25 % of all EU facilities, while production volume equals 11 % of the EU total. Greater concentration rates are to be found in other major producer countries, in particular the Netherlands, France and Germany.

The pet food sector is concentrated into just a few multinational firms: Mars (I), Quaker (UK) and Nestlé (CH), flanked by a number of domestic leaders like Dalgety (UK). To stay competitive, these companies invest heavily in R&D, communication and marketing policies. The size of a company is also important for acquiring contractual leverage with respect to large distribution groups. In addition, firms special-

ising in animal feed for livestock farms and food enterprises process 'wastes' to achieve diversification of production and get onto the pet food market also exist on some of the domestic markets.

### Strategies

Competition in the field of animal feed for livestock farms is very strong, and this tends to have a big effect on price, making producer profit margins precarious. For this reason, the firms with greater product development resources seek a differentiation strategy, e.g. specialising in integrators and pre-mixes (the segment of the animal feed industry with the highest value added), or by innovation through high-protein content products, such as animal-based meals.

Competitive factors for pet food are product innovation and marketing strategies, a large product range to satisfy specialised target and niche markets, and the ability to exploit sales-channel synergies between food and pet food.

The compound feed sector does not appear particularly dynamic in terms of acquisitions and mergers. There were four major acquisitions in 1993 and seven in 1994. Dalgety (UK) is the only group to have made more than one acquisition. With rare exceptions, acquisitions in the sector always have been performed by EU firms.

The countries most specialised in the production of food for animals are Portugal and the Netherlands, where production ratios in compound feed as compared to the manufacturing

**Table 8: Compound feed  
Acquisitions**

1993 Bidder	Country	Target	Target country
Paribas	France	Rental	France
Dalgety	United Kingdom	Oldacre (Unigate)	United Kingdom
Dalgety	United Kingdom	Paragon Petcare	United Kingdom
PMI Holdings	USA	Purina Mills	USA
1994 Bidder	Country	Target	Target country
Nestle	Switzerland	Alpo Petfoods	USA
Irish Agricultural Wholesale Society	Ireland	Nordos	United Kingdom
Leo Foundation	Danmark	N/A	Danmark
Nutreco	Nederland	BP (Core Nutrition Bus)	United Kingdom
Beauporc	España	N/A	España
Tate & Lyle	United Kingdom	Hartham Holdings	United Kingdom
Dalgety	United Kingdom	Nido Industrial	España

Source: Nomisma

**Table 9: Compound feed  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.35	1.17
Danmark	1.03	0.94
BR Deutschland	0.49	0.45
Hellas	0.50	0.79
España	1.78	2.16
France	1.01	1.15
Ireland	1.35	1.43
Italia	0.75	0.75
Luxembourg	0.00	0.00
Nederland	3.18	2.80
Portugal	2.85	2.82
United Kingdom	0.97	0.90

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

industry in 1993 were equal to 2.82 and 2.80 respectively. Spain follows with 2.16, while Ireland, Belgium and France have ratios between 1.43 and 1.15. All the other EU countries have ratios below 1.

A comparison between figures expressed by the individual countries in 1984 and 1993 shows that ratios have grown only in Greece, Spain, France and Ireland. All the other countries - except Italy, which remained stagnant - had 1993 ratios below those of 1984.

### Impact of the Single Market

The impact of the creation of the Single Market on the compound feed sector, has been overall positive, but small. Firstly, the sector is mainly regulated by the Common Agricultural Policy (CAP) and secondly the sector is characterised by a low trade intensity. Transport and distribution are indeed very expensive, so production takes place regionally.

The Single Market only had a limited impact on input costs and on the geographical distribution of production plants, which continue to be concentrated in very rural areas, close to raw material production or to ports.

The remaining internal barriers are linked to phytosanitary and veterinary legislation's that differ across countries. The next priorities for the industry are related to the CAP reform and the GATT agreement, and to the harmonisation of phytosanitary and veterinary legislations.

### ENVIRONMENT

The animal feed industry can be considered a low environmental impact activity, given both the small quantity of waste to be disposed of, and the scarcity of harmful fumes released into the atmosphere, for which simple and effective technical solutions are available. Furthermore, the industry offers a positive contribution to the environment through the recycling of a significant quantity of residue materials from other production cycles of the food industry.

### REGULATIONS

The Community has regulated several aspects of the sector, with the aim of harmonising the legislation among the Member States in relation to the marketing of compound feeds (Directive 90/44), hygiene standards (Directive 92/117), Community test methods for the official control of animal feeds (Directive 93/117) and the composition of feeds (Directives 90/167, 91/357, 92/97 and 93/113).

More specifically, some of the directives mentioned concern:

- Directive 92/117: deals with specific zoonosis protection measures and the fight against zoonotic agents in animals and in products of animal origin to avoid outbreaks of infection and food poisoning. It sets the conditions for collecting data on zoonosis and zoonotic agents and provides for controls on poultry feed to identify contamination sources of salmonella in poultry and to establish procedures to secure the adoption of correct manufacturing practices.
- Directive 90/167 establishes the provisions for the preparation, marketing and utilisation of animal feeds medicated in the Community.
- Directive 93/74 regulates dietetic animal feeds - compound feeds for animals which, due to their particular composition or special manufacturing procedures, are different from other standard feeds and medicated feeds and are thus presented as products with specific nutritional requirements.

Finally, the presence of bovine spongiform encephalopathy (B.S.E.) has sparked a discussion among Community organisations on whether it might not be a good idea to prohibit the use of meals of animal origin for feeding cattle, as well as strengthen precautions for their preparation and use.

### OUTLOOK

Demand is expected to remain stable over the next few years, especially considering the strong pressures on the zootechnical sector both on international and domestic markets. Export patterns recorded in 1993 can represent an opportunity for EU firms. Also advantageous to the sector could be the drop in prices of various raw materials, as provided for by the reform of the CAP, especially as regards the cereals sector which provides the principal raw materials used to make compound feed.

To recover profitability, firms could also pursue differentiation strategies and specialise in greater value added products like integrators and mixes, thereby improving product quality. Given the nature of compound feed as a commodity, however, product differentiation remains a niche strategy.

The pet food sector presents attractive growth prospects, especially in those countries where the rate of penetration is still below the European average. The strong competition keyed to winning over consumers and the particularly aggressive marketing strategies of the large distribution chains play in favour of the big market leader groups and an increased level of concentration in the sector.

Written by: NOMISMA

The industry is represented at the EU level by: European Feed Manufacturers Federation (FEFAC). Address: Rue de la Loi 223, B-1040 Brussels; tel: (32 2) 230 8715; fax: (32 2) 230 5722.



# Miscellaneous food products

## NACE 417, 423

The pasta sector has shown a slower growth trend which particularly affected dry pasta, although there has been an ongoing concentration in the hands of large multinational companies, as well as considerable expansion abroad. The internationalisation and industrial concentration is a strategic goal for other food products of the industry as well.

### INDUSTRY PROFILE

#### Description of the sector

The miscellaneous food sector comprises pasta (NACE 417) and products like coffee, tea, vinegar and other dressings, dietetic sweeteners, baby foods and cake mixes (NACE 423). These products differ in terms of market demand, supply, industrial structures and market strategies.

#### Recent trends

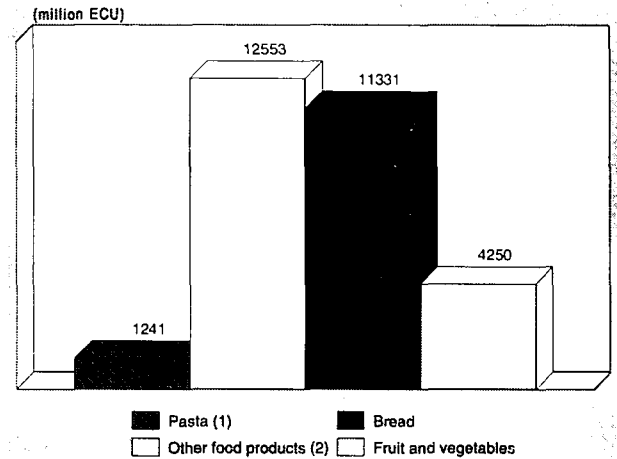
All in all, the economic importance of the sector in terms of value added can be compared to that of more important industries like meat and industrial baking. These values can be traced back to products having a high degree of differentiation, distinguished by extremely different and often complex processing systems.

The geographic distribution of production and value added of the pasta subsector in 1993 was strongly concentrated in Italy which accounts for about two-thirds of total world production. This country is followed by France, Germany and the United Kingdom. With regard to other products, Germany tops the list followed at a distance by France, Spain and Italy.

#### Pasta

In 1993, a stagnating demand was accompanied by a fall in the total supply. The bigger producers, which find an alternative to the internal markets outside the EU and which had increased export levels already, have intensified their inter-

Figure 1: Miscellaneous food products  
Value added in comparison with related industries, 1993



(1) NACE 417.  
(2) NACE 423.  
Source: DEBA

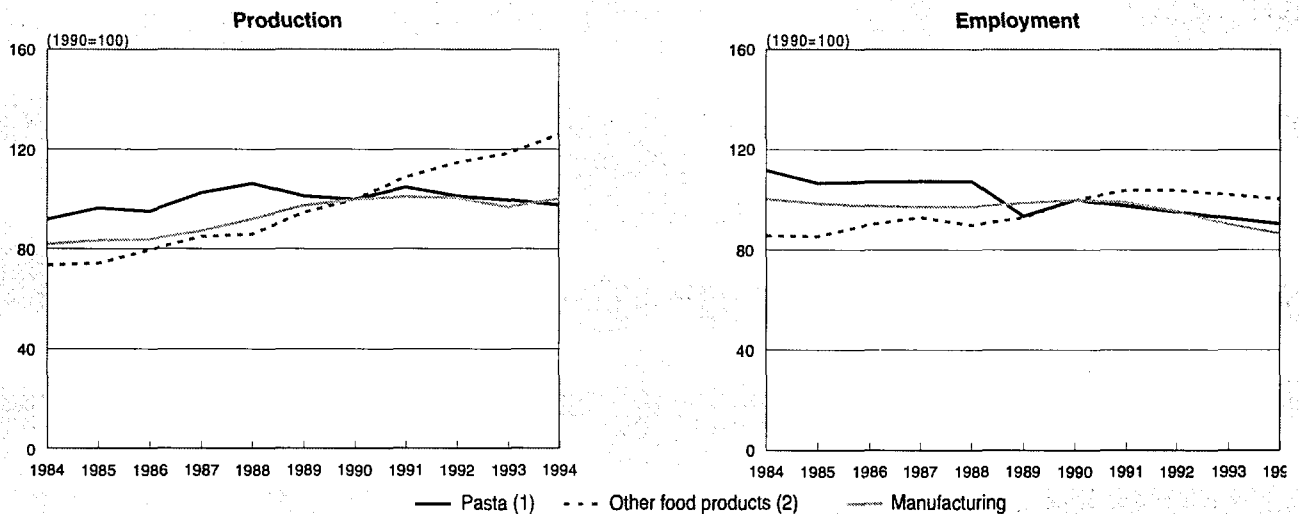
nationalisation process. In 1993, however, after a period of exceptional growth, exports began to show signs of abating.

With respect to employment figures, there was a downswing during the entire 1984-93 period, which reflected the pattern of the EU manufacturing industry as a whole. The pasta market is on the upswing, thanks to an increased demand for fresh and filled pastas which are very popular in France and Germany. Spain and Greece on the other hand, are slow growth markets in terms of volume.

#### Other products

The main indicators relating to miscellaneous foods besides pasta are all extremely positive, thanks to both a domestic and foreign demand which bolster production and employment throughout the sector. For the entire 1984-93 period, the manufacture of these products followed a pattern of strong growth

Figure 2: Miscellaneous food products  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
(1) NACE 417.  
(2) NACE 423.  
Source: DEBA



**Table 1: Miscellaneous food products**  
**Main indicators in current prices - Pasta (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	3 578	4 439	4 385	4 427	4 652	4 376	4 156	3 933	4 100	4 240	4 470
Production	3 694	4 580	4 573	4 619	4 903	4 721	4 462	4 279	4 500	4 700	5 000
Extra-EU exports	135.9	166.9	215.8	221.4	287.3	386.5	356.2	403.0	470.0	540.0	620.0
Trade balance	116.2	141.8	188.3	191.6	250.9	345.2	305.4	346.0	400.0	460.0	530.0
Employment (thousands)	23.5	22.6	19.6	21.0	20.5	20.0	19.5	19.0	19.0	19.0	19.0

(1) NACE 417. Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Miscellaneous food products**  
**Main indicators in current prices - Other food products (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	21 489	24 794	27 978	29 318	33 148	35 336	36 190	38 679	40 720	42 920	45 220
Production	21 744	25 864	29 194	30 583	34 471	36 899	38 035	40 883	43 200	45 600	48 200
Extra-EU exports	1 882	2 060	2 294	2 383	2 516	2 798	3 240	3 674	3 980	4 380	4 680
Trade balance	255	1 070	1 215	1 265	1 322	1 564	1 844	2 204	2 480	2 680	2 980
Employment (thousands)	166.2	174.6	180.4	194.1	201.4	201.7	197.8	195.7	199.0	204.0	207.0

(1) NACE 421; Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Miscellaneous food products**  
**External trade in current prices - Pasta (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	136	160	145	154	167	216	221	287	387	356	403
Extra-EU imports	20	26	23	25	25	28	30	36	41	51	57
Trade balance	116	134	122	129	142	188	192	251	345	305	346
Ratio exports / imports	6.90	6.25	6.27	6.21	6.65	7.85	7.43	7.89	9.35	7.01	7.07
Terms of trade index	94.2	98.6	101.5	97.5	98.0	100.5	100.0	98.6	97.5	91.1	N/A

(1) NACE 417.

Source: DEBA

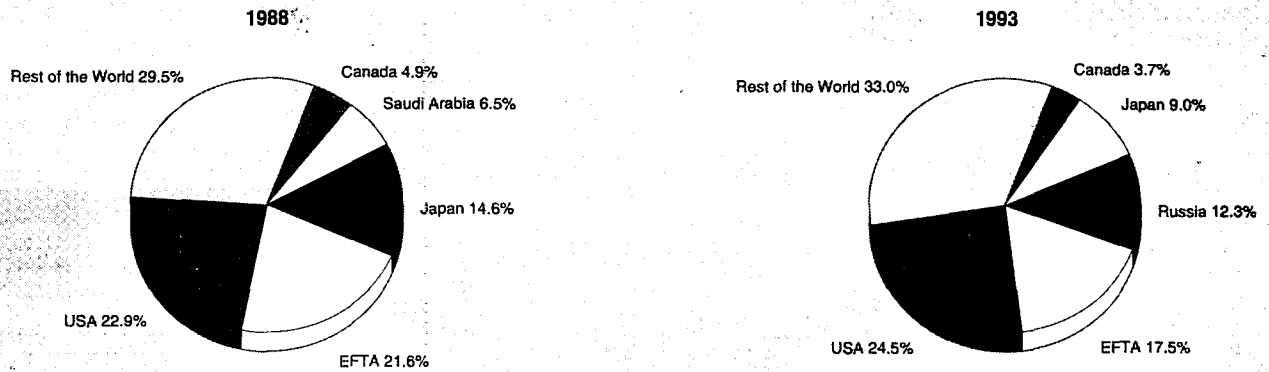
**Table 4: Miscellaneous food products**  
**External trade in current prices - Other food products (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 882	2 185	1 941	1 903	2 060	2 294	2 383	2 516	2 798	3 240	3 674
Extra-EU imports	1 627	1 398	1 123	938	990	1 078	1 118	1 194	1 234	1 396	1 470
Trade balance	255	788	818	965	1 070	1 215	1 265	1 322	1 564	1 844	2 204
Ratio exports / imports	1.16	1.56	1.73	2.03	2.08	2.13	2.13	2.11	2.27	2.32	2.50
Terms of trade index	56.6	64.3	80.1	90.3	97.5	99.2	100.0	102.8	108.5	107.5	N/A

(1) NACE 423.

Source: DEBA

**Figure 3: Miscellaneous food products  
Destination of EU exports - Pasta (1)**



(1) NACE 417.  
Source: Eurostat

which had a positive effect on employment. In fact, these increased by 21 % up to 1992, after which there was a drop.

The EU imports coffee and tea, which are then processed in Europe, mainly for EU consumption. The EU imports about 1.8 million tonnes of green coffee, which represents approximately 40 % of world production. A structural feature of the coffee sector is the wide fluctuation of market prices due to shock waves which hit supply, tied to weather conditions, which often determine steep falls in production. As regards tea, only about 45 % of the world tea production is exported by tea producing countries. The EU imports 24 % of the available products, i.e. about 270 thousand tonnes, of which 175 thousand tonnes go to the United Kingdom.

The total production of vinegar appears stable. Alongside the countries which are increasing their production levels (including The Netherlands, which has tripled its production volume), there are others where production is dropping. The biggest producer of vinegar in the EU in 1993 was Germany, followed by France, the United Kingdom and Italy.

### International comparison

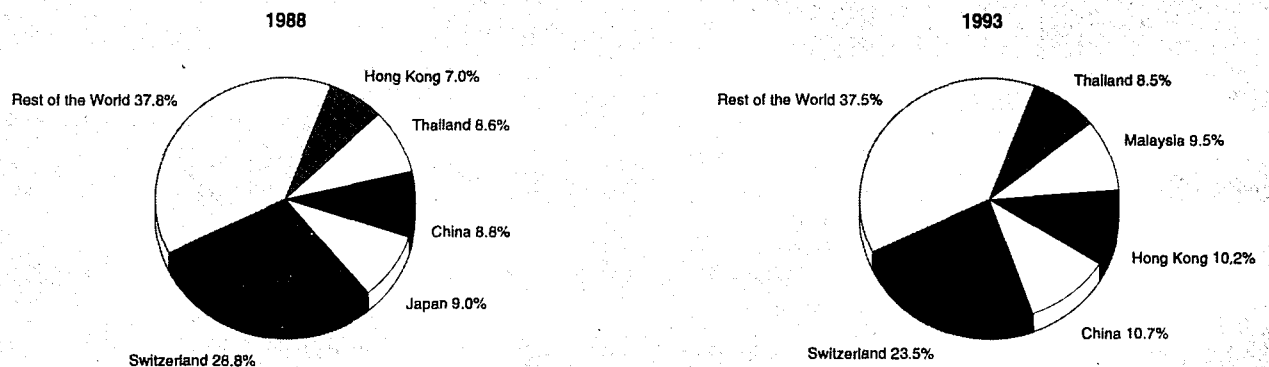
#### Pasta

The biggest producer of pasta in the world is the EU. In 1993, Italy produced about 2.5 million tonnes of pasta, mainly for export. Other important world producers are France and the USA. The South of Italy has the biggest per capita consumption at around 40 kg per year. Consumption levels in many countries outside the Community also have touched high levels. Venezuela has a per capita consumption of 12 kg followed by Switzerland and the USA with 9 kg each and 7 kg in the former Soviet Union.

#### Other products

Green coffee is produced chiefly in developing countries and is exported to the industrialised ones. The biggest world supplier is Brazil, followed by Colombia, which together grow 45 % of total world exports. Recently, African and Asian producers have gained in importance. Among these, Indonesia ranks third in world production. Yet another important growing area is Central America (e.g. Mexico and Guatemala). Since 1991, exports of ICO (International Coffee Organisation) countries have touched an annual average of 75 million 60 kg bags (equal to 45 million quintals). The most important va-

**Figure 4: Miscellaneous food products  
Origin of EU imports - Pasta (1)**



(1) NACE 417.  
Source: Eurostat

**Table 5: Miscellaneous food products  
Imports into the EU - Green coffee**

(tonnes)	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU	1 551 710	1 537 300	1 645 341	1 651 344	1 649 089	1 819 822	1 773 913	1 828 751	1 982 168
Belgique/België, Luxembourg	101 247	81 624	88 668	95 718	76 953	77 786	61 708	65 858	69 563
Danmark	46 296	46 455	50 844	50 019	55 065	50 570	51 606	55 983	53 225
BR Deutschland	423 427	452 888	487 026	492 399	500 238	580 743	609 773	622 766	740 286
Hellas (1)	20 292	12 500	21 361	22 734	22 410	23 682	8 604	3 714	6 000
España	133 396	149 092	147 198	148 966	158 110	175 326	170 387	194 730	166 290
France	275 750	281 515	297 020	303 001	304 068	312 933	322 061	321 755	317 907
Ireland (1)	530	654	756	858	924	984	1 470	1 854	1 500
Italia	281 087	251 547	263 318	259 401	270 565	307 930	267 003	267 724	325 933
Nederland	144 750	141 203	155 465	150 731	137 895	151 529	150 564	154 867	154 336
Portugal	22 051	20 831	27 420	25 190	25 681	29 730	30 740	31 563	35 378
United Kingdom	102 884	98 991	106 265	102 327	97 180	108 609	99 997	107 937	111 750

(1) 1993, estimates.  
Source: EUCA

**Table 6: Miscellaneous food products  
Imports into the EU - Tea**

(tonnes)	1986	1987	1988	1989	1990	1991	1992	1993
EU	224 974	195 250	215 779	216 346	198 371	205 823	205 298	222 521
Belgique/België, Luxembourg	1 498	1 214	1 316	1 587	1 486	1 984	1 617	1 200
Danmark	2 432	2 155	2 001	2 109	2 024	2 026	1 939	2 000
BR Deutschland	14 551	14 699	14 757	14 021	14 650	16 136	18 195	18 100
Hellas	398	370	363	407	303	690	626	550
España	719	768	747	770	747	721	514	650
France	10 036	9 148	10 155	10 090	11 056	11 852	11 750	13 336
Ireland	11 295	10 885	10 376	10 607	11 512	10 895	11 423	12 000
Italia	3 295	3 489	3 485	4 093	4 363	4 683	5 052	5 224
Nederland	9 429	9 725	9 598	9 551	10 125	10 464	9 290	8 900
Portugal	255	218	282	250	211	291	250	250
United Kingdom	171 066	142 579	162 699	162 861	141 894	146 081	144 642	160 311

Source: International Tea Committee

**Table 7: Miscellaneous food products  
Consumption by Member State - Instant coffee**

(tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	100 131	97 141	96 326	97 006	98 024	96 383	98 466	98 395	99 739	99 119
Belgique/België, Luxembourg	1 251	1 257	1 318	1 296	1 344	1 390	1 460	1 490	1 670	1 600
Danmark	570	300	408	360	380	506	479	660	500	380
BR Deutschland (1)	13 000	12 500	12 000	11 900	11 500	11 700	12 500	13 000	13 200	13 400
Hellas	4 500	3 357	3 470	3 180	3 180	4 559	5 153	5 249	5 715	6 000
España	8 500	8 500	8 700	8 900	9 430	9 400	9 600	9 690	9 580	9 300
France	16 100	16 400	16 200	16 300	17 000	16 500	17 400	17 200	18 500	17 235
Ireland	1 970	2 287	2 350	1 760	1 760	1 957	2 115	1 711	1 330	1 330
Italia	1 700	1 300	1 490	1 490	1 500	1 631	1 759	1 812	1 445	1 555
Nederland	1 400	1 440	1 590	1 530	1 530	1 510	1 450	1 353	1 324	1 419
Portugal	800	800	800	1 390	1 400	1 400	1 400	1 730	1 905	1 300
United Kingdom	50 340	49 000	48 000	48 900	49 000	45 830	45 150	44 500	44 570	45 600

(1) From 1990 on. Includes former East Germany.  
Source: AFCASOLE



**Table 8: Miscellaneous food products**  
**Per capita consumption by country - Vinegar**

(litres)	1992	1993
Belgique/België	3.2	2.3
Danmark	3.5	N/A
BR Deutschland	2.2	1.8
España	1.0	1.0
France	1.5	1.6
Ireland	0.6	0.7
Italia	1.0	1.0
Portugal	0.7	0.7
United Kingdom	1.3	N/A

Source: CPIV

ieties are Arabica, which accounts for 75 % of world production, and Robusta, with a stronger flavour and a higher caffeine content. The first is grown above all in Central America (Colombia and Brazil), but also Kenya and India; the second comes from other parts of Africa and Indonesia. Importer countries are above all Western Europe and the USA, but over the last thirty years, the demand from developing countries has increased, touching 30 % of apparent world consumption. The top world producer of tea is India with 745 thousand tonnes, followed by China, Sri Lanka and Kenya.

### Foreign trade

#### Pasta

Foreign trade in the pasta subsector was on the upswing for the entire decade under consideration. In particular, figures showed a progressively improving trade balance and a bigger growth of exports over imports, as evidenced by the exports to imports ratio which peaked in 1992 without significant changes in price levels. 1993, on the other hand, was an anomalous year, inasmuch as the value of exports dropped slightly, due to a sudden fall in prices (with a fall in the terms of trade index which hit rock bottom) and a drop in the quantity of traded goods. In fact, the economic crisis which hit the EU caused a reduction in traded quantities due to greater price discrimination by consumers. Producers responded by cutting profit margins and prices.

Among Member States, the major importers are Germany, France and the United Kingdom, attracted by pasta made in Italy, which has a reputation for good quality. It should be noted, however, that the United Kingdom, like The Netherlands, has a bigger share of imports from third countries, especially rice from Asia. Alongside Italy, Belgium and France are the countries with the highest and still growing export

figures, while Spain and Greece reveal a substantial 'closed shop' attitude. In Italy, pasta is made only from durum wheat, because of laws which prevent the production of common wheat pasta, though imports of it are allowed. In France and Belgium, pasta is chiefly made from common wheat.

#### Other products

An active balance of trade exists for other food products in this category as well. In fact, over the 1984-93 period, figures went up more than five-fold: exports followed the same pattern as imports but reached higher levels. In 1987, the export/import ratio, having exceeded the value of 2, underwent a slight slowdown. Roasted coffee imports continued to rise, despite a certain amount of stability with regard to demand. The major importers of the EU were Germany, Italy and France.

EU tea imports followed a fluctuating pattern, but generally tended to fall. From 1992 to 1993, however, there was a slight growth. Numerous countries are cutting back tea imports including Belgium, The Netherlands, Greece and the United Kingdom. The biggest share of tea imports goes to the United Kingdom (70 %), while the rest was distributed between the other countries, including Germany, France and Ireland.

## MARKET FORCES

### Demand

#### Pasta

The extensive pasta market in the EU - which is made up of pasta of all kinds - can be attributed to the fact that the market perceives this product as inexpensive, quick to prepare and nutritional. The internal demand for pasta, after a lengthy period of fairly sustained growth, not only in terms of value but also in terms of volume, began to fall in 1991 due to the fact that a saturation point had been reached in many major European markets. This was particularly true for dry pasta, while niche products like fresh pasta, filled pasta and pre-packed, ready-to-eat pasta dishes continued to increase their market share, all the while representing a segment of limited size. European consumers consider fresh Italian pasta to be of superior quality, recognise its different regional characteristics and find it appetising and practical to use, both in terms of its packaging and preparation. Other newly-emerging market niches are aromatic pastas, biological pastas and those made from low-residue flours. The latter are especially popular in Germany.

#### Other products

In nearly all of Europe, with the exception of the United Kingdom which is a traditionally tea drinking country, coffee is the most popular hot beverage, and its consumption in the EU for the most part appears stable, with a slight tendency

**Table 9: Miscellaneous food products**  
**Labour productivity, unit costs and gross operating rate - Pasta (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.1	90.3	88.8	95.4	98.8	108.4	100.0	107.4	106.2	107.3
Unit labour costs index (3)	82.9	84.1	89.0	89.1	93.7	84.9	100.0	95.3	101.9	98.6
Total unit costs index (4)	88.0	92.4	94.5	91.9	93.5	94.5	100.0	99.7	102.6	99.5
Gross operating rate (%) (5)	7.7	6.6	8.5	9.6	8.8	9.3	11.1	12.6	12.7	13.9

(1) NACE 417. Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 10: Miscellaneous food products****Labour productivity, unit costs and gross operating rate - Other food products (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	85.9	87.1	88.3	91.2	95.6	101.7	100.0	104.7	110.4	116.3
Unit labour costs index (3)	84.7	87.7	91.8	93.8	92.2	94.3	100.0	103.4	105.0	102.4
Total unit costs index (4)	101.1	105.5	107.2	99.7	99.6	102.8	100.0	102.1	104.7	104.3
Gross operating rate (%) (5)	9.5	10.7	11.4	11.4	13.5	12.9	14.0	14.9	15.6	16.4

(1) NACE 423. Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 11: Miscellaneous food products****Production by Member State - Vinegar**

(thousand hl)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België	154	171	164	168	182	206	207	212	173
Danmark	145	142	119	133	154	152	164	154	151
BR Deutschland	1 177	1 230	1 192	1 235	1 269	1 362	1 437	1 632	1 658
Hellas	N/A	N/A	N/A	80	80	N/A	N/A	N/A	N/A
España	381	398	417	405	413	417	423	436	454
France	987	930	885	1 051	1 230	1 130	1 119	1 137	1 028
Ireland	10	9	10	9	8	11	9	9	8 584
Italia	526	540	535	535	550	550	560	540	558
Nederland	84	N/A	N/A	N/A	N/A	N/A	173	193	240
Portugal	N/A	N/A	N/A	75	77	89	77	69	69
United Kingdom	636	638	663	702	635	725	678	746	784

Source: CPIV

to fall. Espresso coffee, a typical Italian drink, has gained in popularity and has found a market in other European countries.

The lack of uniformity of demand for coffee in the EU stems from the fact that drinking habits are fairly different from one country to another. In Italy, coffee is more of an after-meal drink and a quick "pick-me-up," and the quantities used to make espresso are quite small. In the countries of Northern Europe coffee is consumed in relatively large quantities both during and in between meals. Soluble coffee is consumed mostly in the UK, where it has a market share of 91 %,

compared to 26 % in France and 7 % in Germany (Source: EUCA). While the largest consumption of coffee is recorded in these countries, Italy tops the list in terms of the number of cups consumed.

In the United Kingdom, the traditional demand for tea mentioned above is showing signs of saturation and drinking patterns for this beverage have been on the downswing over recent years. The consumption of herb- or fruit-based teas, as well as cold tea, is expanding. In fact, this trend can be seen throughout Europe.

Finally, data for vinegar consumption can be added. The biggest consumers of vinegar are the Belgians, with 2 litres per person, followed by Germany and France, while all the other countries are more or less on the same level.

**Table 12: Miscellaneous food products****Number of vinegar plants - Vinegar**

(units)	1991	1992	1993
Belgique/België	10	7	7
Danmark	3	3	3
BR Deutschland	34	31	32
España	31	31	31
France	22	20	17
Ireland	1	1	1
Italia	44	41	41
Nederland	N/A	2	2
Portugal	8	8	8
United Kingdom	5	5	5

Source: CPIV

**Supply and competition****Pasta**

The labour productivity index of the pasta sector since 1989 has remained fairly stable. Figures also remained stable with regard to overall costs and labour costs, showing a substantial balance in the production process.

Both marketing and distribution reflect the growing levels of concentration affecting the sector. Products are being made more and more for global markets and sales are directed through modern distribution networks of supermarkets.

Italian durum wheat pasta has lost its top position on the EU market in terms of competitiveness due to technological innovations introduced by the producers of common wheat pasta



**Table 13: Miscellaneous food products  
Acquisitions**

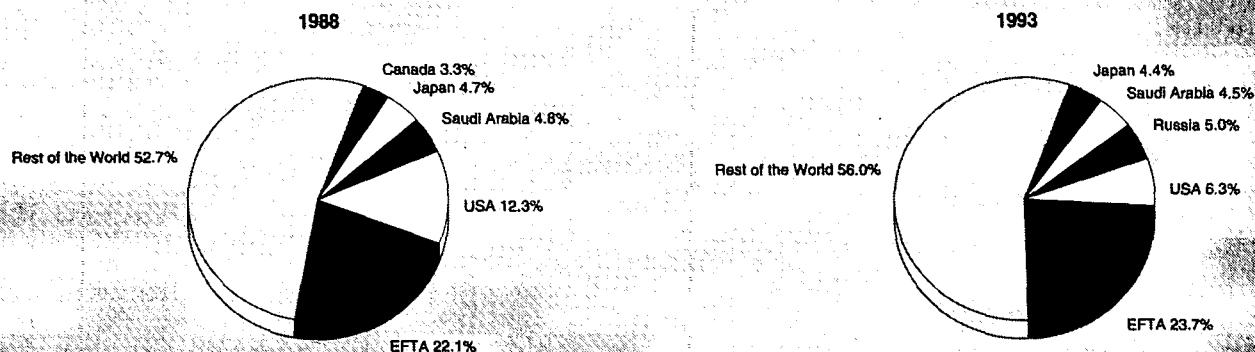
1993 Bidder	Country	Target	Target country
Sandoz	Switzerland	Gerber Products Company (Baby Food)	USA
Irish Agricultural Wholesale Society	Ireland	Shamrock Foods	Ireland
Kerry Co-Operative Creameries	Ireland	Tingles	United Kingdom
Kerry Co-Operative Creameries	Ireland	Research Foods	Canada
Lahden Polttimo	Finland	Rajamaen Hiiivatehdas	Finland
BSN	France	Vivagel	France
Ducros	France	N/A	France
Duesseldorfer Senf-Und Konservenindustrie Frenzel	BR Deutschland	Bizac	France
Koninklijke Bols Wessanen	Nederland	Fastfood International	Nederland
Espanola de Alimentos	Espana	Farmaprima	Espana
Borthwicks	United Kingdom	F&C Hong Kong (Allied-Lyons)	Hong Kong
Markbeech Products	United Kingdom	Burton Son & Sanders (Remaining Bakery Assets)	United Kingdom
Tate & Lyle	United Kingdom	Orsan (Food Additives)	France
Unilever	United Kingdom / Nederland	Burton Son & Sanders	United Kingdom
Windsor Tea & Coffee Co.	United Kingdom	Phoenix Foods Ltd	United Kingdom
McCormick & Co	USA	DCA Food Industries	USA
Philip Morris	USA	Nabob Foods	Canada
Consortium	Mexico	Maiz Industrializado Conasupo	Mexico
Burns Philp	Australia	Hunter Saphir (Herbs & Spice Businesses)	United Kingdom
<b>1994 Bidder</b>	<b>Country</b>	<b>Target</b>	<b>Target country</b>
Famcoo	Belgique/België	Vamos Holding (Speciality Food)	Belgique/België
Sandoz	Switzerland	Gazzoni	Italia
Taffel Foods (Danisco)	Danmark	Dansk Carna Consum (Mustards, Ketchups & Sauces)	Danmark
IAWS Ltd	Ireland	Unifood Ltd (Baking Ingredients)	Ireland
Paulig	Finland	Lyons Tetley (Real Coffee Business)	United Kingdom
BSN	France	Euralim (Prepared Food)	France
Distriborg	France	Groupe Gourmet Forme (Health Food Products)	France
Albert Fisher Group	United Kingdom	Campbell Chilled Foods (Chilled Sandwiches & Salads)	United Kingdom
Grand Metropolitan PLC	United Kingdom	n/a (Baking Mixes)	USA
IMC Industries	United Kingdom	Red Mill Snack Foods (Maize & Potato-Based Snacks)	United Kingdom
Abbott Laboratories	USA	Puleva (Baby Food Division)	Espana
Heinz Company	USA	Farley Health Products (Baby Food)	Espana
Heinz Company	USA	N/A (Baby Food)	Espana
Philip Morris	USA	N/A	United Kingdom
Goodman Fielder Wattie	Australia	N/A	Mexico
Burns Philp	Australia	Deutsche Hefewerke (Yeast)	BR Deutschland
Burns Philp (1)	Australia	Indiañ Yeast Company (Yeast)	India
Burns Philp	Australia	St Petersburg Yeast Factory (Yeast)	Russia
Ajinomoto CO (1)	Japan	Eurolysine	France

(1) Diversified company.  
Source: Nomisma

in Northern Europe. This latter variety is now quite similar to durum wheat pasta in terms of its physical and organoleptic characteristics, although it is less expensive.

Furthermore, European pasta has had difficulty penetrating the US market following the USA/EEC agreement of 1987, which is effective until July 1995. Under this agreement, exports to the USA which exceed a threshold of 50 % are subject

**Figure 5: Miscellaneous food products**  
**Destination of EU exports - Other food products (1)**



(1) NACE 423.  
 Source: Eurostat

to repayment cuts. This decision penalises medium-size European producers with less well-known brand names the most.

**Other products**

The labour productivity index shows a strong growth trend, in line with the particularly successful performance of the sector. Unit costs of production are moving in the opposite direction, starting with high values which stabilise more or less on the level of the base year. The cost of labour, meanwhile, shows a linear growth trend for the entire period under consideration.

**Production process**

**Pasta**

Generally speaking, production processes are directed towards the exploitation of scale economies which focus on greater cost efficiency. The common wheat pasta manufacturers employ technologies based on high temperatures which gelatinise the product, thereby making it withstand cooking better. Such technologies are employed less frequently by manufacturers of durum wheat pasta which, thanks to a high gluten content, does not require this type of treatment.

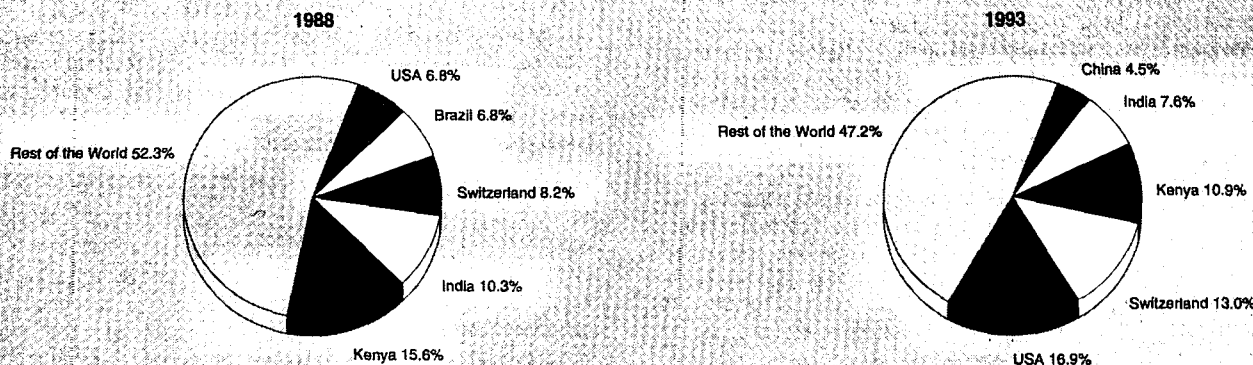
With regard to production costs of pasta, it is the production process which bears down the heaviest. For rice on the other hand, the production process is fairly simple and it is the raw materials themselves which have the biggest impact on cost.

**Other products**

The processing of coffee (roasting, de-caffeination, solubilisation) is a complex process and involves numerous controls during production. Controls on the physical characteristics of the raw materials are fairly important as they lead to the manufacture of blends of different varieties to achieve quality, flavour and consistent aroma over time. To obtain soluble coffee powder and caffeine-free coffee, various technologies exist.

Tea processing includes flavouring, blending and packing. Tea is also extracted to prepare instant tea powders which are sold as such or used for ready-to-drink teas, which can also be made from tea leaves by infusion, this infusion then being canned, bottled and tetra-packed.

**Figure 6: Miscellaneous food products**  
**Origin of EU imports - Other food products (1)**



(1) NACE 423.  
 Source: Eurostat



**Table 14: Miscellaneous food products  
Production specialisation - Pasta (1)**

(ratio)	1984	1993
Belgique/België	N/A	1.12
Danmark	N/A	N/A
BR Deutschland	0.23	0.33
Hellas	2.02	3.49
España	0.33	0.35
France	0.68	1.13
Ireland	N/A	N/A
Italia	3.77	3.42
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	1.35	N/A
United Kingdom	N/A	N/A

(1) NACE 417. Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

**Table 15: Miscellaneous food products  
Production specialisation - Other food products (1)**

(ratio)	1984	1993
Belgique/België	0.87	0.66
Danmark	N/A	N/A
BR Deutschland	1.00	1.04
Hellas	0.59	1.13
España	1.09	1.16
France	0.58	0.91
Ireland	N/A	N/A
Italia	0.65	0.66
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.74	N/A
United Kingdom	N/A	N/A

(1) NACE 423. Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## INDUSTRY STRUCTURE

### Companies

The greatest production specialisation is achieved in Greece and Spain, followed by Germany, Italy and France. Greece has the highest degree of production specialisation for both pasta and other products. Italy has a high degree of specialisation for pasta, but not so much for other products, while the other countries have a reasonably high degree of specialisation for both pasta and other products.

### Pasta

The industrial structure of the sector in the EU has, over the last few years, undergone a process of greater rationalisation which has led to the closure of numerous facilities in France, Germany and Italy, where there are now 10, 25 and 170 production facilities respectively. The average production per facility in 1991 was 288 thousand tonnes in France, 13 thousand tonnes in Italy, 10 thousand tonnes in Germany and about 7 thousand tonnes in Spain.

The principal companies in the sector are: Danone (F), the multinational leader on the French market with the Panzani brand which recently acquired the second most important Italian pasta brand; Agnesi (I); Ranks Hovis McDougall, (UK multinational), Nestlé (CH) and Barilla (I), with numerous facilities spread across France, Spain, Greece, as well as Japan and Eastern Europe (Poland).

### Other products

In many countries, a restructuring process of the coffee industry is under way by means of a decisive push towards concentration which leads to the creation of a handful of market leader brands. Among Europe's leading coffee brands are Jacob, belonging to the Suchard group, and Nescafé, belonging to the Nestlé group. In the tea sector, the Anglo-Dutch multinational Unilever has recently gone into the ready-to-drink tea business as a competitor of Nestlé.

The number of vinegar manufacturing facilities is tending to drop, especially in Germany and France. The largest facilities are in The Netherlands and the United Kingdom, with production capacities equal to 120 thousand hl and 156 thousand hl respectively.

### Strategies

#### Pasta

The process of internationalisation currently affecting the sector involves not only the EU but also Eastern Europe, Japan

and the USA and is promoted by the major companies, most of which have become big multinationals. As a reaction to the drop in consumption, pasta producers (above all in France and Italy), have begun manufacturing under distributor brands and focusing on the quality of the production process. Many companies require ISO 9002 certification or PGI (Protected Geographic Indication), recognised by the EU.

### Other products

In 1993, 19 acquisitions were concluded primarily in France and the United Kingdom, revealing the strategic aim of consolidating leadership at the national level and strengthening the concentration process.

In the coffee industry, apart from the major multinational companies, a small number of other relatively large companies exist alongside smaller enterprises. The degree of concentration varies with respect to the different segments: the soluble coffee segment is very concentrated while the espresso coffee segment is more fragmented. The major groups tend towards a wide diversification and large investments in advertising in order to create a strong market image. The smaller companies, on the other hand, are more intent on keeping down production costs. Furthermore, the coffee industry is distinguished by its careful attention to quality aspects during the production process, which has caused some enterprises in the sector to request ISO guarantee certificates. Due to a certain stability of domestic consumption, the enterprises in this sector are intensifying their internationalisation policies through acquisitions and trade agreements.

Meanwhile, the tea industry, in order to liven up the market, is tending towards greater product differentiation. Efforts are also being directed towards the creation of products to compete with soft drinks where there has been an important upswing in consumption. In particular, traditional tea manufacturers have entered into joint ventures or even acquired mineral water companies to manufacture ready-made cold tea.

### Impact of the Single Market

The creation of the single market had an overall positive impact for most products of the miscellaneous industry. Low effects were instead recorded for coffee as blendings significantly differ from country to country because of customers' different tastes. For the other products, the free movement of good, favouring international trade, generated the most relevant impact.

The remaining internal barriers are related to the lack of legislation on products definition. This represents a priority for the industry.



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## OUTLOOK

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### Pasta

Consumption is continuing to slow down, especially that of dry pasta where there is a saturation of demand. The production of fresh and frozen pasta has focused more and more on product innovation, and this should be the prime mover of the sector. The tendency towards greater concentration should play an active role and will lead to the creation of national brands through large investments in advertising.

### Other products

The coffee market is stable and only minor growth is expected, with the market for espresso coffee and speciality coffees growing. The tendency in the future will be towards greater internationalisation and concentration in the industry.

The tea market will continue to decline throughout Europe, although there will be greater product differentiation with the supply of flavoured teas, caffeine-free teas and ready-to-drink teas. The latter will increase their penetration on the soft-drinks market.

Written by: NOMISMA

The industry is represented at the EU level by: European Federation of Coffee Roasters Associations (EUCA). Address: Boulevard Baudouin 21, 7<sup>th</sup> Floor, B-1210 Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244; Association of Soluble Coffee Manufacturers of the EEC (AFCASOLE), and European Tea Committee (CEdT/ETC). Address: 51-53 rue Fondary, F-75015 Paris; tel: (33 1) 45 79 80 75; fax: (33 1) 45 79 61 29; and Standing International Vinegar Committee (CPIV), and Federation of Soup Industry Associations of the EEC (FAIBP). Address: Reuterstrasse 151, D-5300 Bonn; tel: (49 228) 21 20 17; fax: (49 228) 22 94 60.

# Alcohol and spirits

## NACE 424

The sector is distinguished by a general drop in consumption, even though some domestic markets, particularly Germany and Spain, are expanding. Exports are growing, above all towards the Asian and East European countries, while the EU imports mainly from the USA and the Caribbean.

The two divisions making up the sector, spirits and ethyl alcohol, have diverse characteristics. The industrial structure of the spirits subsector is highly concentrated, with large multinational groups operating on the world market and competing through differentiation strategies, product innovation and investments and acquisitions to extend brand portfolios and distribution networks. Ethyl alcohol, on the other hand, is more of a commodity, with medium-sized enterprises and diversified market outlets such as the food, pharmaceutical, cosmetic and chemical industries.

### INDUSTRY PROFILE

#### Description of the sector

The sector comprises two categories of products: spirit drinks and ethyl alcohol. The spirit drinks industry receives its raw materials directly from the agricultural sector and uses them to manufacture the major types of alcoholic drinks: whisky, rum, vodka, gin, brandy, cognac and other drinks that are not wine-based, i.e. punch and cocktails, liqueurs, bitters and grappa (a typical Italian product) and pastis/anisette (French spirits). The main producers of spirit drinks are the United Kingdom, France and Germany.

Ethyl alcohol is made from the processing of various agricultural products such as beets, wine and fruit or other vegetable products (cereals, potatoes, etc.). It is not only used in the food industry (neutral alcohol), but also in the pharmaceutical and cosmetic industries, as well as for the production of solvents (raw alcohol). In some countries outside Europe (e.g. Brazil and other South American countries), the ethyl alcohol made from cane sugar is, to a great extent, used as fuel for motor vehicles. In the USA too, ethyl alcohol is used as a fuel to a much greater extent than in Europe, where this application is still at a much more experimental stage. Now developments are made possible under the set-aside policy of the EU

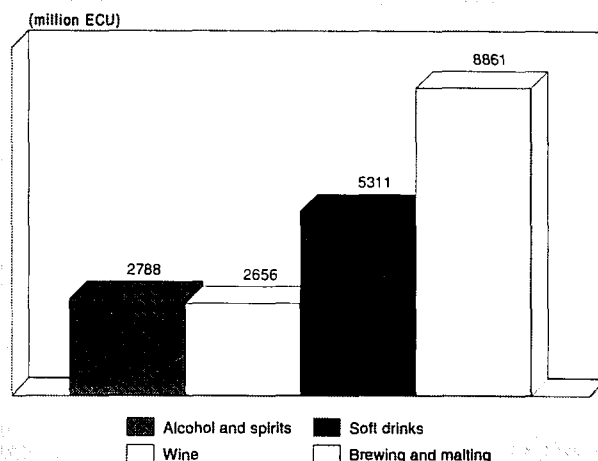
#### Recent trends

The main indicators are distinguished by considerable fluctuations. After a period of overall stability, there was a significant growth in both production and apparent consumption at current prices, as well as in the foreign trade indicators (extra-EU exports and trade balance) from 1989 to 1991. Subsequently, this trend inverted, however, and apparent consumption and production began to decline with -7 % and -3.4 % respectively (1993 compared to 1992). At the same time, the foreign trade indicators continued to rise with an increase in extra-EU exports of over 9 %.

With regard to employment, we find a steeply falling trend which does not look likely to stop in the near future. Figures dropped from 62 thousand in 1984 to 43 thousand in 1993. There are many reasons for this fall, such as a drop in outputs, technological improvements in areas such as bottling, and the numerous mergers and acquisitions which have taken place in the sector and which have brought about a more rational organisation of work forces not directly involved in production.

In terms of value added, compared to related industries, the spirits sector is more or less on the same level as the wine

Figure 1: Alcohol and spirits  
Value added in comparison with related industries, 1993



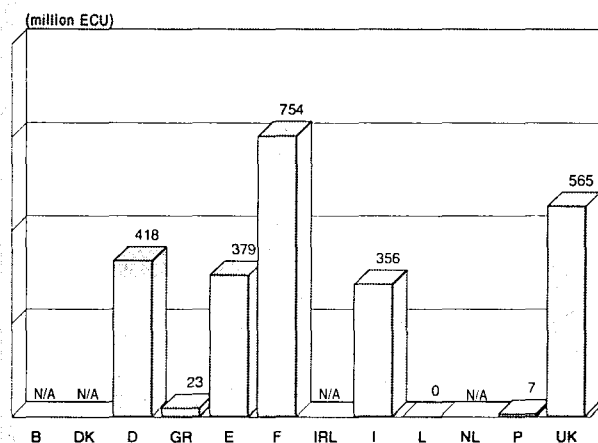
Source: DEBA

sector and below that of soft drinks and beer. The country which contributes most to the aggregate value added of the EU is France, followed by the United Kingdom, Germany, Spain and Italy.

At constant prices, apparent consumption and production show rather significant fluctuations. Apparent consumption appears to be dropping, and this trend was accentuated in 1992/93 (-8.7 %). Internal production slowed down at a more gradual pace, with a drop of over 4 % in 1992/93.

Demand, however, varies among the different European countries. Considering only the principal markets in the 1989/93 period, there was a steep drop in the United Kingdom and Italy (20 % and 11 % by volume respectively), while in Spain demand increased by 27 % and in France by 6 %. For this period, it is impossible to make a comparison with Germany, where the market expanded considerably after unification, and now represents one-third of EU consumption (by volume). The EU country with the highest per capita consumption in

Figure 2: Alcohol and spirits  
Value added by Member State, 1993



Source: DEBA



**Table 1: Alcohol and spirits**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	8 855	9 112	9 047	10 046	11 087	10 748	9 975	10 005	9 900	9 900	9 900
Production	10 912	11 421	11 749	12 939	14 074	13 964	13 487	13 839	14 000	14 300	14 500
Extra-EU exports	2 216	2 505	2 958	3 219	3 327	3 579	3 914	4 230	4 500	4 800	5 200
Trade balance	2 057	2 309	2 702	2 893	2 987	3 216	3 512	3 834	4 100	4 400	4 600
Employment (thousands)	62.3	49.5	48.2	47.7	46.6	44.7	42.9	41.4	40.0	38.0	37.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Alcohol and spirits**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	-2.44	-0.80	-1.71	-8.70
Production	-1.09	-0.29	-0.74	-4.25
Extra-EU exports	4.25	1.67	3.10	10.33
Extra-EU imports	6.16	5.62	5.92	-1.19

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Alcohol and spirits**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 216	2 395	2 160	2 235	2 505	2 958	3 219	3 327	3 579	3 914	4 230
Extra-EU imports	159	168	176	199	196	256	326	340	363	402	396
Trade balance	2 057	2 227	1 984	2 037	2 309	2 702	2 893	2 987	3 216	3 512	3 834
Ratio exports / imports	14.0	14.3	12.3	11.3	12.8	11.5	9.9	9.8	9.9	9.7	10.69
Terms of trade index	105.9	111.6	106.8	105.0	99.1	95.8	100.0	101.7	106.5	94.1	N/A

Source: DEBA

**Table 4: Alcohol and spirits**  
**Exports of cognac, 1993**

(million ECU)	
Total	1 140
Hong Kong	269
Japan	264
USA	162
Taiwan	117
EFTA	51
Singapore	49
Malaysia	40
Mexico	27
Thailand	21
Russia	13

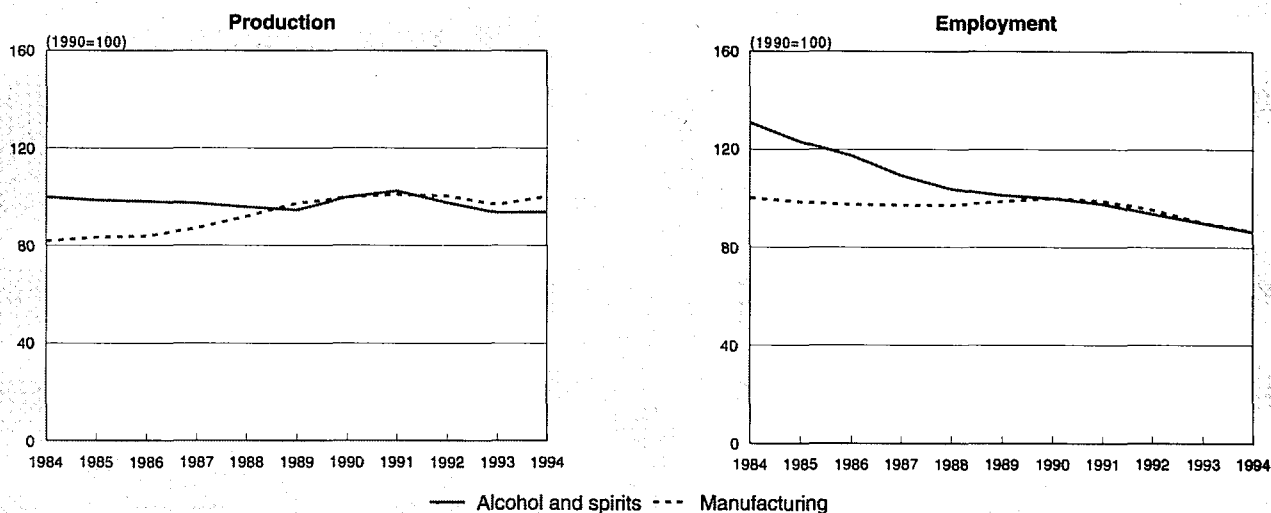
Source: Eurostat

1993 was Greece, followed by Spain and Germany (Source: Consumer Europe).

Although the internal market is not particularly lively, demand from abroad absorbs all surplus production and showed a growth of over 10 % in 1992/93. As evidence of the surplus phase recently experienced by the sector, and as an expression of the typically European production specialisation, the imports from third countries have, over the last year, gone down by 1 % compared to the mean growth rate of nearly 6 % during the 1984/93 period.

Up to 1987, production in the spirits industry underwent a counter-trend compared to the manufacturing industry as a whole: while the latter expanded, the former contracted. Starting in 1989, however, the alcohol and spirits industry began to show a pattern very similar to that of the manufacturing industry as a whole. From 1984 to 1989, the sector also showed a different trend than the manufacturing industry in terms of employment figures. Again, both underwent a substantially negative trend thereafter.

**Figure 3: Alcohol and spirits**  
**Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

**International comparison**

The biggest and undisputed world producer of alcohol and spirits (at current prices) is the EU. This was true for both 1984 and 1993. In 1993, Japan's production was roughly half that of the EU, while the USA accounted for a very small share, with a production one-fifth of that of the EU.

A comparison of production at constant prices between the EU, USA and Japan shows Japan as having the steepest drop in production. In the five years between 1989-93, the average annual growth rate was -5 % against a rate of 1.8 % in the USA and 0.3 % in the EU.

**Foreign trade**

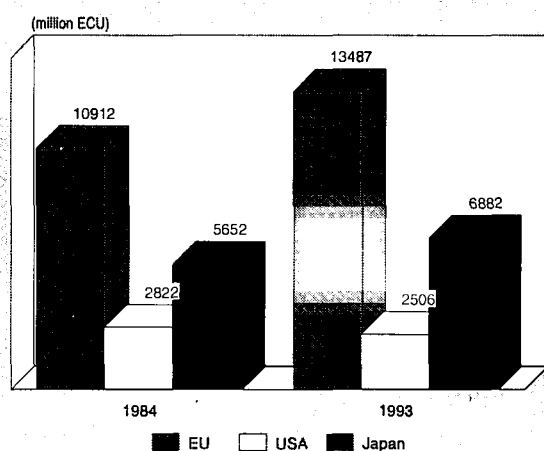
The balance of trade figures remained positive for the entire decade under consideration, and in 1993, the EU played the role of world leader in terms of production and exports. In 1993, exports represented 29 % of total production, while imports accounted for only 4 %.

EU exports go chiefly to the USA and Japan. While exports to Asia - in particular to Japan and Hong Kong - went up compared to 1988, those to the USA dropped steeply, going from one-third to about one-fifth of the total. Of growing importance are the East European markets, in particular Russia.

As far as exports of the different types of drinks are concerned, whisky provides the largest volume (from the UK and Ireland) followed by Cognac (from France). More than half of the total imports to the EU come from North and Central America.

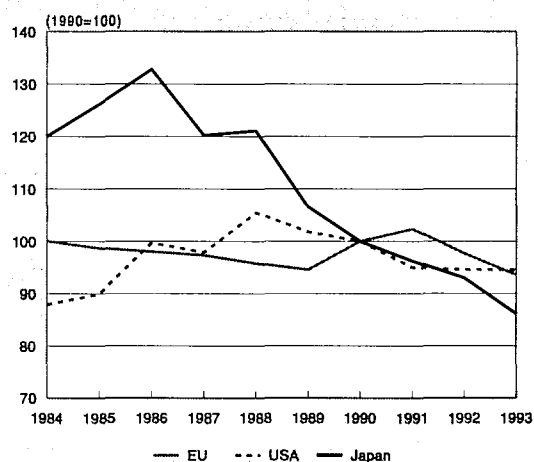
Imports to the EU tend to concentrate around North and Central America, areas which supply over half the total. As far as the USA is concerned, the situation represents a mirror image of that of exports; imports from the USA have gone up by about 11 % compared to 1988.

**Figure 4: Alcohol and spirits**  
**International comparison of production in current prices**



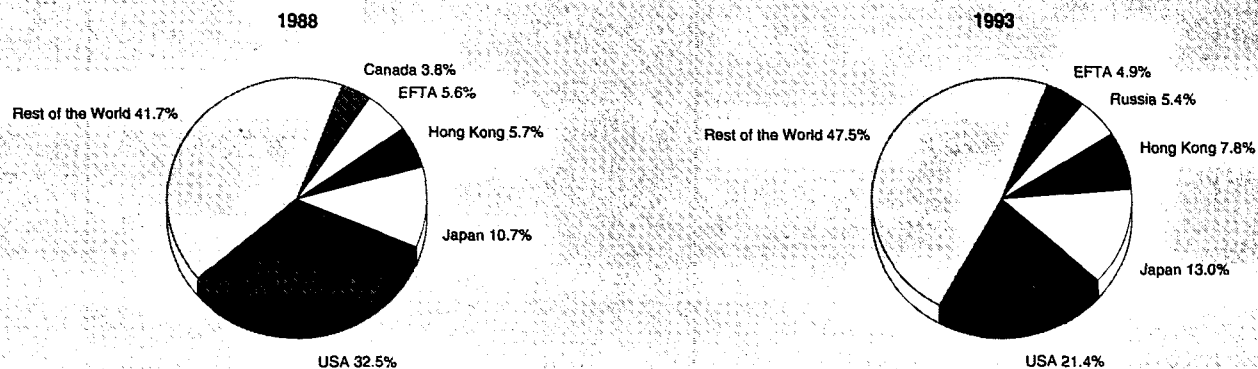
Source: DEBA

**Figure 5: Alcohol and spirits**  
**International comparison of production in constant prices**



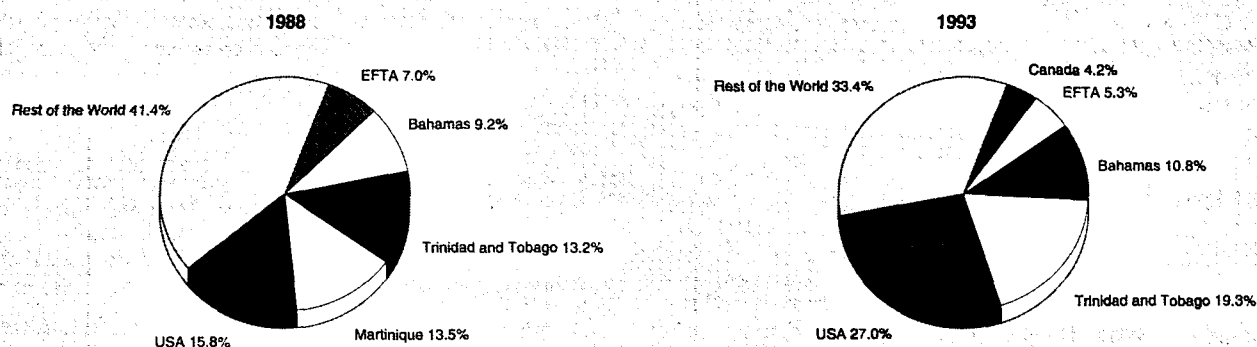
Source: DEBA

**Figure 6: Alcohol and spirits  
Destination of EU exports**



Source: Eurostat

**Figure 7: Alcohol and spirits  
Origin of EU imports**



Source: Eurostat

**Table 5: Alcohol and spirits  
Exports of whisky, 1993**

(million ECU)

Total	7 389
Japan	2 629
USA	1 305
EFTA	1 045
Canada	240
Poland	225
Czech Republic	210
Turkey	113
Russia	111
Canary Islands	100
Thailand	97

Source: Eurostat

## MARKET FORCES

### Demand

The demand for spirit drinks is affected by the variety of lifestyles and national drinking habits within the EU. In fact, the healthier lifestyles, numerous anti-alcohol campaigns and high product taxation in the Member States have all contributed to the drop in demand. Two good examples of the latter are Spain and the United Kingdom. In Spain, demand has jumped considerably since the country joined the EU and removed its trade and tariff restrictions, while in the United Kingdom a steep drop in consumption can be attributed to high taxation and restrictive policies towards businesses selling alcoholic beverages.

### Supply and competition

As seen above, the EU is the major world producer of spirit drinks, with Japan and the USA falling behind. With regard to ethyl alcohol on the other hand, the EU takes a back seat to the large quantities manufactured by South and Central America. Furthermore, it must be emphasised that US customs

**Table 6: Alcohol and spirits**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	76.4	80.3	83.4	89.0	92.2	93.6	100.0	104.6	104.2	104.0
Unit labour costs index (3)	90.1	92.7	93.8	91.9	94.7	101.5	100.0	104.6	110.7	111.6
Total unit costs index (4)	78.2	81.1	76.9	79.0	85.4	96.2	100.0	110.0	114.4	116.1
Gross operating rate (%) (5)	15.9	17.5	16.9	17.2	17.1	14.1	14.2	12.4	10.8	9.9

(1) Some country data have been estimated.  
 (2) Based on index of production / index of employment.  
 (3) Based on index of labour costs / index of production.  
 (4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.  
 (5) Based on (value added - labour costs) / turnover.  
 Source: DEBA, Eurostat

duties make European products uncompetitive. The USA has a preferential trading agreement with the countries of the Caribbean and Central America for the processing of alcohol to be used as fuel. The Caribbean also receives most of the EU production of ethyl alcohol which is supported by intervention organisations.

Labour productivity in the alcohol and spirits industry was stable from 1991 to 1993, while the unitary cost of labour and production went up. The drop in the gross operating rate is can be attributed in part to the waning development of innovative production techniques, compared to the levels reached in the years prior to 1989.

**Production process**

The production of spirit drinks is based on the fermentation and distillation of agricultural products. For some products (such as whisky, brandy and cognac) this is followed by an ageing process ("maturation").

If it is possible to speak of innovation in a sector where techniques tend to be consolidated, it is primarily in the context of building plants with greater production capacities. As far as distilleries manufacturing ethyl alcohol are concerned, improvements in the production process are sought above all to reduce the cost of cleaning up effluents - in order to comply with the regulations for safeguarding the environment.

**INDUSTRY STRUCTURE**

**Companies**

The spirits industry is split into a number of large groups operating on the international market and small firms with niche positions (e.g. grappa manufacturers in Italy). The main European groups are: Grand Metropolitan (UK) which, with 10 of the 100 leading spirit drink brands, is the fourth largest European group in the food industry; Allied Domecq, producer of fortified wine, whisky and spirits, which has a large share of the second biggest world market for whisky consumption (i.e. Japan, where the group has established a joint venture with Suntory); Guinness (UK), the major British company for whisky and gin (and the seventh group in the European food industry); Pernod Richard (F) has the leading position in the very large pastis market and is also an important manufacturer of whisky (and soft drinks), with a large share of the continental European market: it owns the number one spirit drinks distribution network; Remy-Cointreau (F), producer of cognac, champagne, liqueurs and spirits, one of the major groups at the world level, with a presence in 200 countries; and Martini & Rossi (I), specialised in the production of vermouth and spumante wine.

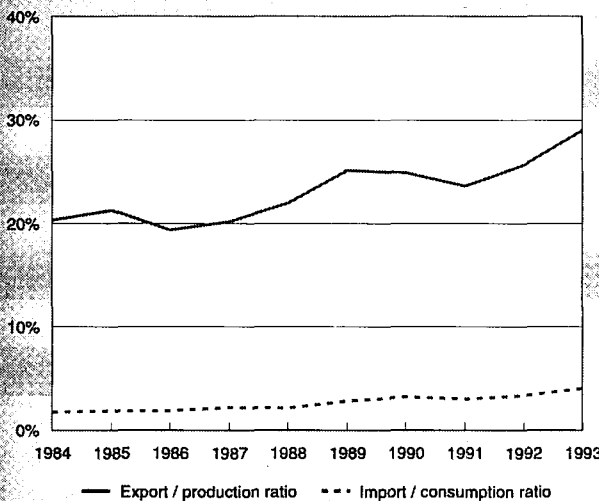
The ethyl alcohol sector comprises numerous medium-sized firms, prevalently active on their own domestic markets. An example is Germany, a country with a high number of small distilleries manufacturing only raw alcohol, since the distilling and marketing of neutral alcohol remains a state monopoly. In addition, it must be remembered that in the ethyl alcohol sector, sugar manufacturers also have a strong presence. For example, Ferruzzi is the number one operator in Italy and the second in France (figures refer to the end of 1992).

The EU leader in terms of production specialisation is France, which has strengthened its position considerably since 1984. This is due to the fact that one of the most important products in the sector, cognac, is manufactured in the country, where the necessary high-quality grapes are grown. The United Kingdom is the second country, above all thanks to its production of whisky. The UK had the lead position in 1984, but has considerably decreased its specialisation since then, along with Italy and Portugal. All the other countries intensified their specialisation between 1984 and 1993.

**Strategies**

Key factors affecting the success of the spirit drink companies on the world market are: the provision of a wide range of branded products to meet an extremely fragmentary demand in terms of consumer preferences; and the ability to penetrate high-potential markets, e.g. by introducing traditional spirits from other countries through the establishment of marketing agreements with local manufacturers (a strategy widely pursued on the Asian market).

**Figure 8: Alcohol and spirits**  
**Trade Intensities**



Source: DEBA



**Table 7: Alcohol and spirits  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	N/A	N/A
BR Deutschland	0.66	0.72
Hellas	0.92	1.02
España	1.00	1.17
France	0.99	1.37
Ireland	N/A	N/A
Italia	0.97	0.92
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	0.26	0.16
United Kingdom	1.73	1.32

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

Ethyl alcohol, on the other hand, is more of a commodity. Consequently, the main strategy is to acquire cost advantages so as to remain competitive in terms of price.

There were seven main acquisitions in the sector in 1993 and seven again in 1994. The most active groups in terms of acquisitions are in the UK, especially Grand Metropolitan and Allied-Lyons. A particularly significant acquisition was that of Pedro Domecq (the eighth world group for spirit drinks in 1992) by Allied Domecq. As a result, Allied-Lyons will become the world leader in brandy and number two in tequila, and will own 13 of the top 100 spirit brands in the world.

### Impact of the Single Market

The implementation of the Single Market had a globally positive impact on the spirit sector. In fact the harmonisation of labelling, packaging and distribution legislation increased trade intensity, and in general competition inside the market has risen.

The remaining internal barriers are linked to different advertising legislation across Member States, to different taxation regimes, to the lack of common technical standards and to different levels of excise taxes. The next priorities for the external market are the negotiation of extra EU export condition as the definition of more restricted technical standard and the reduction of export duties. On the domestic front the harmonisation of advertising towards a more relaxed legislation and the harmonisation of excise levels are priorities for the industry.

The effect of the implementation of the Single Market on the alcohol industry has been positive but small. Trade intensity in this market segment is relatively low, and the market has already been deeply influenced by wine CMO. The breakdown of barriers to extra-EU trade is a priority for the industry.

### REGULATIONS

Community regulation policies in the sector go in two directions: on the one hand, they aim at promoting free trade; on the other, they promote good health by restricting the consumption of alcohol.

Article 37 of the Maastricht Treaty provides for the suppression of exclusive rights relating to the import, export and wholesale marketing of alcoholic products. Furthermore, the European Court of Justice has ruled on several occasions that the presence of monopolies in the trade of alcoholic products undermines the spirit of the Maastricht Treaty.

The promotion of health is implemented by two instruments: harmonisation policies - directed towards creating minimum European standards in taxation, advertising and alcohol abuse suppression; and monitoring policies, including health-related educational seminars and campaigns.

With regard to advertising, safety and sales, the legislation of the Member States is still somewhat diversified. Nonetheless, two legislative tendencies can be seen: strong regulation in Northern Europe and weaker or virtually no regulation in Southern Europe. With regard to commercial communication instruments, the strictest limits are imposed on radio and television (although television advertising continues to show an

**Table 8: Alcohol and spirits  
Acquisitions**

1993 Bidder	Country	Target	Target country
Martiniquaise	France	Bardinet	France
Allied-Lyons	United Kingdom	Tullamore Dew Brand (Pernod-Ricard)	United Kingdom
Burn Steward Distillers	United Kingdom	Ledaig Malt Distillery	United Kingdom
Grand Metropolitan	United Kingdom	Cockspur Rum Trademark	Barbados
Grand Metropolitan	United Kingdom	North British Distillery Company	United Kingdom
American Brands	USA	Invergordon Distillers Group	United Kingdom
Heaven Hill Distilleries	USA	United Distillers (70 US Spirit Brands)	USA
1994 Bidder	Country	Target	Target country
Danish Distillers	Danmark	Ninheset Norden	Danmark
Pernod-Ricard	France	Altai	Russia
Koninklijke Bols Wessanen	Nederland	Bols Benelux	Nederland
Koninklijke Bols Wessanen (1)	Nederland	Davide Campari Milan	Italia
Allied-Lyons	United Kingdom	Pedro Domecq	España
Guinness	United Kingdom	Whyte & Mackay Group	United Kingdom
Seagram (1)	Canada	Larios	España

(1) Diversified company.  
Source: Nomisma



erratic pattern), while there are more lenient limits for the printed press. Self-regulation codes are converging towards common standards in the EU countries.

Community regulations require the setting of rates at an above-average level, to make alcoholic drinks more expensive. For example, Directive 92/77 provides for a minimum VAT rate of 15 %. The matter of excises involves two aspects: harmonisation of duties on alcohol and alcoholic drinks, and the convergence of these charges. Directive 92/93 provides for an excise on beer, wine and other alcoholic drinks, on intermediate products and also on ethyl alcohol. Moreover, this directive determines the different application modalities of the manufacturers taxation fee referring to the definition contained in the Common Customs Tariff and to the proportion of determined substances relating to the total volume. In addition, reduced rates are provided for some products with a low alcohol content. Directive 92/84 provides for the harmonisation of the production charges for wine, beer and other alcoholic products.

Basic provisions for spirit drinks, and the definitions of the different categories of spirit drinks are laid down in Regulations 1576/89 and 1014/90, respectively. These have been amended several times, most recently by Regulation 3458/92, which was implemented on January 1, 1993).

Finally, it should be remembered that ethyl alcohol is regulated by the provisions of the Common Market Organisation of the wine industry, specifically by the regime of support distillation and obligatory distillation. In these cases, if the distillers have recognised the minimum price for wine producers, they are granted aid for storing the alcohol produced or, in the case of obligatory distillation, they are offered the opportunity to deliver production to the intervention organisations.

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## OUTLOOK

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In the alcohol and spirits sector, a slight downswing in apparent consumption is forecast over the next few years, though patterns could differ on the various domestic markets. Conversely, given the opening up of previously closed markets, exports are expected to rise. These are already sustained today by the lead role of the EU on the world market.

Furthermore, these groups are pursuing a strategy of growth onto rapidly expanding markets, especially those of the more economically advanced Asian countries and the East European countries. The aim is to increase market penetration through marketing agreements with local companies.

On the internal market, growth through acquisitions is aimed at enlarging product portfolios and strengthening distribution networks. This trend also leads to a more rational organisation of company structures which, together with a fall in outputs, contributes to the ongoing fall in employment figures in the sector.

While product diversification and the ability to develop new marketing strategies are feasible possibilities for the spirit drink companies as a means of contrasting those factors which negatively affect demand (i.e. high taxation, campaigns to restrict consumption, healthy lifestyles), the firms manufacturing ethyl alcohol are obliged to pursue strategies aimed at keeping down costs, in order to remain competitive in terms of price.

Written by: **NOMISMA**

The industry is represented at the EU level by: **Confédération Européenne des Producteurs de Spiritueux (CEPS)**. Address: Avenue de Tervuren 192, Bte 3, B-1150 Brussels; tel: (32 2) 779 2423; fax: (32 2) 772 9820;  
**Union Européenne des Producteurs d'Alcool (UEPA)**. Address: Avenue de Tervuren 192, Bte 3, B-1150 Brussels; tel: (32 2) 772 9830; fax: (32 2) 772 9824.



# Wine

## NACE 425

The overall per capita consumption of wine has tended to drop over the years within the EU. On the other hand, there is a growing uniformity of eating habits in the north and south of the EU which has led to a greater demand for wine in the traditionally non-wine drinking countries like Belgium and Denmark. The penetration of imports is increasing and eating into market shares in the United Kingdom and the Netherlands.

### INDUSTRY PROFILE

#### Description of the sector

The sector includes the production of wine and other alcoholic drinks made from grapes, the manufacturing of cider and alcoholic beverages made from other fermented fruits.

The biggest producers of wine-based drinks in the EU are Italy (in terms of volume, though the average quality is not high), France, Spain and Germany. Since 1984, there has been an overall drop in production of wine following Community initiatives to minimise production surpluses. Currently, such production surplus goes for distillation, which to a large extent is paid for by the EU. The biggest percentage of wine for distillation comes from Italy with a 24 % share. The countries with the biggest per capita consumption are France, Italy, Spain, Portugal and Greece.

#### Recent trends

The production and consumption of wine at current prices dropped between 1992 and 1993. Such a pattern seems to have followed trends in the market. In recent years, there has been an increase in prices compared to the steep production drop in physical terms, in part related to economic inflation and to a greater extent tied to a swing in demand towards high-value products.

The trade balance in the sector shows a tendency to worsen throughout the period under consideration, with a substantial improvement between 1992 and 1993 thanks to a drop in average unitary production prices.

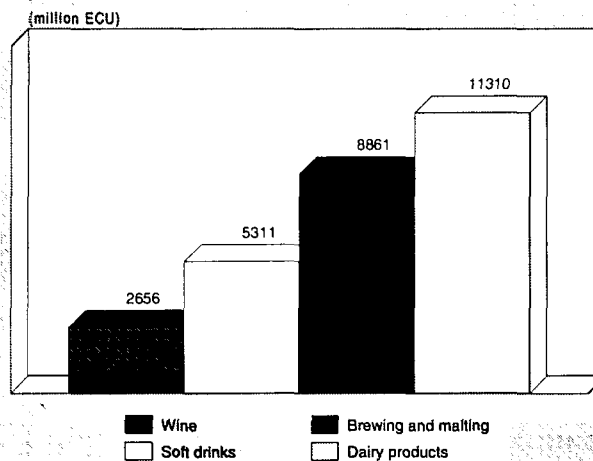
Employment too has been negatively affected by the situation of the sector, with a loss of around 5 000 jobs over the decade. The biggest drops occurred between 1987 and 1988, after which there was a partial recovery, followed by a continued drop in figures.

The wine-based product sector had a value added of around 2 656 million ECU in 1993, substantially lower than that recorded in related sectors, e.g. soft drinks and beer.

France remains the EU country with the most important wine industry in terms of value added, even though this position appears seriously threatened by the up-and-coming Spain. In fact, the latter has similar commercial and production policies to those of France, especially in relation to its policies concerning high-quality wines, which have caused a sharpening of competition between the two countries. Though the number one producer in the EU, Italy generally pursues price and product policies different from the others, as is shown by the low value added associated with its product. Since 1986 (following the methanol wine scandal), Italian wine producers have focused on the production of table wine.

Over the last decade, real apparent consumption and production growth rates went up, especially in 1993 and 1994. This upswing also affected exports, which had gone down by around 9 % between 1984 and 1989, but which rose by 19 % between

Figure 1: Wine  
Value added in comparison with related industries, 1993



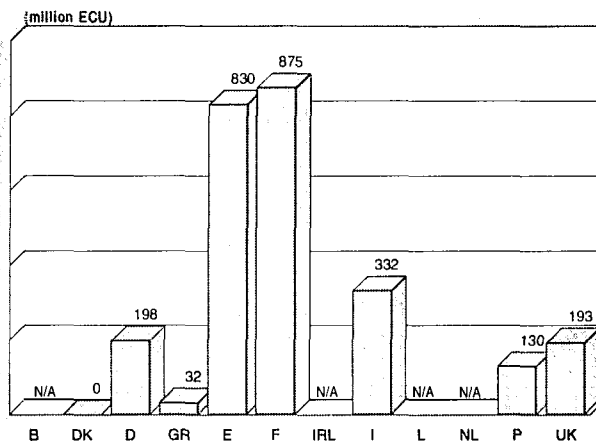
Source: DEBA

1992/93, following a pattern which can be considered exceptional considering the trend which characterised the early 1990s. The growth rate of imports also rose both considerably and steadily.

The production of wine by volume within the EU for 1993 was around 197 million hl (+23 % compared to the previous year). The only country which did not show a growth was Portugal, while all the others, showed increases varying from 53 % for France to 15 % for Italy and 14 % for Spain, despite the heavy rainfall. Such increases also affected production of the highest quality wines (i.e. VQPRD wines), which went from 50 million hl to 62 million hl, thus expanding surpluses which, in 1992, were around 52 million hl. (The usual gap between production and consumption levels is about 32 million hl).

The positive and anti-cyclical pattern of wine production, measured at constant prices, failed to compensate for a continuing drop in the number of people employed in the sector. After a negative peak recorded in 1988, employment figures underwent a substantial upswing between 1989 and 1991,

Figure 2: Wine  
Value added by Member State, 1993



Source: DEBA

**Table 1: Wine  
Production in volume**

(1000 hl)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	210 549	194 245	189 040	211 420	212 018	160 293	181 008	187 185	160 650	197 675
Belgique/België	2	2	2	2	2	2	2	2	1	2
BR Deutschland (1)	13 397	8 887	6 102	10 921	9 713	9 981	14 491	9 510	10 704	13 487
Hellas	5 250	5 025	4 782	4 334	4 467	4 345	4 532	3 526	4 022	4 050
España	32 465	36 249	34 511	37 042	41 481	23 249	32 444	42 231	33 324	37 981
France	68 547	64 360	71 297	73 974	69 340	57 620	61 058	65 530	42 689	65 401
Italia	82 200	70 900	62 340	76 962	75 822	61 010	60 327	54 866	59 788	68 686
Luxembourg	185	152	107	160	142	142	232	151	86	271
Portugal	8 483	8 655	9 893	8 017	11 047	3 938	7 901	11 351	10 021	7 771
United Kingdom	20	15	6	8	4	6	21	18	15	26

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

**Table 2: Wine  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.15	4.05	2.99	4.52
Production	0.86	3.56	2.05	5.39
Extra-EU exports	-8.98	-1.61	-5.77	19.05
Extra-EU imports	-1.82	18.25	6.64	7.41

(1) Some country data for apparent consumption and production have been estimated.  
Source: DEBA

**Table 3: Wine  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	6 244	7 408	8 105	9 560	10 177	10 187	9 973	9 961	10 472	11 038	11 630
Production	6 954	8 092	8 859	10 262	10 834	10 816	10 737	10 837	11 392	11 988	12 610
Extra-EU exports	734	709	782	738	701	684	827	940	990	1 040	1 090
Trade balance	710.0	684.0	754.1	702.0	657.4	629.2	763.9	875.2	920.0	950.0	980.0
Employment (thousands)	56.3	48.5	49.1	54.2	55.8	53.9	52.6	51.8	51.8	52.0	51.9

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

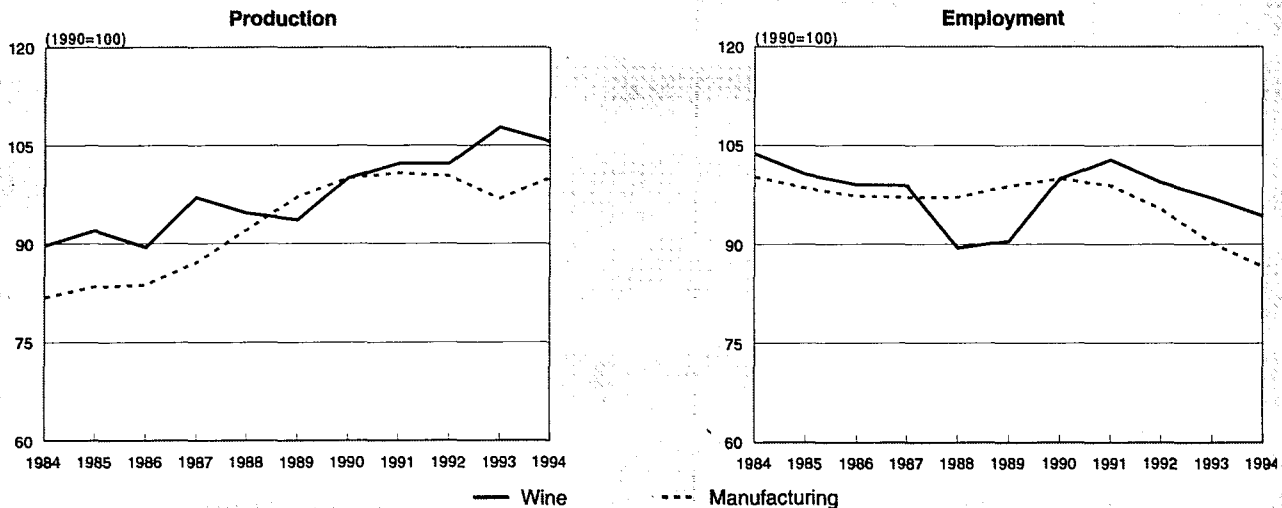
Source: DEBA

**Table 4: Wine  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	734	795	724	717	709	782	738	701	684	827	940
Extra-EU imports	24	24	21	22	25	28	36	44	55	63	64
Trade balance	710	771	703	695	684	754	702	657	629	764	875
Ratio exports / imports	30.6	33.0	34.6	33.3	28.8	28.3	20.6	15.9	12.4	13.1	14.61
Terms of trade index	72.8	75.1	73.3	67.2	95.8	98.5	100.0	99.3	99.8	95.2	N/A

Source: DEBA

**Figure 3: Wine  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

after which they followed the general downswing trend of the economy as a whole.

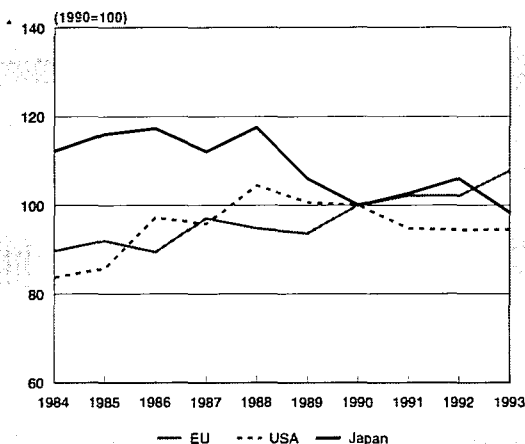
### International comparison

The EU is classified as the major wine producer worldwide, with 60 % of world production and 55 % of consumption, in front of the countries of the former Soviet Union, Argentina, the USA and Eastern Europe.

At the global level, 1993 production was estimated at 261.6 million hl, with a drop of about 12.5 % compared to 1992. This drop was particularly heavy in the USA where it touched 7.7 %, while in all other areas average falls were around 3-5 %.

At the international level, between 1984 and 1993 there was an increase in production at constant prices in the EU and the USA. Japan on the other hand showed a gradual drop in production over the period, except between 1991 and 1992, when there was a slight increase.

**Figure 4: Wine  
International comparison of production in constant prices**



Source: DEBA

Canada, Australia, New Zealand, Chile and Morocco are the new competitors on the international market, which have come on strong over the last few years.

### Foreign trade

The export pattern to countries outside the EU shows negative growth for the entire decade under consideration. Despite this, there was a noticeable improvement from 1992 to 1993. Conversely, imports, on the downswing until 1986, increased thereafter. This trend appears to still be going strong. The gap between exports and imports has narrowed substantially over the decade. While the export-import ratio is less than half of what it was in 1984, it is still high at around 13.

In 1993, EU exports went mainly to the USA, Switzerland, Russia and Japan. Since 1988, the share of the USA, Canada and Switzerland has shrunk considerably, while the level of exports to Japan rose. Russia has been an important market since 1993, and its significance is growing.

As regards imports, EU suppliers have changed substantially since 1988. In fact, Australia and the USA have increased their market shares dramatically, while the former Soviet Union, which used to make up more than 30 %, has practically disappeared.

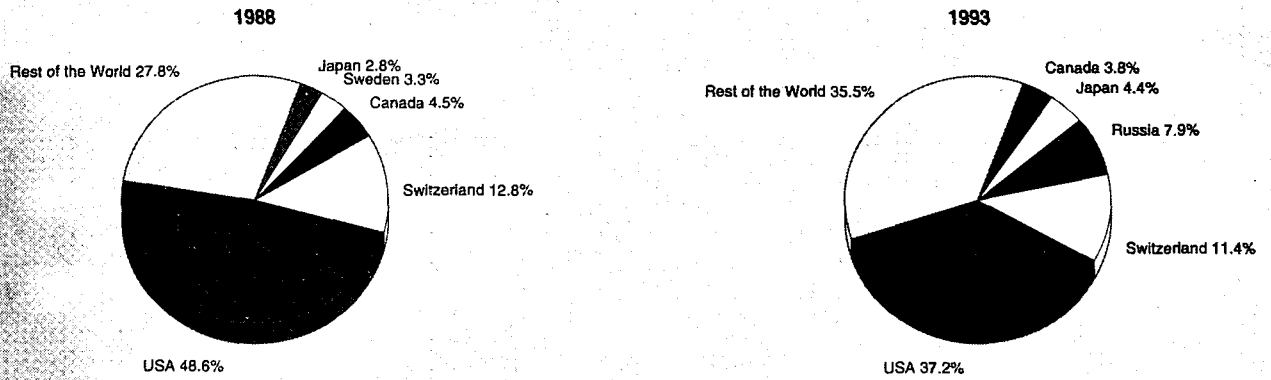
Despite the above trends, imports onto the EU market remain marginal at less than 1 %, while the quantities exported are high compared to overall production.

## MARKET FORCES

### Demand

The consumption of wine has dropped since the early 1970s, as consumer eating and drinking habits have changed. In particular, the increase in average wages and of white-collar workers has fostered the demand for high-quality products. Like all traditional products, wine has followed this pattern. Countries like Italy and France underwent a steep drop in gross per capita consumption between 1989 and 1993 and this has affected the Community as a whole. It should be said, however, that if wine and alcoholic drinks in general are no longer in fashion, the merging of northern and southern European eating habits has brought about a somewhat greater consumption of wine in countries such as Denmark and Belgium where, until only a few years ago, wine was not as popular.

**Figure 5: Wine  
Destination of EU exports**



Source: Eurostat

Alongside such trends is the greater attention on the part of consumers for health which has led to a swing towards lower-alcohol content products like wine-based drinks. Wine is habitually drunk during meals only in the countries of southern Europe (including the southern region of France), while in the northern countries it is more of a luxury commodity, beer being preferred.

#### Supply and competition

Beginning in the mid 1980s, the European wine-making industry lost in competitiveness, with internal and foreign market shares being eaten into by the USA and other countries such as Chile, South Africa and Australia. All of these countries have adopted particularly aggressive marketing policies.

A case in point is the USA, which, thanks to the huge funds provided by the federal government for the upgrading of US wine products abroad, set up extremely effective sales and marketing policy organisations whereby American wine producers have managed to penetrate not only the Canadian and Mexican markets, but also that of the EU, namely the United Kingdom and the Netherlands.

## INDUSTRY STRUCTURE

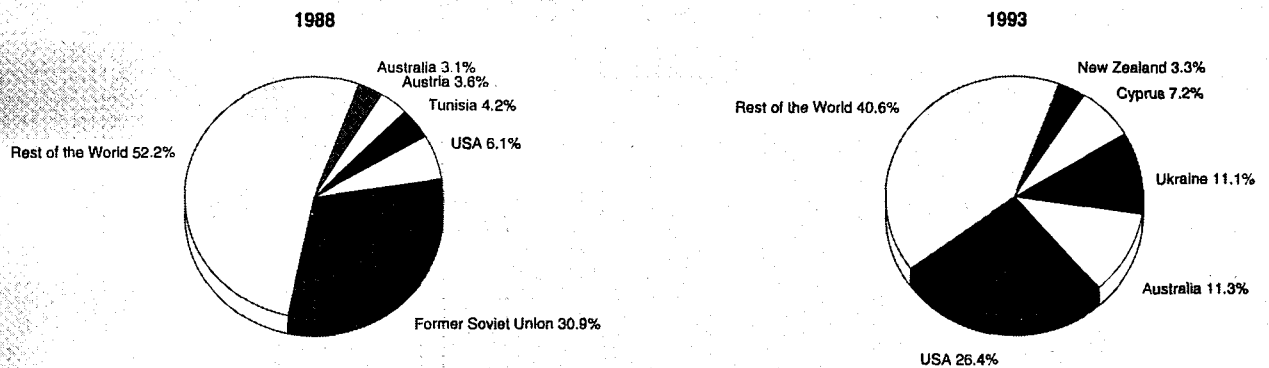
### Companies

The wine industry is still distinguished by a highly fragmented situation in terms of production which varies from country to country. For instance, market fragmentation is more evident in Italy compared to France, Spain and Germany.

Many cooperatives operate in the wine sector, making up 65-70 % of the table wine market in France (35-40 % of the choice wine market and about 35 % of the champagne market). In Italy, cooperatives are responsible for 40 % of the wine sold on the domestic market. These are located mostly in the south, and produce blended wines, stopped must or concentrates used in other regions to blend local wines.

The companies making up the sector are mainly small-sized firms tied to multinationals in the spirits sector which have added wine to their product range, and other independent firms. The main companies are Pernod Ricard (F), LVMH (F), Allied Lyons (UK), Grand Metropolitan (UK) and Martini & Rossi (I). In the multinational bracket, major companies are: Antinori (I), Gancia (I), Castel (F) and Lagedar (F).

**Figure 6: Wine  
Origin of EU imports**



Source: Eurostat

**Table 5: Wine  
Consumption per capita**

(l/head)	1989	1990	1991	1992	1993
EU (1)	42.0	39.0	38.0	37.0	37.0
Belgique/België	18.7	19.7	18.4	20.9	20.5
Danmark	21.2	18.4	21.7	22.0	22.5
BR Deutschland (1)	26.2	26.0	26.1	22.8	23.1
Hellas	33.3	31.8	25.7	25.3	25.7
España	46.0	41.0	44.0	43.0	42.0
France	73.2	71.9	67.2	64.5	64.9
Irland	4.2	4.4	4.5	3.9	3.9
Italia	69.7	58.6	62.0	61.6	63.0
Luxembourg	61.3	58.2	59.3	58.2	57.7
Nederland	13.5	13.1	14.0	14.0	12.7
Portugal	53.0	54.0	59.0	57.0	55.0
United Kingdom	11.7	12.8	10.9	10.4	11.7

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat

## Strategies

The strategies adopted by companies in the sector vary according to the different types of production. Generally speaking, there is considerable attention paid towards meeting market requirements, particularly by producers of Beaujolais nouveau, wine with low alcohol content and spumante.

Producers of medium-quality wine have adopted strategies of keeping costs down as much as possible while widening the market niches for the wines they produce. An example of this is the "Tetra Pak," designed to promote consumption outside the home (e.g. for travelling).

Different again are the strategies adopted by high-quality wine producers. In this case attempts are made to differentiate production and increase market segments, qualifying production through Controlled Denomination of Origin and VQPRD labels, or through the adoption of company brand name enhancement policies. Companies are also trying to widen their product ranges to include white, red and rosé wines.

Of great importance are the strategies directed towards external growth, exemplified by the 22 acquisition deals completed between 1993 and 1994. These involved mainly French com-

panies and were directed towards expanding domestic market shares.

With regard to the levels of specialisation in the wine sector between the different EU countries, it should be pointed out that though Italy, France and Spain effectively possess levels of specialisation above the average, it is also true that it is becoming even more important in those countries with poorer manufacturing industries like Greece and Portugal.

Furthermore, the specialisation levels are higher or lower from country to country for completely different reasons. French production centres on high-quality wines and therefore has increased its degree of specialisation. Meanwhile, the specialisation patterns recorded in Greece and Portugal can be attributed to a general reorganisation of respective manufacturing industries.

## Impact of the Single Market

The impact of the creation of the Single Market on the sector of wine has been overall positive, stimulating in particular international trade and consumer protection.

**Table 6: Wine  
Gross human consumption**

(1000 hl)	1989	1990	1991	1992	1993
EU (1)	135 897	127 751	132 232	127 536	132 459
Belgique/België	1 848	1 958	1 837	2 092	6 062
Danmark	1 087	947	1 118	1 137	1 166
BR Deutschland (1)	16 137	16 292	20 781	18 290	18 593
Hellas	3 336	3 198	2 623	2 595	2 651
España	17 883	15 892	17 158	16 834	16 283
France	41 009	40 473	38 019	36 903	37 354
Irland	147	154	158	137	140
Italia	40 081	33 754	35 782	35 572	35 843
Luxembourg	230	220	226	227	228
Nederland	1 996	1 955	2 098	2 111	1 941
Portugal	5 435	5 570	6 182	5 636	5 421
United Kingdom	6 708	7 338	6 250	6 002	6 777

(1) Including former East Germany from 1991 onwards.  
Source: Eurostat



**Table 7: Wine**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	86.5	91.5	90.4	98.2	105.9	103.5	100.0	99.4	102.8	111.0
Unit labour costs index (3)	85.7	89.7	92.1	88.7	86.7	96.7	100.0	103.8	107.9	99.5
Total unit costs index (4)	75.9	79.6	79.7	78.8	78.8	92.5	100.0	101.4	100.2	94.4
Gross operating rate (%) (5)	14.8	16.6	16.3	16.5	16.2	10.5	10.3	12.7	12.0	12.2

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

Nevertheless it is perceived to have increased administrative and production costs for small and medium sized firms because of the approval of packaging regulations.

The legislation with respect to advertising, which deeply differs within EU countries and fiscal harmonisation, is considered to be the main remaining internal barrier. On the export side, the reform of the Common Market Organisation and international trade negotiations with USA, Chile, South Africa, Canada and New Zealand are considered priorities for the industry.

## REGIONAL DISTRIBUTION

The wine industry is widely distributed throughout the EU. However, certain areas can be identified which are particularly active in the sector. These are the regions of Valencia, Extremadura and Castilla de la Mancha in Spain; Languedoc-Roussillon, Provence, the French Riviera, Champagne, Alsace, the Pyrénées and Bordelais in France; the Peloponnese and Aegean islands in Greece; western Ribatejo in Portugal; Emilia-Romagna, Veneto, Trentino, Tuscany and Puglia in Italy; and finally, Rheinland, Moselle, Franconia and Württemberg in Germany.

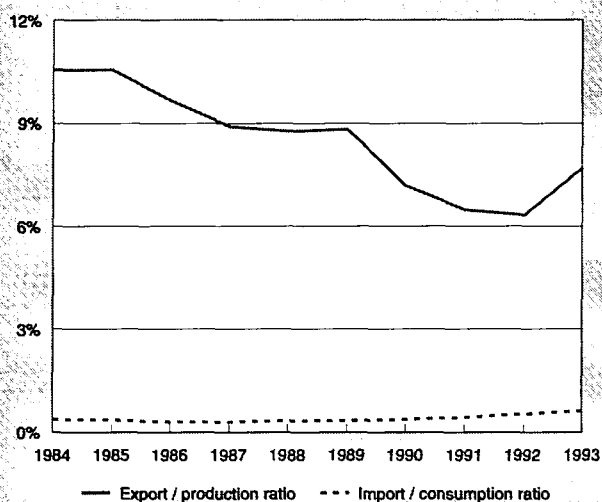
**Table 8: Wine**  
**Acquisitions**

1993 Bidder	Country	Target	Target country
Alcatel	France	Chateau Gruaud Larose	France
Artemis	France	Chateau Latour (Allied-Lyons)	France
Boisset	France	N/A	France
Grands Vins Jean-Claude Boisset	France	Francois Chauvenet	France
Louis Roederer	France	CDGV	France
Orpar	France	Piper-Heidsieck Deutschland Import und Vertriebs	BR Deutschland
Orpar (1)	France	Shanghai Shenma Winery Co	China
Guenther Reh	BR Deutschland	Moingeon	France
Ricasoli	Italia	N/A	Italia
Vinos del Condado	España	Bodegas Diaz Caparros	España
MacDonald Martin Distilleries	United Kingdom	Crabbie's Old Scottish Green Ginger Wine	United Kingdom
Matthew Clarck	United Kingdom	Grants of St. James's	United Kingdom
Canandaigua Wine Co	USA	Vintners International Company	USA
International Distillers & Vintners	USA	Champagne Laurent-Perrier	France
1994 Bidder	Country	Target	Target country
Danish Distillers	Danmark	Ninheset Norden	Danmark
Credit Agricole Banking	France	N/A	France
GAN	France	Kirwan	N/A
Vranken	France	Barancourt	France
Franz Wilhelm Langguth Erben	BR Deutschland	Keller-Geister	BR Deutschland
Banco Bilbao Vizcaya	España	Bodegas	España
Canandaigua Wine Company	USA	N/A	United Kingdom
Rothbury Wines	Australia	Saltram Wine Estates Pty	Australia

(1) Diversified company.

Source: Nomisma

**Figure 7: Wine Trade intensities**



Source: DEBA

**Table 9: Wine Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	0.00	0.00
BR Deutschland	0.34	0.37
Hellas	2.25	2.98
España	3.97	3.08
France	1.43	1.78
Irland	N/A	N/A
Italia	1.45	1.26
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	0.30	3.32
United Kingdom	0.47	0.43

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

imported from a non-member country. In accordance with the Uruguay Round, the Community has agreed not to fix a reference price (starting on 1 July 1995) and to replace this system with a tariff equivalent. The reference price system for grape must, on the other hand, will be replaced by tariff equivalents to be reduced by 20 % during the course of the six-year implementation period.

Other effects of the GATT concern:

- for NC 2204 code products (fresh grape wine, including alcohol-enriched wines) and NC 2205 code products (vermouths and other wines made from fresh grapes and using plants and aromatic substances) no specific protection measures are provided; an exception is grape must for which an entry price is fixed; and
- the elimination of refunds for grape must starting at end-1993.

Of particular interest for the wine-making sector is the agreement relating to intellectual property rights in trade (ADPIC). This agreement contains an article on the protection of geographic indications, which prevents the utilisation of any labelling or packaging which could create confusion for the consumer as to the actual place of origin of the product.

With regard to the individual segments of the sector, Regulation 122/1994 has been adopted. This specifies the application procedures of Regulation 1601/91, relating to the definition, designation and presentation of aromatised wines, of wine-based aromatised drinks and of aromatised wine-based cocktails.

## OUTLOOK

In the years to come, a drop in wine consumption is expected which will hit the market for higher-alcohol content wines and red wines in particular. Furthermore, marketing strategies will become more consequential as will the upgrading of brands, especially company brands.

Competition will sharpen within the sector, mainly because of the appearance of aggressive competitors which primarily will hurt medium-quality production. This situation will bring about greater concentration on the market through acquisitions of companies operating on domestic markets.

Written by: NOMISMA

The industry is represented at the EU level by: *Comité de la Communauté économique européenne des industries et de commerce des vins (COMITE VINS)*. Address: Rond Point Schuman 9, Bte 4, B-1040 Brussels; tel: (32 2) 230 9970; fax: 230 4323.

## ENVIRONMENT

The sector's main impact on the environment comes from the use of high amounts of pesticides during grape growing. Recently, however, the spread of integral/organic cultivation methods have helped to reduce the environmental pollutants created by the sector.

Wine sold in bottles involves the problem of recycling the glass. To eliminate this problem, some companies have promoted the sale of wine in cardboard "briks."

## REGULATIONS

Beginning with Regulation 24/62, common market organisation of the wine industry was gradually established. The basic regulation in the sector is Regulation 822/82, which was subsequently amended by Regulation 1756/92.

The Community is essentially inclined towards a reduction of production considering that intervention measures are no longer sustainable due to their heavy costs. In conformity with the decisions of the Council adopted in February 1988, a packet of stabilisation measures has been adopted, hinging on the abandonment of wine-growing areas and the strengthening of compulsory distillation, measures which have been accompanied by a drop in the support price of surplus wine. The aim of these measures is to decrease the EU production potential between 1988 and 1996 by 40 million hl.

The impact of these measures, however, would seem to have little affect on the reduction of the structural surplus of the Community, considering that yields have increased on average by half a hectolitre per year per hectare despite the fact that 250 thousand hectares of vineyards were uprooted between 1988 and 1993. This has sparked a review of Community policies, starting with the document presented by René Steichen in June 1993, behind which lies the principle of directing Community resources towards the prevention of surplus formation, rather than towards getting rid of it.

As far as price regulations are concerned, each year the Council fixes a target price for each type of table wine and an intervention price, while the Commission fixes the representative price (average production price for each type of wine) and the reference price, which aims at protecting Community olive growers by fixing a minimum price at which wine may be

# Brewing and malting

## NACE 427

In 1993, 1 611 breweries were operating throughout the Community. These employed 139 000 workers and produced 289 319 million hectolitres (hl) of beer. Germany, with 1 281 breweries, a workforce of 60 000 and a production of 115 000 million hl is the major EU producer and, with 138.5 litres per capita, against the 85 litres EU average, is also the biggest consumer. Over the last decade, employment figures for this sector dropped consistently. Taxes on general alcohol production play an important role in the sector. The beer market also has been affected by the economic recession, with a drop in volume of around 4 %.

### INDUSTRY PROFILE

#### Description of the sector

The beer brewing sector includes the processing of hops, maize and barley to make biological beer, exotic beer, light beer, non-alcoholic beer, normal beer, special beer and double-malt beer. These product types are further categorised by colour (pale, red and dark), while in terms of packaging, they are divided into draught beer, bottled beer with returnable bottles, bottled beer with non-returnable bottles and canned beer. Along with the brewing of beer, the sector also includes the processing of malt, used as an ingredient in some types of beer and employed as an input for other food industries, especially the confectionery, spirits and liqueur industries. In 1993, Community malt production reached 6 436 000 tonnes. Imports (960 000 tonnes) were considerably below exports (2 530 000 tonnes).

Most EU-produced malt (4 223 000 tonnes) was used to make beer. Germany (1 841 million of tonnes in 1992), the UK (1 434 million of tonnes) and France (1 263 million of tonnes) were the major producers, followed by Belgium and The Netherlands. Germany, France, the UK, Denmark and The Netherlands have shown a slight increase in production since 1989, while Italy and Spain strongly reduced their production. Beer malt (97 %) and malt whisky (3 %) are the main categories of malt production.

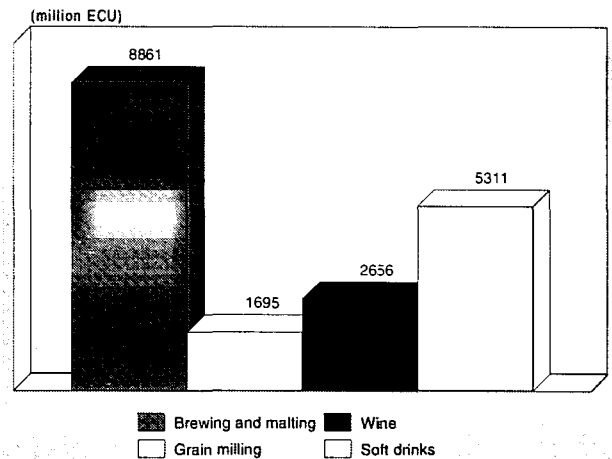
The beer-making process is fairly complex and requires big capital assets. The value added in the brewing industry is very high compared to related industries and is the highest in Germany, followed at some distance by the UK. The other countries have a much lower value added. The value added of the malting sector, on the other hand, is very low, and malt represents 80 % of the sale price. Although the malting production process is not complex, it too requires big capital assets.

#### Recent trends

A look at the main indicators of the sector first of all shows a rise in production, up from 19 604 million ECU in 1984 to an estimated 25 972 million ECU in 1994, with an ongoing annual growth rate. In 1992, there was a slight drop in consumption, but demand recovered immediately in the following year. Counter to growth in production and consumption has been the ongoing drop in employment figures, down from 164.5 thousand in 1984 to 123.9 thousand in 1994. Exports, except for the 1986-88 period showed a positive annual trend in 1989, thus contributing to an improvement in the already positive trade balance.

The value added produced by the brewing and malting sector is equal to 5.2 times that of the value added of the grain milling industry, 3.3 times that of wine and 1.7 times that of

Figure 1: Brewing and malting  
Value added in comparison with related industries, 1993



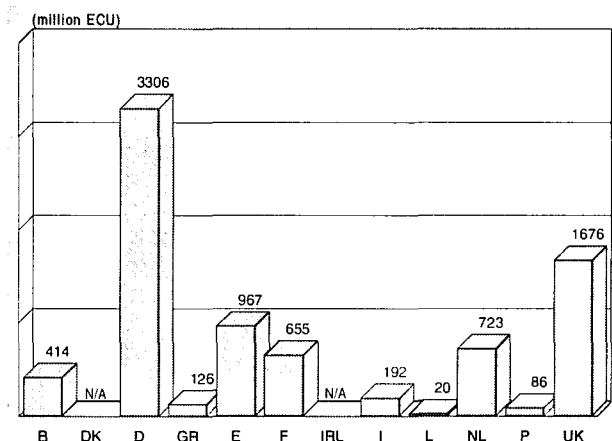
Source: DEBA

soft drinks. Germany is the country that contributes the most to the level of EU value added (40.5 %), followed by the UK (20.5 %), Spain (11.8 %), the Netherlands (8.9 %) and France (8 %).

At constant prices, growth rates - excepting those of foreign trade - are distinguished by substantially modest, when not negative, variations, which intensified between 1992 and 1993. Export and import levels, on the other hand, have undergone considerable growth variations, though the latter slowed down suddenly between 1992 and 1993. At constant prices, production patterns in the EU were fairly stable up to 1990, unlike those of the manufacturing industry as a whole. Since 1990, EU production in the brewery sector has begun to fall, while the manufacturing industry rose and then stabilised for the most part, excepting 1993.

Employment figures continued to fall throughout the period without showing any signs of recovery. In the 1984-91 period, the drop in the number of jobs in the brewery sector contrasted with a fairly stable situation in the manufacturing industry

Figure 2: Brewing and malting  
Value added by Member State, 1993



Source: DEBA



**Table 1: Brewing and malting**  
Main indicators in current prices (1)

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	18 675	21 234	21 678	23 042	24 331	24 302	24 412	24 594	25 300	25 900	26 600
Production	19 604	22 025	22 592	24 021	25 325	25 363	25 569	25 852	26 600	27 300	28 100
Extra-EU exports	969	840	970	1 049	1 108	1 168	1 266	1 373	1 400	1 500	1 600
Trade balance	930	791	914	979	994	1 061	1 157	1 258	1 300	1 400	1 500
Employment (thousands)	164.5	143.4	141.1	138.9	137.8	134.5	129.9	121.9	119.0	116.0	113.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Brewing and malting**  
Average real annual growth rates (1)

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.05	-1.46	-0.62	-3.04
Production	0.03	-1.10	-0.47	-2.57
Extra-EU exports	0.04	7.60	3.33	5.77
Extra-EU imports	12.97	14.74	13.75	-7.10

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Brewing and malting**  
External trade in current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	969	992	958	846	840	970	1 049	1 108	1 168	1 266	1 373
Extra-EU imports	40	43	44	43	49	56	70	115	107	109	115
Trade balance	930	949	914	803	791	914	979	994	1 061	1 157	1 258
Ratio exports / imports	24.4	23.0	21.9	19.9	17.2	17.4	15.0	9.7	10.9	11.6	11.94
Terms of trade index	79.1	89.3	93.0	95.9	101.1	103.5	100.0	97.7	95.5	89.5	N/A

Source: DEBA

**Table 4: Brewing and malting**  
Labour productivity, unit costs and gross operating rate (1)

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.3	84.1	88.7	91.9	95.9	96.0	100.0	99.9	99.0	99.8
Unit labour costs index (3)	89.2	91.5	91.5	93.2	92.3	97.6	100.0	106.6	112.6	117.7
Total unit costs index (4)	85.1	85.2	86.6	87.9	91.3	96.6	100.0	106.5	112.5	116.1
Gross operating rate (%) (5)	12.6	13.4	15.1	15.6	15.7	13.7	14.0	13.9	15.3	14.9

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

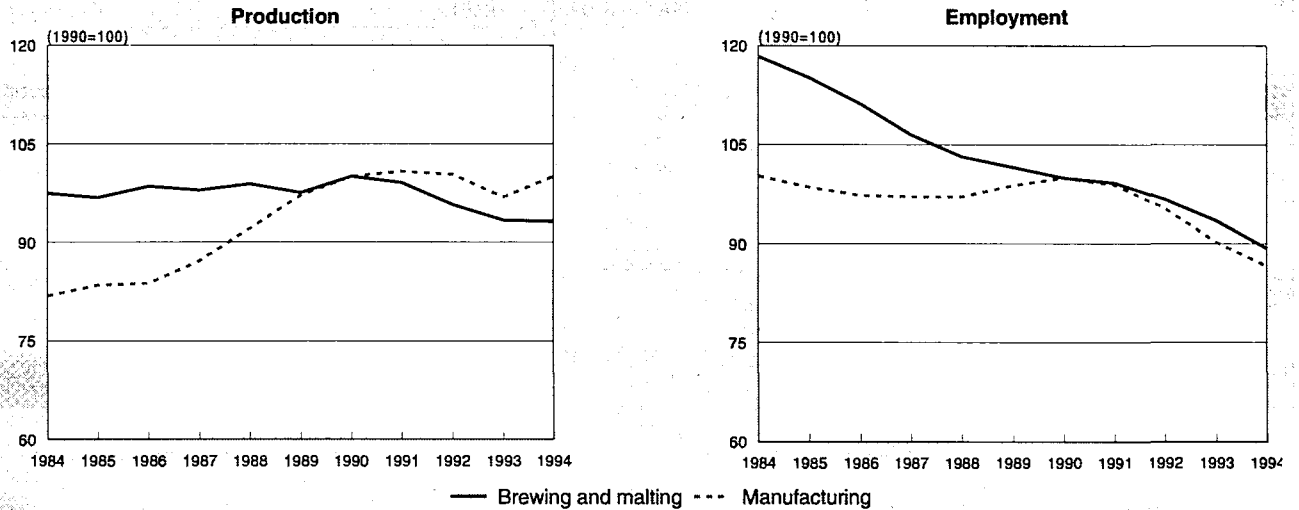
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Brewing and malting**  
Production and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: DEBA

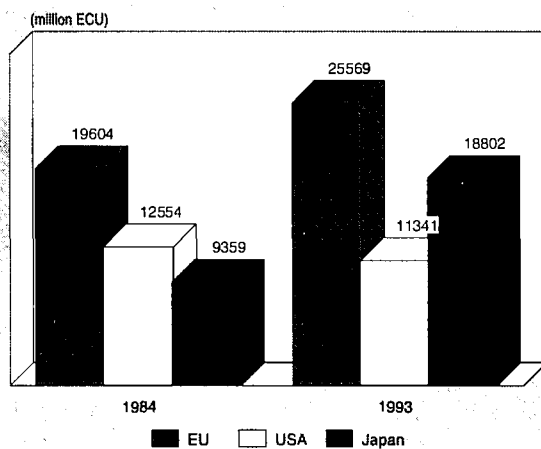
as a whole. This decline, in spite of the fairly stable demand for beer and an equally stable production, is due to an increased use of technologies in the production process and to a general process of concentration of enterprises producing advantageous scale economies.

Over the last decade, different local and national drinking traditions have tended to overlap, or at any rate to affect one another. Countries strongly tied to a wine-drinking culture, and traditionally strong producers and consumers of wine (e.g. Spain) shifted to beer, which is becoming more popular throughout the Mediterranean. At the same time, countries that were at one time almost exclusively beer-drinking have witnessed a growing demand for wine. This is the case, for example, of Ireland, Germany, the Netherlands, Denmark and the Scandinavian countries. It should not be forgotten, however, that in each country the importance of traditional drinks is still strong: wine in the Mediterranean countries, beer in Central and Northern Europe, spirits in the North and in some areas of Eastern Europe.

**International comparison**

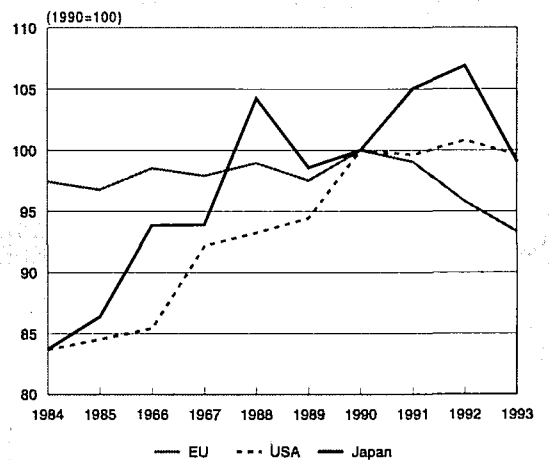
In 1993, the biggest world producer (in value) of beer was the EU, followed by Japan, while the USA not only lost its position on the world market but showed a tendency to reduce its production capacity compared to 1984. An analysis of the evolution of production at constant prices shows an increase in EU production, though very slight, up to 1990. This was followed by a three-year downswing. The USA, on the other hand, enjoyed considerable growth from 1984 to 1990 and then levelled off over the 1990-93 period. The biggest fluctuations were experienced by Japan over two separate periods: the first, from 1984 to 1988, shows annual growth rates, except for 1987, of between 3.2 % and 10.9 %; in the 1990-92 period, the annual growth rates were between 1.4 % and 5.1 %. In 1989 and 1993 there was a fall in production of 5.6 % and 7.9 % respectively compared to the previous years.

**Figure 4: Brewing and malting**  
International comparison of production in current prices



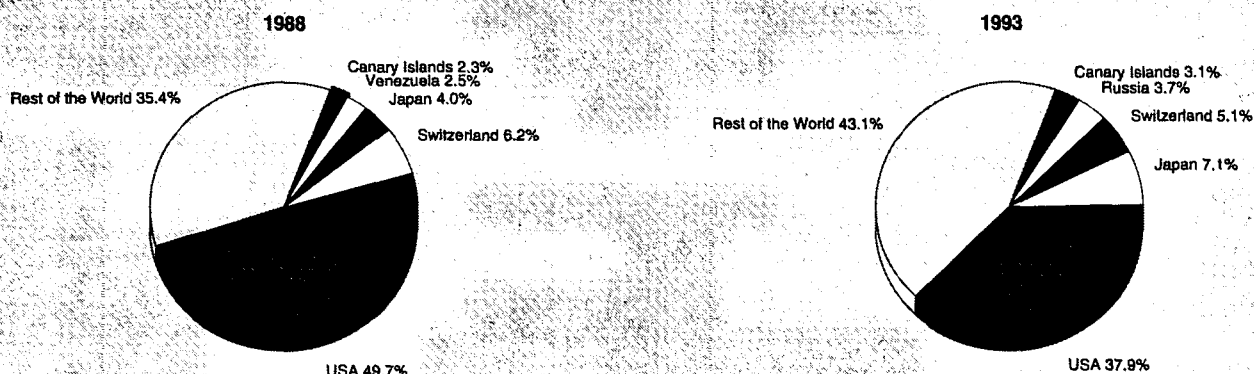
Source: DEBA

**Figure 5: Brewing and malting**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Brewing and malting  
Destination of EU exports**



Source: Eurostat

### Foreign trade

The balance of trade figures in the sector, positive through the decade, show a slight drop between 1986 and 1988; and a recovery starting in 1989 with a growth rate from 15.6 % in 1988/89 to 1.5 % in 1990/91. Behind this trade balance growth are, above all, exports to countries outside the EU, the value of which, excepting 1986-1988, grew over the decade at a rate between 2.3 % and 15.5 %. Imports at current prices also grew during the course of the decade, though hardly as much as exports, going from 39.7 million ECU in 1984 to 108.8 million ECU in 1993. In 1991 alone there was an annual growth rate of 64.1 %. The export/import ratio also fell during the decade, down from 24.4 in 1984 to 9.7 in 1991. It then rose slightly in subsequent years until it touched a value of 11.6 in 1993, indicating that variations in imports were greater than those of exports.

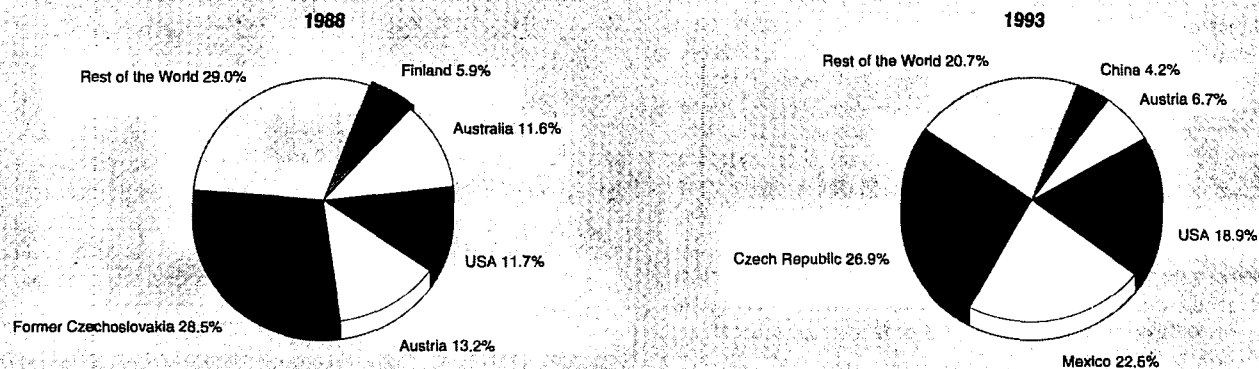
Most brewing and malting exports went to the USA, though this country's share of exports fell by more than 10 % since 1988. Switzerland's share of exports also dropped. The second most important importer of brewing and malting products from the EU in 1993 was Japan which, compared with 1988, increased its share. Russia also joined the group of major im-

porting countries, with a 3.7 % share in 1993, just out in front of the Canary Islands, which also had increased their share compared to 1988. The most export-oriented country is Ireland; in fact the volume of beer for export is just less than half that produced there. The other countries of the north and north-west - like Luxembourg, The Netherlands, Belgium and Denmark - have high foreign market shares. Germany, on the other hand, accounts for a fairly small share of foreign markets because most of the beer produced goes to meet its domestic demand. Finally, Spain, France and Italy import more beer than they export. These are the less typical brewing regions and domestic demand is met chiefly by foreign imports.

In 1993, the main countries of origin of EU imports were the Czech Republic, Mexico, the USA, Austria and China. In 1988, the former Czechoslovakia accounted for 28.5 % of EU imports, followed by Austria (13.2 %), USA (11.7 %), Australia (11.6 %) and Finland (5.9 %). A comparison between the two periods shows a growth in imports from Mexico and a drop in imports from Austria. The USA, on the other hand, slightly increased its import share.

The degree of penetration of exports shows a downswing up to 1988, dropping from 4.94 % to 3.81 %. Starting in 1989,

**Figure 7: Brewing and malting  
Origin of EU imports**



Source: Eurostat

**Table 5: Brewing and malting  
Beer statistics, 1993**

	Number of breweries (units)	Number of employees (units)	Total production (1000 hl)	Imports world (1000 hl)	Exports world (1000 hl)	Per capita consumption (litres)
Belgique/België	102	8 000	14 700	363	4 077	107.0
Danmark (1)	17	4 459	9 435	21	2 739	126.0
BR Deutschland	1 281	60 000	115 000	2 400	7 000	138.5
Hellas (1)	7	N/A	4 010	182	130	40.0
España	27	11 200	24 278	2 250	293	67.1
France	27	6 700	20 833	2 765	1 013	39.2
Ireland	7	2 785	6 910	584	3 130	123.0
Italia	19	3 851	11 715	2 826	217	25.1
Luxembourg	5	304	558	37	175	103.8
Nederland	16	8 294	20 431	553	7 966	85.2
Portugal	8	3 230	6 568	137	424	64.4
United Kingdom	95	30 200	54 881	4 582	2 100	100.2

(1) 1992 figures for imports and exports.  
Source: CBMC

this trend reversed, recovering in 1993 the same positions shown in 1984. The import/consumption ratio, though having doubled over the decade, shows a minimum growth of around 0.2 %, going from 0.2 % in 1984 to 0.4 % in 1993.

In the malt sector, France is the main export country, exporting 80 % of its production to extra-EU and EU countries. Belgium and Denmark, which produce only one-half as much as the French, export more than 65 % of their production. The main malting import countries are Germany, The Netherlands and Italy. The Netherlands imports 50 % of their capacity of production, while Italy's malting imports percentage is higher.

## MARKET FORCES

### Demand

In recent years, there has been a general tendency for consumers to move towards lower alcohol-content drinks and, above all, to soft drinks. This process has been enhanced by the recession, which has contributed to the 4 % drop in volume. Increased consumer concern about the potential health hazards of excess alcohol consumption and general fitness conscientiousness have stimulated the demand for non-alcoholic beers - especially on the part of women - as well as for biological beers, made from raw materials cultivated without the use of pesticides and fertilisers.

'Exotic' beers are also gaining in popularity, e.g. Latin-American beers. Some pass off this particular increase in demand as a fad, caused by more widespread travel and the growing number of Tex-Mex restaurants. However, the growth of imports from Mexico shows that this is not the case. The big seller, when speaking of 'exotic' beer, is 'Corona' made by Cerveceria Modelo and popular today in 68 countries, including Mexico, where the Corona phenomenon also has grown regularly over the last 15-20 years. Between 1984 and 1986, the Corona brand took the USA by storm and today it ranks second among imported beers.

Climate also has a great impact on consumption patterns. Beer is very much a seasonal drink, especially in the Mediterranean countries. For example, in the summer of '94, temperatures throughout Europe were higher than normal and beer consumption rocketed.

The biggest per capita consumption is to be found in the main producer or exporting countries. Alongside Germany, with almost 139 litres per head in 1993, come Denmark (126 litres), Ireland (123 litres), Belgium (107 litres), Luxembourg

(103.8 litres) and the UK (100 litres). Italy, with 25.1 litres, is the EU country recording the lowest consumption of beer.

### Supply and competition

Labour productivity did not increase much during the 90s. Rather, it remained substantially stable at base year values, with the labour and production index falling steadily at constant prices. The brewing industry is distinguished by the strong utilisation of fixed assets, which increased notably in the 1980s.

The production costs presented a higher growth rate starting in 1990. One of the most significant cost items was labour, as the labour cost index indicates.

### Production process

Beer is a drink made from barley or other cereals obtained through alcoholic fermentation of a watery concoction of malt, barley or other cereals, mixed with aromatic substances (e.g. hops) and also carbon dioxide. The sector benefits from important economies of scale, both in the production process and in distribution.

The beer brewing sector comprises companies of various sizes, starting with the small firms which meet local demand right up to the large multinationals with their direct productions and licensed productions, the latter granted to other companies in other countries. Therefore, productivity levels vary considerably depending on the type and size of manufacturers.

## INDUSTRY STRUCTURE

### Companies

In 1993, the Community counted 1 611 independent beer brewing companies. Germany, the biggest manufacturer, followed at a distance by the UK, had 1 281 brewing companies. Of these, the top 52 made over 60 % of the overall production and 860 only 3.5 %.

France, with the same number of breweries as Spain and more or less the same production volume, is distinguished by high capital investment in the work cycle, with a workforce half the size of Spain. In 1993, total production of the 16 Dutch breweries equalled 20 431 thousand hl, while the 102 Belgian breweries produced 14 700 thousand hl.

The largest number of malt processing facilities is in Germany (97); these include the main independent factories to be found in the sector. The United Kingdom also has a fairly high

**Table 6: Brewing and malting Maltings, 1993**

(units)	B	DK	D	F	IRL	I	NL	UK	Total
Independent	4	3	68	6	5	3	2	10	101
Associated to breweries	2	2	29	1	2	0	1	6	43
Associated to other industries	0	0	0	0	1	0	0	4	5
Total	6	5	97	7	8	3	3	20	149

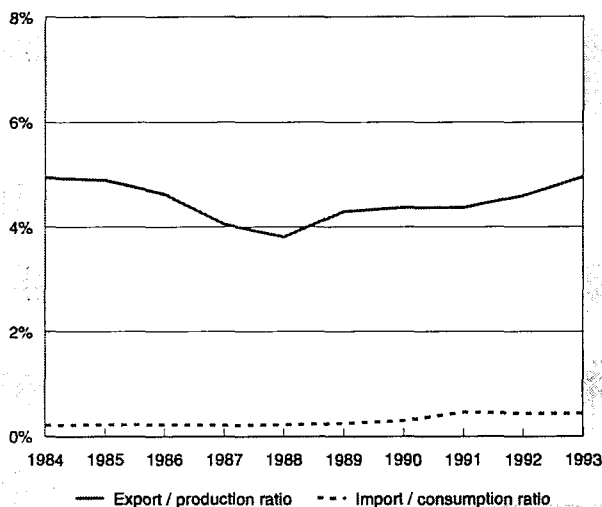
Source: EUROMALT

number of malt processing facilities: 20 facilities of which 10 are independent. It should be noted that the overall number of facilities dropped between 1991 and 1993, due to the closure of independent firms, while the number of those associated with breweries remained substantially stable. 86 % of malt processing facilities have a low production capacity (below 10 thousand tonnes), while 24 % have a production capacity of over 50 thousand tonnes. In Germany, small facilities predominate (83 % of German facilities have a production capacity below 40 thousand tonnes) and contribute only 20 % to total production. Conversely, the United Kingdom is distinguished by high-capacity plants (45 % of facilities have a production capacity of over 50 thousand tonnes) and account for 91 % of total production.

Over recent decades, there has been a generalised process of productive concentration, through mergers and acquisitions. Thus, beer brewing has been concentrated into large multinationals. In some countries such as the Netherlands, Portugal, Ireland and Greece, medium-sized industries prevail, while in France, and above all Germany, many low-capacity firms operate.

Similarly, in the malt processing sector, there is a general trend towards concentration (from 170 companies in 1989, to 97 in 1993), aimed at the growth of the production capacity of each individual facility, thereby enabling the achievement of strong scale economies. In fact, out of a total 49 malt processing enterprises within the EU, the top 21 have a production capacity equal to 2/3 of the total. In France, Malteurop and Soufflet are the main malting companies; Saplo and Malt Italia are the major ones in Italy.

**Figure 8: Brewing and malting Trade intensities**



Source: DEBA

## Strategies

Within the sector, there has been a generalised process of concentration favoured by the possibility of achieving scale economies and amortising the cost of the factories and equipment. Over the last decade, through a series of acquisitions on the part of a number of European giants, the European market has become concentrated in the hands of large industrial groups. In 1993, 18 acquisitions took place worldwide. Of these, 11 were accomplished by industrial enterprises and groups belonging to the EU; five of those were conducted by British companies and four by Dutch companies. The number of acquisitions went up in 1994 with 21 operations worldwide, of which 12 were promoted by EU enterprises. The German Brau & Brunner and the Dutch Heineken completed four acquisitions each. Five operations carried out by European groups involved East European breweries and demonstrate the great interest for these new markets. It should be remembered, however, that in some countries (e.g. Poland), strict regulations are being introduced to penalise beer consumption.

The growth of hard discount distribution chains and increased consumer concern for prices have convinced beer manufacturers to review their brand and promotion policies. Promotion and advertising are important strategic levers for the marketing of beer.

In 1993, the types of containers used within the Community for the sale of beer were returnable bottles (48.4 %), draught beer (34.9 %), non-returnable bottles (10.1 %) and cans (6.6 %). The consumption of draught beer is prevalent in Ireland (83.1 %), the United Kingdom (68.5 %) and Luxembourg (48.4 %), while returnable bottled beer is prevalent in Denmark (92.3 %), Germany (78 %), Greece (76 %), the Netherlands (63.9 %) and Portugal (54.9 %). Non-returnable bottles are used mainly in France (57.7 %) and Italy (56 %). Some 'precious' containers are also used, e.g. ceramics, for top-quality beer. In this case, a lever-top often enables the bottle to be re-closed.

Two main marketing channels are used by brewers: the 'long channel' (company, agent, sales outlet or bar/café) and the 'short channel' (from the industry directly to the retailer). Direct sale is prevalently done through the large chains, which possess a centralised purchasing structure. Finally, there is the phenomenon of specialised 'brand' outlets, where a particular brand of beer is highlighted. In this case, the breweries supply managers with orders and advice on how to run the premises.

Over the last few years, breweries have attempted to reorganise supply and transport - because the place of production is often distant from that of consumption - and to improve transport packaging, in order to reduce breakage and keep retail prices down or increase profit margins.

The strategies adopted by European breweries in general are the following: first-price strategies, which offer small profits but permit the amortisation of the heavy investments required by breweries; strategies based on special or double-malt beers, which affect margins; strategies based on product innovation,

**Table 7: Brewing and malting**  
**Number of maltings, 1993 - capacity (1)**

(thousand tonnes)	0-9 (2)	10-19	20-29	30-39	40-49	50-99	100-199	200+	Total
Belgique/België	0	0	1	0	0	0	4	1	6
Danmark	1	0	2	0	1	1	0	0	5
BR Deutschland	58	10	6	7	3	11	1	1	97
France	2	N/A	N/A	N/A	N/A	N/A	2	3	7
Ireland	2	3	2	0	0	1	0	0	8
Italia	0	0	1	2	0	0	0	0	3
Nederland	0	0	1	0	0	1	1	0	3
United Kingdom	6	3	1	1	0	1	7	1	20
Total	128	N/A	N/A	N/A	N/A	N/A	15	6	149

(1) All malt-houses, whether independent or associated with the brewing, distilling or other industries, are included.

(2) Size class data for France includes total number for capacity of 0-99.

Source: EUROMALT

especially alcohol-free beers, which are riskier, but are not subject to taxes on alcoholic drink production; and client portfolio diversification strategies throughout Europe. This last strategy is implemented through the winning of new markets within the EU and in the East European countries and is becoming indispensable, as most companies are leaders of their domestic markets and often find it difficult to expand into other countries.

#### Impact of the Single Market

The creation of the Single market had a positive impact on the brewing sector, stimulating and favouring international trade and the internationalisation of products. However, internal barriers still remain. In particular the lack of fiscal harmonisation, and in particular relevant differences in excise levels across countries reduce competition inside the market. The harmonisation of excises is a priority for the industry.

The effects of the creation of the Single Market on the malting sector was in general positive, but small. Trade intensity in the sector is very low and production takes place regionally, near the breweries company. One of the next priorities for the malting industry is the new CAP, which reduced the production of raw material in the European Union. Consequently, malting firms are constrained to import from third countries the barley malt, often at higher prices.

#### ENVIRONMENT

The main problems tied to the production of beer are linked to the disposal of packaging, which now is partially reused during production, thereby providing considerable energy savings. Furthermore, over the last few years, there has been a considerable savings of water used during the production process. Other problems concern the disposal of yeast generated during brewing and of fumes discharged into the atmosphere.

EU Directive 94/62 has introduced a series of measures concerning the recovery and recycling of food packaging. These measures will result in important benefits for the environment inasmuch as they will oblige companies to adopt adequate packaging and change supply and transport organisation within the sector in order to facilitate and expand the recovery and recycling of packaging. Germany, Denmark and France have begun to implement this policy already.

#### REGULATIONS

Community policies in the sector regulate two different aspects. On the one hand, they promote a marketing logic based on free trade; on the other, they promote healthy lifestyles by restricting the consumption of alcohol.

The promotion of the health is implemented by harmonisation policies directed towards creating minimum European standards in taxation, advertising and abuse control; and monitoring

**Table 8: Brewing and malting**  
**Total capacity of maltings, 1993 (1)**

(thousand tonnes)	0-9 (2)	10-19	20-29	30-39	40-49	50-99	100-199	200+	Total
Belgique/België	0	0	21	0	0	0	522	210	753
Danmark	5	0	45	0	40	90	0	0	180
BR Deutschland	200	120	160	250	140	640	140	300	1 950
France	80	N/A	N/A	N/A	N/A	N/A	215	1 055	1 350
Ireland	10	39	55	0	0	74	0	0	178
Italia	0	0	21	64	0	0	0	0	85
Nederland	0	26	0	0	0	60	125	0	211
United Kingdom	29	49	30	34	0	68	994	365	1 569
Total	2 350	N/A	N/A	N/A	N/A	N/A	1 996	1 930	6 276

(1) All malt-houses, whether independent or associated with the brewing, distilling or other industries, are included.

(2) Size class data for France includes total number for capacity of 0-99.

Source: EUROMALT

**Table 9: Brewing and malting Acquisitions**

1993 Bidder	Country	Target	Target country
Greencore Group Consortium	Ireland	HDM Group (Malting Division)	Belgique/België
BSN	Europe	Pannonia Sorgyar	Hungary
	France	San Miguel Fabricas de Cerveza y Malta	España
Bols Wessanen (1)	Nederland	Mautner Markhof	Austria
Heineken	Nederland	Brauerei Haldengut	Switzerland
Heineken	Nederland	DB Group	New Zealand
Allied-Lyons PLC	United Kingdom	Krombach & Sohne	BR Deutschland
Bass*	United Kingdom	Prague Breweries	Czech Republic
Belhaven Holdings	United Kingdom	Behalven Brewery Company	United Kingdom
Crown Buckley	United Kingdom	Crown Brewery	United Kingdom
Guinness	United Kingdom	Desnoes & Geddes	Jamaica
Adolph Coors Co	USA	Aguila	España
Anheuser-Busch Companies (1)	USA	Modelo Grupo	Mexico
Philip Morris (1)	USA	Molson Breweries	Canada
Lion Nathan	New Zealand	S A Brewing Holdings	Australia
Fraser & Neave (1)	Singapore	DB Group	New Zealand
South African Breweries	S.Africa	Kobanyai Sorgyar	Hungary
South African Breweries	S.Africa	Tanzania Breweries	Tanzania
<b>1994</b>			
1994 Bidder	Country	Target	Target country
Oesterreichische Brau-Beteiligungs*	Austria	Starobno	Czech Republic
Interbrew (1)	Belgique/België	Zagreb Breweries	Croatia
Irish Agricultural Wholesale Society	Ireland	Malting Company of Ireland	Ireland
Malteurop	France	Intermalta	España
Brau & Brunnen (1)	BR Deutschland	Kamenitza	Bulgaria
Brau&Brunner	BR Deutschland	Wickueler	BR Deutschland
Brau&Brunner (1)	BR Deutschland	Okocim	Poland
Brau&Brunner (1)	BR Deutschland	Wernersgruener Brauerei	BR Deutschland
Heineken	Nederland	Komaromi Sorgyar RT	Hungary
Heineken	Nederland	Brauerei Haldengut	Switzerland
Heineken (1)	Nederland	Zywiec	Poland
Heineken (1)	Nederland	Aguila	España
Nordic Capital Svenska	Sweden	Falcon AB (Unilever)	Sweden
Belhaven Holdings	United Kingdom	Belhaven Brewery Company	United Kingdom
John Labatt (1)	Canada	Cerverceria Cuauhtemoc	
		Moctezuma	Mexico
Coors	USA	Aguila	España
Brahma	Brasil	C A Cerverceria Nacional	Venezuela
Swire Pacific	Hong Kong	Huizhou Brewing Company	China
Cheung Kong (1)	Hong Kong	San Miguel Brewery	Hong Kong
Swire Pacific (1)	India	Carlsberg Brewery Honk Kong	Hong Kong
Asashi Breweries/Itochu Corp.	Japan	CSI Brewery	China

(1) Diversified company.  
Source: Nomisma

policies, developed through educational campaigns to inform the public about health issues.

With regard to advertising, safety and sales, the legislation of the Member States is still somewhat diversified. With respect to taxation, Community action requires the homogeneity of rates at a high level, in such a way as to render alcoholic drinks more expensive: for example, Directive 92/77 provides for a minimum VAT rate of 15 %.

The matter of excises involves two aspects: harmonisation of these charge structures on alcohol and alcoholic drinks on the one hand, and the convergence of such charges for the same products on the other. Directive 92/93 provides for the

application of an excise on beer (in addition to wine and other alcoholic products). Directive 92/84 provides for the harmonisation of the production charge percentages for wine, beer and other alcoholic products.

Within the EU, the lack of fiscal harmonisation in relation to the excises of the different countries creates trade distortions between the EU countries. In fact, especially with regard to neighbouring countries, there is active trade along frontiers caused specifically by the different excises existing in the different countries. At the same time, the excises in the beer sector make the product less competitive in terms of price

**Table 10: Brewing and malting  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.28	1.35
Danmark	N/A	N/A
BR Deutschland	1.09	1.12
Hellas	1.04	1.71
España	0.70	0.99
France	0.44	0.47
Ireland	N/A	N/A
Italia	0.24	0.22
Luxembourg	1.01	0.88
Nederland	N/A	1.49
Portugal	0.73	0.96
United Kingdom	2.00	1.59

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

compared to substitute drinks like wine, soft drinks and mineral waters, which are not subject to this type of duty.

Finally, EEC Directive 88/136 on the packaging of liquids indicates the standards of packaging used for liquids. They are: 25, 33, 50 and 75 cl. This standard is optional; the manufacturer can use either the capacities in use in his own country or those fixed by the EU. In the second case, if the measurements are not identical, the 'e' mark is applied.

## OUTLOOK

Prospects for the sector, in the medium term, are for a general growth and concentration of beer manufacturing enterprises. Mergers and acquisitions will be directed towards new markets like the East European countries. Concentration in the sector, which facilitates the achievement of important scale economies, will continue to lower the employment level over the years to come. Diversification of beer will continue, with growth rates greater than those for non-alcoholic beer. The demand for non-alcoholic and light beers and, at the same time, for special and double-malt beers look ready to expand. There should also be a greater consumption of beer in the Mediterranean countries. There will be a general tendency to keep costs down by concentrating production facilities so as to obtain scale economies, as well as better supply and transport organisation and sales prices.

Written by: NOMISMA

The industry is represented at the EU level by: Confederation of Common Market Brewers (CBMC). Address: Boulevard du Souverain 191-197, Bte 10, B-1160 Brussels; tel: (32 2) 672 2392; fax: (32 2) 660 9402; and Working Committee of the Malting Industry of the EU (EUROMALT). Address: Avenue des Gaulois 9, B-1040 Brussels; tel: (32 2) 733 1264; fax: (32 2) 734 6702.



# Soft drinks and mineral waters

NACE 428

The consumption of soft drinks went up through the 1980s thanks to a greater attention on the part of consumers health and physical fitness which fostered the demand for low-calorie soft drinks containing sweeteners in place of sugar and, at the same time, a general swing of preference from more to less alcoholic drinks and, above all to non-alcoholic beverages. Table mineral water has, over the last ten years, virtually become a 'must'. French, Italian and German firms share the continental mineral water market.

## INDUSTRY PROFILE

### Description of the sector

The sector comprises soft drinks which are generally carbonated and prepared with water, sugar (excepting diet and light varieties), fruit juices, fruit extracts and/or other flavourings. Production in the sector is not concentrated in any specific area or country of the EU.

There are various ways to classify the products making up the sector. Among the principal types are fruit-based beverages (e.g. orangeade, lemonade and grapefruit), those with special formulas (colas, tonic waters, etc.), those named from plants (chinotto) and finally, diet drinks. The latter include low-calorie drinks on the one hand, and saline-integrated drinks on the other. A special category is that of tea-based drinks, which are becoming particularly important (some with fruit added). The consumption of such beverages has risen sharply over the last five years.

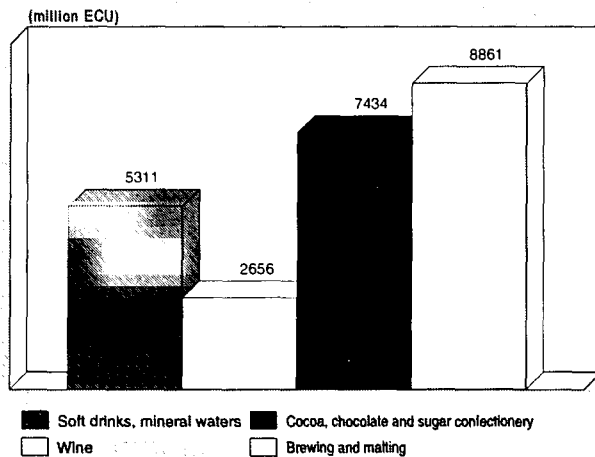
The value added produced by the soft drinks and mineral water sector is twice that of the wine sector, while it is 71 % of the cocoa, chocolate and sugar confectionery sector and 60 % of the brewing and malting sector.

An assessment of the size of the sector in the various EU countries, in terms of value added, shows Germany in the lead, followed by the United Kingdom and France. Such a classification hides a more complex situation, but one that is already visible if the soft drinks and mineral water sectors are taken separately. In both, production capacity depends directly on domestic consumption rates. Such a statement justifies the position of Germany, considering this is the EU country with the highest number of inhabitants and with a per capita consumption among the highest. In fact, both the consumption per capita of soft drinks and mineral water equals 88 litres and underscores eating habits which are much different to those of other EU countries. The United Kingdom, for instance, shows how the domestic soft drinks sector is consistent in terms of domestic consumption, production and number of employed, while the production of mineral waters goes mainly for export. The opposite is true in Italy which, though covering the domestic demand for soft drinks, is undoubtedly specialised in the production of mineral waters.

The biggest producers of soft drinks are Germany (6 670 million litres), the United Kingdom (4 123 million litres), Spain (2 756 million litres), Italy (2 625 million litres) and the Netherlands (1 012 million litres). Germany and Belgium, with 86 litres per person, are the countries with the highest consumption figures, while Portugal, with 36.3 litres per person, is the country where consumption is the lowest.

The biggest producers of mineral water are Italy (6 650 million litres), Germany (6 300 million litres) and France (5 406 mil-

Figure 1: Soft drinks, mineral waters  
Value added in comparison with related Industries, 1993



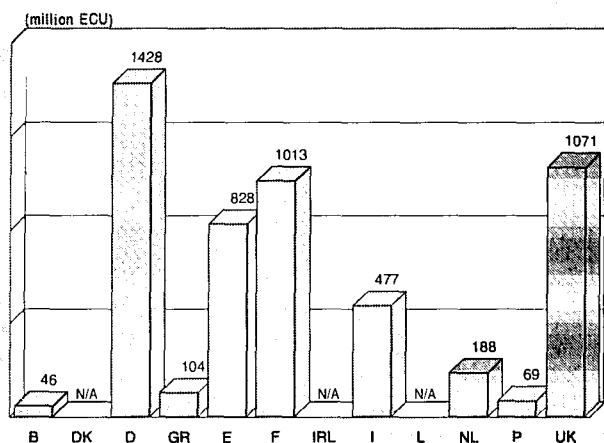
Source: DEBA

lion litres). Spain follows, with 2 001 million litres. With regard to per capita consumption, Italy is in the lead (118 litres) followed by Belgium (106 litres), Germany (92 litres), France (81 litres) and Spain (50 litres). The other countries have a per capita consumption of between 7 and 29 litres. France is the biggest exporter (185 million ECU) and, at the same time, the country with the best trade balance (178 million ECU) (the Netherlands, the United Kingdom and Italy come next). Germany also has fairly high export figures (72.3 million ECU) followed by the Netherlands (58.5 million ECU).

### Recent trends

Over the last decade, production at current prices has more than doubled, going from 8 767 million ECU in 1984 to 18 792 million ECU in 1994 with an annual growth rate of between the 3.6 % of 1991 and the 21.4 % of 1989 (excepting 1993, where a slight decrease was recorded). Apparent consumption shows a slightly higher annual growth rate compared to those recorded for production, but in 1993 there was a drop of 1.5 % compared to the previous year. The value of exports

Figure 2: Soft drinks, mineral waters  
Value added by Member State, 1993



Source: DEBA



**Table 1: Soft drinks, mineral waters**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	8 556	12 385	15 042	16 931	17 472	18 154	17 876	18 643	20 070	21 640	23 310
Production	8 767	12 586	15 281	17 202	17 824	18 469	18 235	19 041	20 500	22 100	23 800
Extra-EU exports	237.0	246.1	308.2	341.1	421.7	393.4	449.7	586.1	650.0	710.0	790.0
Trade balance	211.4	201.2	239.1	271.6	352.3	315.8	358.6	398.6	430.0	460.0	490.0
Employment (thousands)	94.7	95.3	99.6	101.4	101.8	98.3	94.8	91.2	91.0	91.0	91.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Soft drinks**  
**Main indicators by Member State, 1993**

(million litres)	B	DK	D	E	F	GR	IRL	I	NL	P	UK
Apparent consumption	856	338	6 980	2 816	2 257	576	270	2 620	1 138	363	4 123
Exports (1)	217.0	12.5	540.0	31.0	N/A	N/A	34.0	32.0	376.0	N/A	N/A
Imports (1)	219.0	8.5	310.0	60.0	N/A	N/A	90.0	27.0	126.0	N/A	N/A
Production for home market (1)	637	309	6 670	2 756	N/A	N/A	180	2 625	1 012	N/A	4 123
Consumption per capita (litres)	85.6	65.6	86.0	73.7	40.0	57.0	77.0	46.8	74.0	36	73
Number of enterprises (units) (1) (2)	25	9	248	90	N/A	N/A	23	N/A	15	43	70
Employment (units)	3 217	N/A	25 800	13 870	N/A	N/A	2 100	N/A	2 675	2 330	10 000

(1) Denmark, 1992 figures.

(2) Enterprises with 20 or more persons employed.

Source: Unesda

**Table 3: Mineral water**  
**Main indicators by Member State, 1993**

	B	D	E	F	I	IRL	NL	P	UK
Consumption per capita (l)	106	92	50	81	118	8	14	29	7
Production (million litres) (1)	705	6 300	2 001	5 406	6 650	29	59	297	420
Extra-EU exports (million ECU) (2)	17.9	72.3	25.7	185.0	40.5	1.6	58.5	6.1	48.3
Trade balance (million ECU) (2)	14.2	20.5	21.4	178.0	31.8	1.3	56.8	5.8	35.2

(1) France, provisional figures.

(2) Belgian data includes Luxembourg.

Source: GISEM - UNESEM, Eurostat

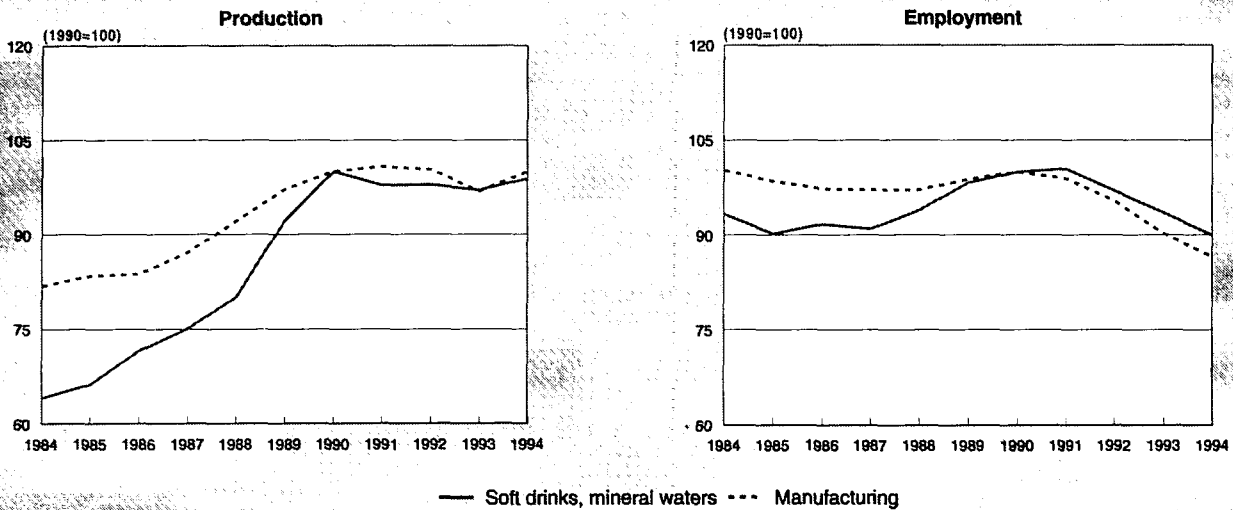
**Table 4: Soft drinks, mineral waters**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	7.65	1.05	4.66	-1.39
Production	7.54	1.28	4.72	-0.84
Extra-EU exports	4.40	12.23	7.81	26.43
Extra-EU imports	19.23	6.73	13.50	21.20

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Figure 3: Soft drinks, mineral waters  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

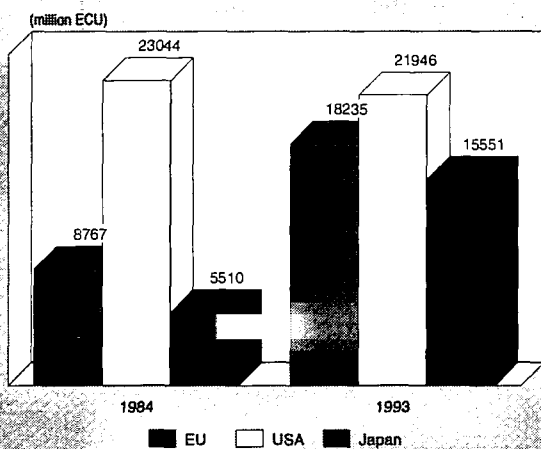
at current prices also doubled, recording in 1989 and 1991 annual growth rates equal to 25.2 % and 23.6 % respectively, thereby consolidating the trade balance which went from 211.4 million ECU in 1984 to 358.6 million ECU in 1993. Employment figures went up from 1985 to 1991, with annual rates between 0.4 % and 4.6 %. Starting in 1992, there was an annual drop of around 3.5 %, which brought the number of employees in the sector back down to 1984 levels.

The consumption of soft drinks most definitely went up during the 1980s. The fitness craze, which provoked a fall in the consumption of alcoholic drinks, at the same time pushed up the consumption of soft drinks and mineral waters. EU production managed to cover internal consumption and also generated a surplus which went completely for export and rose steeply. Between 1984 and 1993, the increase, measured at constant prices, was over 54 % in terms of production, while the value added in the sector underwent a more restricted growth of 22 % going (at 1990 constant prices) from 3 976 million ECU in 1984 to 4 880 million ECU in 1994. The

smaller growth in the sector in terms of value added can be explained in part by the drop in the number of persons employed in the sector, caused by the recession of the early 1990s, which was not followed by an improvement of gross operating margins.

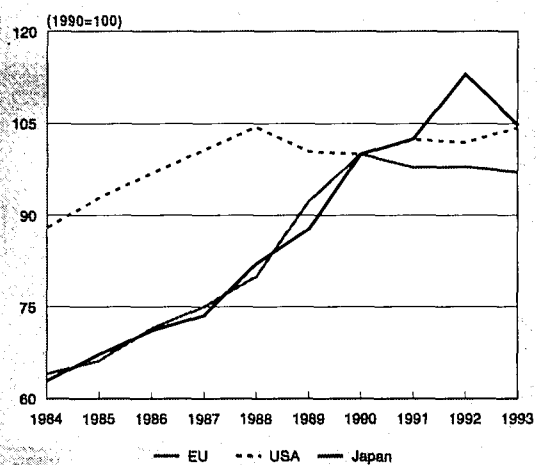
During the 1984-90 period there was a bigger growth of the 1990-base production index in the soft drinks and mineral waters sector than in the manufacturing industry as a whole and, since then, this index has remained practically unchanged, while that of the entire manufacturing industry shows a slightly fluctuating rate around the base-year figure. The production pattern between 1992 and 1994 has strongly affected employment levels in the sector, which appear aligned to those of the manufacturing industry in general. The 1990-base index in relation to the number of employees in the soft drinks and mineral water sector was lower than that of the manufacturing industry during the 1984-94 period. Three separate stages can be highlighted: first, a period of substantial stability from 1985 to 1987; this is followed by a period of growth to 1990,

**Figure 4: Soft drinks, mineral waters  
International comparison of production in current prices**



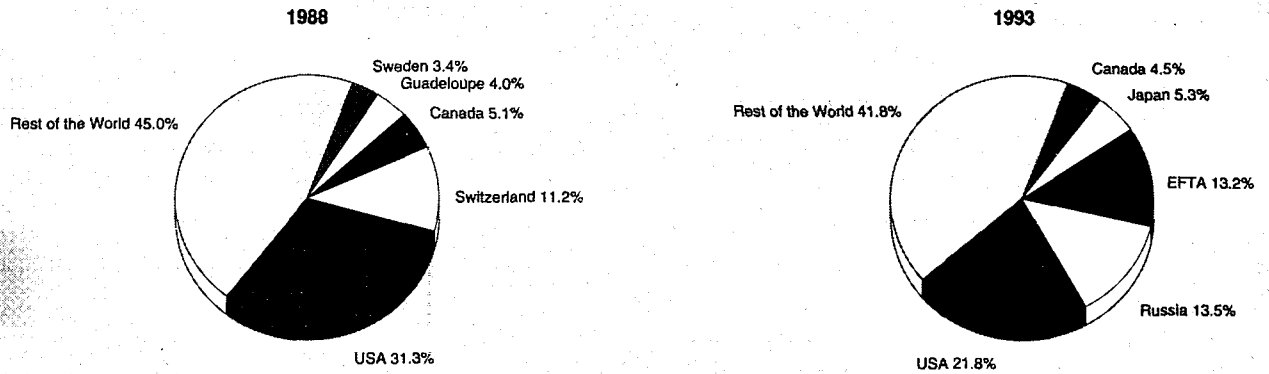
Source: DEBA

**Figure 5: Soft drinks, mineral waters  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Soft drinks, mineral waters  
Destination of EU exports**



Source: Eurostat

after which there is a sharp fall, with annual variations around 3.5 % - slightly lower than those recorded in the manufacturing industry as a whole. This steep drop in jobs brought the number of employed in the industry in 1993 to the same levels as 1984.

#### International comparison

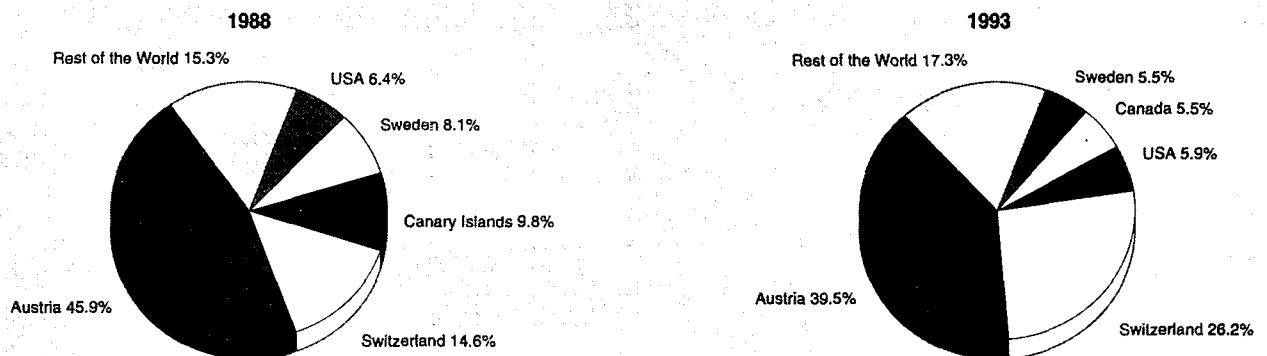
The considerable increase in value at current prices of soft drinks and mineral water production recorded in the 1980s has changed the strength of the EU, USA and Japan. In 1984, European production was around one-third that of the US, while in 1993, the situation was much closer between the two areas. And, although Japan also shows an impressive growth over the period, has not bridged the pre-existing gap with the USA to the same extent. The increased production levels are interesting considering the shrinking employment figures in the sector. And, while production indices of the EU and Japan at constant prices show a general, somewhat parallel upswing in the sector until 1990, patterns thereafter diverge, with a continuing rise in Japanese production and a levelling off of Community production.

#### Foreign trade

A look at imports and exports shows that the sector produces chiefly for domestic markets. The self-sufficiency in terms of EU production is reflected by the level of exports which increased throughout the 1980s, rising almost 90 % between 1984 and 1993. The trade balance, though remaining largely active, must take account of the growth in imports which more than doubled (increasing by 65 %), showing a greater inclination to import as is shown by the export/import ratio which, from 1984 to 1993 went from 9.26 to 4.94. The percentage variations in the 1990 base terms of trade index illustrate a situation marked by an almost regular fluctuations between good and bad years. Finally, in the 1991-93 period the terms of trade index showed an overall drop equal to 16.7 %.

Exports to countries outside the EU changed between 1988 and 1993, with Russia and the EFTA countries taking a larger share. Japan's share also grew while Switzerland, which in 1988 imported 11.2 % of EU exports, drastically reduced this figure in 1993. On the import side, there are no important changes, excepting the increase in Switzerland's share (from 14.6 % in 1988 to over 26.2 % in 1993) and the 6.4 % drop in Austria's share. The structural data which emerge are in and of themselves interesting. In fact, as supplies are con-

**Figure 7: Soft drinks, mineral waters  
Origin of EU imports**



Source: Eurostat

**Table 5: Soft drinks, mineral waters**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	237	233	230	232	246	308	341	422	393	450	586
Extra-EU imports	26	27	31	33	45	69	70	69	78	91	187
Trade balance	211	206	199	199	201	239	272	352	316	359	399
Ratio exports / imports	9.26	8.59	7.36	7.10	5.48	4.46	4.91	6.08	5.07	4.94	3.13
Terms of trade index	96.1	106.2	101.1	109.6	95.7	89.9	100.0	97.6	87.1	81.3	N/A

Source: DEBA

centrated in Austria and Switzerland, the sector there is strongly subjected to localised trade.

Generally speaking, the degree of penetration of imports has undergone a slight increase, going from 0.3 in 1984 to 0.5 in 1994, with an overall growth of 66 % (7 % in 1992 and around 19 % in 1993). The export/production ratio went down in the 1984-90 period, and in 1991 and 1993 recovered to reached the same level recorded in 1985.

## MARKET FORCES

### Demand

Nearly all soft drinks follow a seasonal pattern, with consumption varying between hot months and cold months depending on the type of drink and its use function. The demand for soft drinks and mineral waters is strong throughout the EU and growth is more than proportional compared to the drop in demand for alcoholic drinks. As a result, the per capita consumption of soft drinks within the EU has gone from 44 litres in 1982 to 66 litres in 1993.

Within the total consumption of soft drinks, that of colas is prevalent throughout the EU, with levels between 41 % (France) and 56 % (Greece). Exceptions are Portugal and Italy, where the consumption of fruit juice drinks is prevalent, with respective shares of 47 % and 32.4 %. Fruit juice consumption is also high in the Netherlands, Spain and France, where it touches around 30 %.

On the basis of per capita consumption of soft drinks, Germany leads (86 litres per person), followed by Belgium (85.6), Ire-

land (77), the United Kingdom, the Netherlands and Spain (73), Portugal, with a per capita consumption of 36.3 litres is the back runner. With regard to mineral waters, Italy tops the list (112 litres) followed by Belgium (106 litres), Germany (92 litres) and France (81 litres). Portugal, the Netherlands, Ireland and the United Kingdom have a per capita consumption between 7 and 29 litres.

The general upswing in consumption has occurred not only as a consequence of the fitness craze, but also in response to the deterioration of the quality of tap water. There also has been a general tendency over the last few years for consumer preferences to shift from alcoholic beverages to drinks with low levels of alcohol (or even none), hence the move towards soft drinks. The economic recession has accelerated this trend. The number of teetotalers is also going up, especially among women. Attention to health and physical fitness also has boosted demand for low-calorie drinks, containing artificial sweeteners instead of sugar and salt integrators. The consumption of diet and light soft drinks reached 30 % in the United Kingdom and 33 % in the USA, while the mean European figure is around 9-10 %. The introduction of products with dietetic/light characteristics has helped to alter the competitive balance of corresponding conventional drinks. In fact, light soft drinks occupy areas which once belonged to regular soft drinks and mineral water.

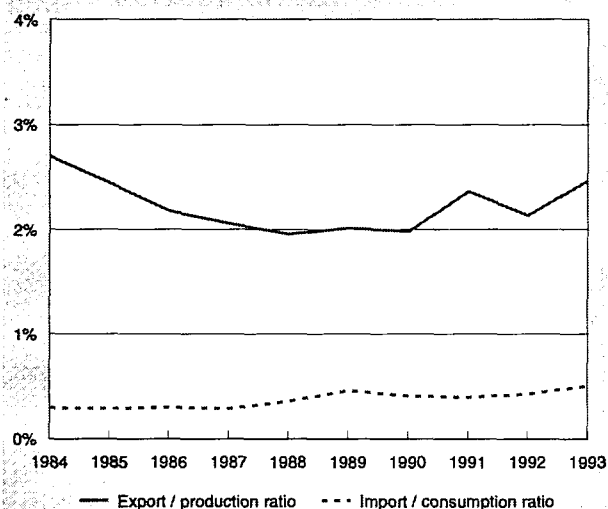
### Supply and competition

Though the drop in employment figures in the sector has improved productivity, it has not been able to prevent the further reduction of the gross operating margin, which had already been undergoing a negative trend since 1987, as a result of the progressive increase of production costs. Starting in 1988, the gross operating margin was reduced at an annual rate between 0.7 % and 7.1 %. The expansion of the hard discount distribution chains and greater consumer concern for prices have spurred soft drink manufacturers to review their brand and promotion strategies. Promotion and advertising are strategically important levers for the marketing of soft drinks and mineral waters.

Within the sector, it is difficult to make comparisons at the international level in relation to the competitiveness of different product systems, due to the high influence of transport costs on retail prices which create big problems of competitiveness in the case of extra-EU exports. The consumption of mineral water, due to high transport costs, is essentially tied to domestic markets.

In 1993, the most utilised packaging for soft drinks in the EU was non-returnable plastic, especially in Italy (64.7 %), but also in other countries, e.g. Ireland (56 %), the United Kingdom (51 %), Spain (43.9 %) and Belgium (43.4 %). In Germany and Portugal, returnable glass/plastic is preferred (respectively 76.7 % and 53.1 %). Metal packaging accounts for a modest share and is most popular in the United Kingdom (30.4 %). Other types of packaging (cardboard, non-returnable glass and pre/post mix) do not account for more than 10 % of the packaging used by the Member States. Two principal marketing channels are used by soft drink manufacturers: the

**Figure 8: Soft drinks, mineral waters**  
**Trade intensities**



Source: DEBA

**Table 6: Soft drinks, mineral waters  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	68.7	73.4	78.0	82.5	85.2	93.9	100.0	97.5	100.9	103.8
Unit labour costs index (3)	101.0	101.9	99.9	99.2	101.1	99.4	100.0	111.0	114.6	113.0
Total unit costs index (4)	80.6	83.6	84.5	85.8	89.9	95.9	100.0	107.2	110.6	110.2
Gross operating rate (%) (5)	14.9	14.8	15.7	16.2	15.1	14.1	14.0	13.0	12.6	12.5

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 7: Soft drinks  
Packaging used, 1993**

(%)	B	D	E	IRL	I	P	UK
Returnable glass / plastic	28.7	76.7	28.7	10.3	10.3	53.1	7.0
Non-returnable plastic	43.4	N/A	43.9	56.0	64.7	27.6	51.0
Metal	19.0	12.8	19.2	21.6	16.4	8.8	30.4
Cardboard	3.0	N/A	0.0	0.0	0.0	2.5	N/A
Non-returnable glass	2.0	10.5	4.3	7.1	3.6	5.1	2.0
Pre / post mix	3.9	N/A	3.9	5.0	4.9	2.9	9.6

Source: Unesda

**Table 8: Soft drinks, mineral waters  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.11	0.75
Danmark	0.38	N/A
BR Deutschland	0.89	0.80
Hellas	2.08	3.66
España	1.82	1.95
France	0.86	1.02
Ireland	N/A	N/A
Italia	0.77	0.78
Luxembourg	N/A	N/A
Nederland	N/A	0.89
Portugal	0.99	0.93
United Kingdom	1.25	1.27

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

'long channel' (company, agent, sales outlet or bar/cafe) and the 'short channel' (direct from manufacturer to retailer). Direct retail is most prevalent where large distribution chains are involved.

### Production process

Production in the sector is not restricted to any particular area or country. In the case of mineral waters, the geographic location of the companies depends on the existence of springs.

One factor which has undoubtedly stimulated the soft drink market is the evolution of packaging, through the use of plastic containers, especially those of the PET type. The trend towards the replacement of glass with plastic materials has been very strong within the entire drinks sector. However, the pace at

which this replacement has gone on, as well as the methods used, have differed greatly from one segment to another. In the soft drinks sector, as in that of mineral waters, the swing towards PVC first and PET next has been strong. While the share occupied by metal cans has remained steady in the soft drinks sector, the use of glass has dropped steeply. Used in both the soft drinks and the mineral waters segments, PET has a high resistance to the pressure of carbon dioxide and better chemical inertia than its predecessor, PVC. Just like glass, PET can be re-closed and is transparent. A possible threat to the use of this material could come from increased legislation on plastic packaging.

## INDUSTRY STRUCTURE

### Companies

A look at the evolution of the production specialisation index over the 1984-93 period shows that Greece is the only country whose index has risen, going from 2.08 to 3.66, while Belgium showed the biggest fall, going from 1.11 to 0.75. The data available for the other countries shows minimum fluctuations.

In the soft drinks sector, the level of concentration is very high and is tied to the existence of just a few large multinationals (Coca-Cola, Pepsi-Cola, Cadbury and Schweppes). In the mineral water sector on the other hand, three types of company stand out: regional, national and supranational.

French, Italian and German firms share the continental mineral water market. First on the list are the two French giants Perrier and Evian, followed at a distance by Vittel (F), Volvic (F), and four Italian firms: Sangemini-Ferrarelle, San Pellegrino, San Benedetto and Crippa & Berger Levissima.

### Strategies

In the soft drinks sector, where the areas of taste and consumption are well outlined and now widely consolidated, in-

**Table 9: Soft drinks, mineral waters  
Acquisitions**

1993 Bidder	Country	Target	Target country
Nestlé	Switzerland	Deer Park Spring Water	USA
BSN	France	Aguas de Lanjaron	España
BSN	France	Ardes-sur-Couze Spring	France
Castel Freres	France	Source-Perrier (Mineral Water Brands)	France
Castel Freres	France	Source-Perrier (Pierval Mineral Water)	France
Mineralbrunnen Ueberkingen Teinach	BR Deutschland	Afri-Cola Bluna	BR Deutschland
Knorr Family (1)	España	Agua de San Martin de Veri	España
Allied-Lyons	United Kingdom	Ballygowan Spring Water Company	Ireland
Allied-Lyons	United Kingdom	N/A	Ireland
Cadbury Schweppes	United Kingdom	A&W Brands	USA
Cadbury Schweppes (1)	United Kingdom	Dr Pepper/Seven Up Companies	USA
Rutland Trust	United Kingdom	Benjamin Shaw & Sons	United Kingdom
Coca Cola	USA	Coca-Cola Beverages Nederland	Nederland
Coca Cola (1)	USA	Femsa Refrescos	Mexico
PepsiCo	USA	Capital Mineral Water & Soft Drinks Co	Hungary
PepsiCo	USA	Fovarosi Asvanyviz es Uditoipari	Hungary
Amatil (Coca Cola)	Australia	Djaya Beverage Bottling	Indonesia
1994 Bidder	Country	Target	Target country
Nestlé	Switzerland	Sources du Col-Saint-Jean	France
Nestlé (1)	Switzerland	CFHR (San Pellegrino)	Luxembourg
MD Foods Amba	Danmark	Rynkeby Mosteri	Danmark
BSN	France	Aquaterra	Canada
Bad Brambacher			
Mineralquellen	BR Deutschland	Bad Brambacher Sprudel	BR Deutschland
Gerolsteiner Brunner & Co	BR Deutschland	Terme di Sant'Andrea	Italia
Pasquali	Italia	San Bernardo	Italia
Nordic Capital Svenska	Sweden	Falcon AB (Unilever)	Sweden
Cott Corporation	Canada	Benyamin Shaw & Sons	United Kingdom
Coca Cola	USA	Vinto Minerals	South Africa
Pepsico	USA	Duke & Sons	India
Panamerican Beverages (1)	Mexico	Azteca	Mexico
Coca Cola	Australia	CCA	Poland
Swire Pacific (1)	Hong Kong	Coca-Cola Swire Beverages	Hong Kong
Consortium	N/A	Egyptian Bottling Co	Egypt

(1) Diversified company.

Source: Nomisma

novation concerns marketing more than the products themselves.

The unitary value, weight and volume of the products contribute to storage and transport costs far above those of other consumer goods. Consequently, the market areas for the individual production facilities are somewhat limited.

Mineral waters can be distributed regionally, nationally and internationally, depending on the size of the firm, the customers' perception of intrinsic and extrinsic qualities, etc. The mineral waters which go for export (e.g. Perrier and San Pellegrino) are those with the greatest value added and which are the most diversified, destined for the medium-high income consumer segments.

Investments in advertising take up a substantial share of the total costs borne by the manufacturers. Marketing and product communication strategies have contributed heavily to the sector's success. These are based on carefully studied placing and focus on specific functions and uses, the widening of the product range and the efficient distribution policies of the larger companies, which have permitted a diffuse presence

of products in various businesses and sales outlets. The globalisation of tastes on an international scale has also helped to push up sales. Finally, the gradual pollution of ground water has forced consumers to turn to mineral waters and soft drinks, and the arrival of products on the mass market has considerably enlarged the potential consumer base.

In 1993, 17 mergers and acquisitions took place, of which 11 involved multinational groups of the EU, especially from the British (5 operations) and French groups (4 operations). The phenomenon has slowed down due to the recession of recent years. In 1994, there were 14 mergers and acquisitions, of which only 4 involved European groups.

#### Impact of the Single Market

The impact of the creation of the Single market on the soft drinks and mineral water sector has been globally positive, increasing firms' efficiency at satisfying consumer demand satisfaction and dismantling barriers to intra-EU trade, as the regulations on additives had been before harmonisation. Moreover it favoured international trade thanks to the abolition's



of controls at internal frontiers. Higher costs were, however, generated by the approval of the packaging regulation.

The harmonisation of VAT within European Countries, the prevention of new national barriers connected to the environmental issue and the creation of a single EU currency are the main priorities for the industry.

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## ENVIRONMENT

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The widespread use of PET and PVC for packaging made the disposal of these plastic containers more acute and leads the sector to waste closely with consumers, distributors and local authorities to set-up environmentally-friendly packaging systems.

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## REGULATIONS

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The basic directive regulating the exploitation and marketing of mineral waters is Directive 80/777. A draft proposal of this directive has been done in which the European mineral waters industry has asked for its revision and the update of certain technical provisions to it. As part of the discussions under way, the Commission declared its willingness to regulate spring and mineral waters separately (such an approach is contained in document III/5502/93 - Rev.2).

EU Directive 94/62, which has introduced a series of measures concerning the recovery and recycling of food packaging, will oblige companies to adopt adequate packaging and change supply and transport organisation within the sector in order to facilitate and expand the collection and recycling of packaging.

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## OUTLOOK

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The gradual shift in consumer tastes from alcoholic to soft drinks will positively affect the growth of consumption in this sector. In particular, greater attention to health and fitness will increase the popularity of light and sports drinks. Similarly, the gradual deterioration of ground water sources will push up the consumption of mineral water. Such growth in the sector will favour concentration and stimulate more acquisitions.

Written by: NOMISMA

The industry is represented at the EU level by: Union of Soft Drink Associations (UNESDA). Address: Boulevard Louis Schmidt 35, Bte 14, B-1040 Brussels; tel: (32 2) 735 3749; fax: (32 2) 732 5102.



# Tobacco

## NACE 429

The tobacco industry has a high value added concentrated mainly in the processing stage of production. The consumption of cigarettes began to drop in many EU countries in 1992 and 1993. Production, which for many types of tobacco does not respond to market requirements, will fall in the future due to the lowering of the ceiling set by the Community. This is likely to provoke a rise in unemployment - particularly in the Mediterranean growing areas - given the labour-intensity of tobacco manufacture.

### INDUSTRY PROFILE

#### Description of the sector

The industry comprises the growing and processing of tobacco to make cigars, cigarillos, cigarettes and other products like pipe tobacco, chewing tobacco, cut tobacco for cigarettes and agglomerated sheets (NACE 429). The main types of tobacco grown in the EU are: Flue Cured (e.g. Virginia), Light Air cured (e.g. Burley), Dark Air cured (e.g. Paraguay), Fire cured (e.g. Kentucky), Sun cured (e.g. Herzegovina), Basmal, Katerini and Kaba Koulak classic.

Altogether, the EU accounts for 9 % of world production. In the EU, the main producers are Italy with 45 % of overall production, Greece with 32 %, Spain with 11 %, and, to a lesser extent, France and Germany.

The tobacco industry has a high value added, equal to 44 669 million ECU, far above that of related sectors like mineral water and soft drinks, beer, cocoa-based products, sweets and ice cream, which already are considered to be in the high-margin bracket. The countries of the EU which most strongly contribute to this value added are the United Kingdom, Germany and Spain.

With regard to processing, the biggest EU labour forces are in Germany, The Netherlands and the United Kingdom, while Italy, Spain and Greece have the highest work forces engaged in cultivating tobacco.

#### Recent trends

At current prices, apparent consumption rose until 1990 and then levelled off; production levels followed a similar trend. Exports also went up, while the trade balance fluctuated.

1992 shows a drop in tobacco production of around 11 %, caused by the reform of the Common Agricultural Policy (CAP), which resulted in a shrinkage of cultivated land area, and also by the prolonged drought in Greece (Europe's second largest producer), where tobacco yield fell by around 24 %.

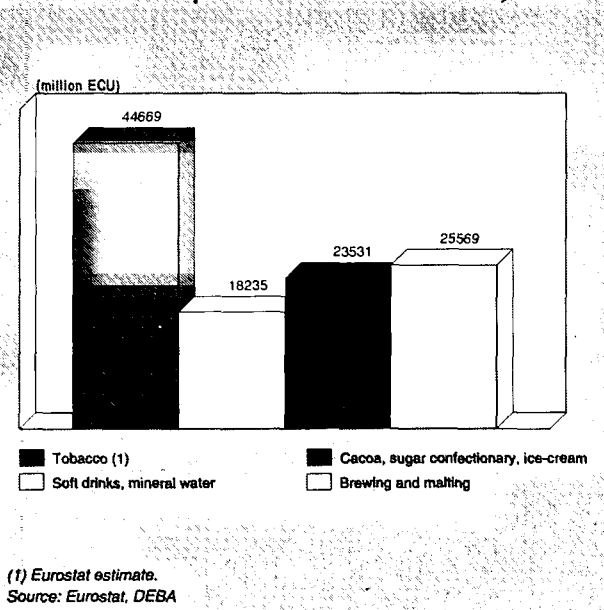
Average real annual growth rates for production and apparent consumption have been substantially stagnating over the decade; the sudden increase between 1989-1993 was mainly caused by the reunification of Germany.

Extra-EU exports have been growing since 1989, after dropping between 1984-89. In fact, levels between 1992-93 increased by 8.16 %. Extra-EU imports showed a similar dynamic even though the 1989-93 increase was at 21.12 % and 1992-93 showed a drop of 13.23 %.

#### International comparison

The USA, though with production levels far above those of the EU (728 801 tonnes in 1993 as compared to 179 430 tonnes) has a production value at current prices substantially below those of the EU (24 564 million ECU as opposed to

Figure 1: Tobacco  
Production in comparison with related industries, 1993



39 671 million ECU). This situation persisted through the 1984-93 period.

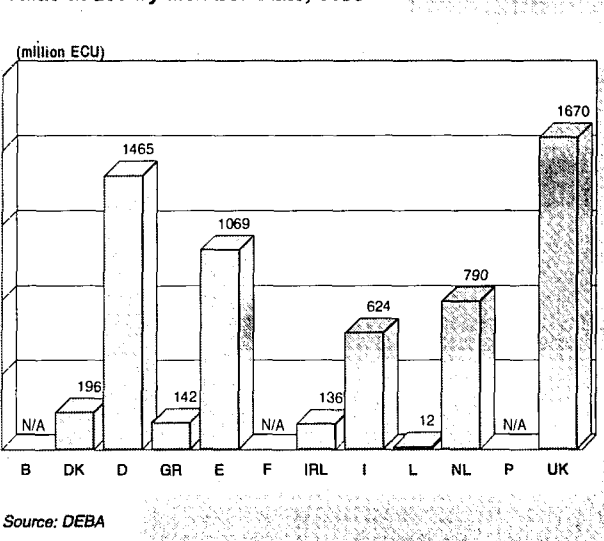
The pattern of EU production at constant prices showed an ongoing increase with strong variations in 1993. Prices in Japan and the USA on the other hand, were less stable; and while the former underwent a slight upswing until 1992, the latter recorded a fall. This trend can be attributed to drops in cultivated land area and in yield per hectare. In 1993, such drops had a particularly significant affect on Flue Cured and Burley crops.

Similarly, economic and social problems between 1992-93 caused production to drop in Cuba by around 50 %. Conversely, strong growth was recorded in the East European countries, especially Poland and Romania which practically doubled their tobacco production in only two years.

#### Foreign trade

In 1988, EU exports went mainly to the Middle East (about 17 %) and south-east Asia (14 %). By 1993, the EU's export

Figure 2: Tobacco  
Value added by Member State, 1993



**Table 1: Tobacco**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	31 139	31 998	31 647	32 468	32 836	34 501	36 213	39 251	38 584	39 093
Production (2)	31 576	32 594	31 983	32 716	33 184	34 960	36 791	39 993	39 525	39 671
Extra-EU exports	665	713	612	595	648	740	890	1 211	1 424	1 523
Trade balance	437	596	336	248	349	459	579	741	941	577

(1) Some country data for apparent consumption and production have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 2: Tobacco**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.46	1.63	0.98	0.39
Production (2)	0.38	1.85	1.03	0.89
Extra-EU exports	-0.51	17.17	6.99	8.16
Extra-EU imports	11.03	21.12	15.41	-13.23

(1) Some country data for apparent consumption and production have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 3: Tobacco**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	665	713	612	595	648	740	890	1 211	1 424	1 523	1 062
Extra-EU imports	229	117	276	346	299	280	311	470	483	946	898
Trade balance	437	596	336	248	349	459	579	741	941	577	164
Ratio exports / imports	2.91	6.09	2.22	1.72	2.17	2.64	2.86	2.58	2.95	1.61	1.18
Terms of trade index	58.9	64.2	68.6	76.2	90.2	92.5	100.0	102.4	147.1	64.4	N/A

Source: DEBA

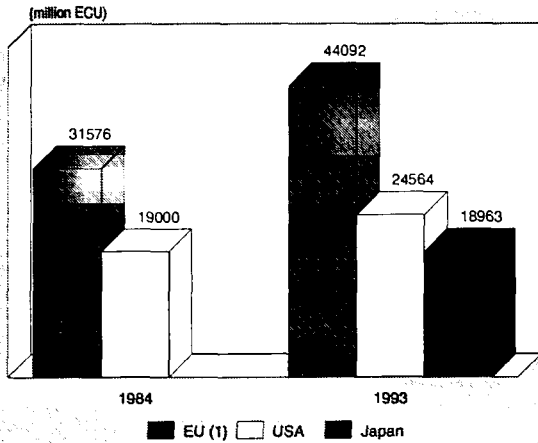
**Table 4: Tobacco**  
**External trade - Tobacco leaf**

(thousand tonnes)	1989	1990	1991	1992	1993
Imports					
World	1 413	1 460	1 631	1 709	1 645
EU (1)	614	627	692	677	553
Five largest non-EU importers					
USA	194	199	267	325	360
Japan	86	80	101	117	119
Former Soviet Union	38	36	35	35	105
Egypt	43	48	42	47	44
Indonesia	14	26	28	25	30
Exports					
World	1 432	1 516	1 653	1 684	1 664
EU (1)	305	340	352	343	321
Five largest non-EU exporters					
USA	231	230	229	230	212
Brazil	194	188	191	200	243
Zimbabwe	104	116	126	151	187
Malawi	117	95	137	95	91
Turkey	58	70	69	75	78

(1) Including former East Germany from 1991.

Source: FAO

**Figure 3: Tobacco**  
International comparison of production in current prices



(1) Eurostat estimates.  
Source: Eurostat, DEBA

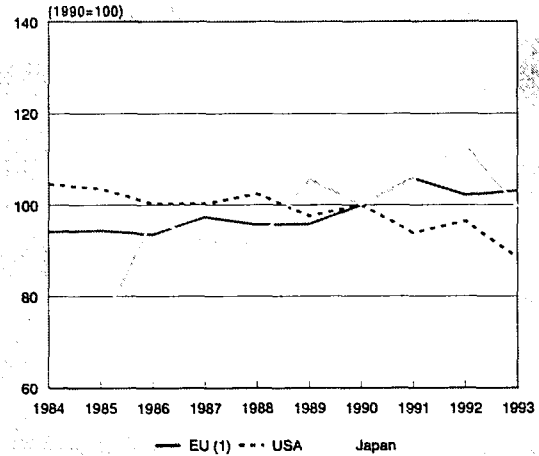
partners had changed radically, with the Far East's share almost doubling and the appearance of Russia. Exports to the USA are expected to drop considerably over the next few years, though in any case they are not particularly significant. The further drop will reflect regulations whereby 75 % of tobacco used to make certain cigarettes must be of domestic origin, and the fact that the American anti-smoking laws have become even stricter.

With regard to imports, the Canary Islands supply more than half the EU's tobacco. In 1993, the market share of the Canary Islands was strengthened, while imports from the USA and Cuba decreased by around 50 %.

The penetration of imports has increased steadily over the decade, as foreign tobaccos meet the needs of the EU market better than those produced by the Member States. 45-50 % of Community imports are made of Virginia flue cured. Despite this, since 1987 there has been a sustained increase in exports as well, chiefly of dark tobaccos to the less demanding markets.

At the global level, the EU is the biggest importer of tobacco leaves and accounts for about half of all world imports, though

**Figure 4: Tobacco**  
International comparison of production in constant prices



(1) Eurostat estimates.  
Source: Eurostat, DEBA

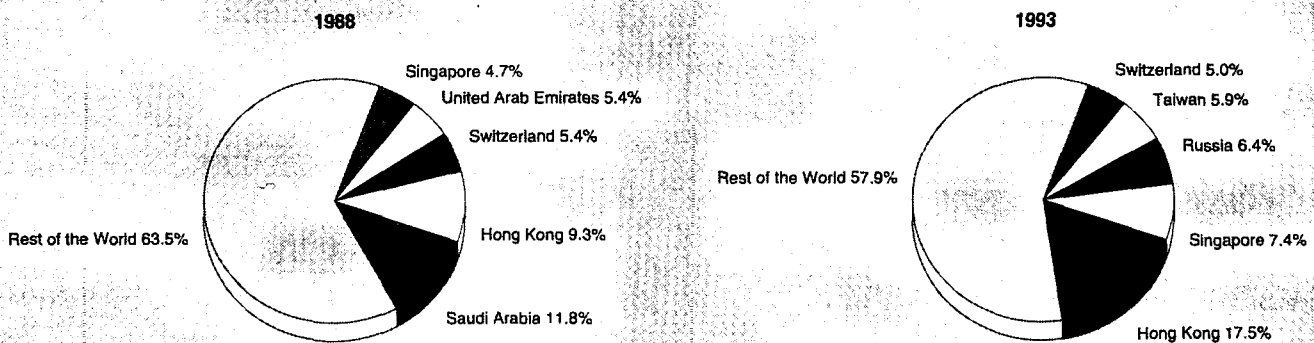
this figure fell a little in 1993. Among the major importers are the USA, Japan and the former Soviet Union. Raw materials originate in countries with favourable climatic conditions for growing tobacco, e.g. Brazil and some African countries. In 1993, trade in tobacco leaf fell slightly, causing a drop in imports. The global trade of cigarettes on the other hand, rose in 1993: the contribution of the EU in terms of imports and exports was 24 % and 28 % respectively.

## MARKET FORCES

### Demand

Over the last 20 years, there has been an overall redirection of demand for tobacco-based products. Consumption has turned prevalently to cigarettes, while there has been a drop in the consumption of pipe tobacco, cigars, etc. From 1987 to 1992, the production of cigarettes went up, especially in Spain, Germany and The Netherlands. Meanwhile, Italy and France experienced a drop in production, and in 1993 there was a general drop in all Member States. The cigarettes which have undergone the biggest growth rates are lights and filter

**Figure 5: Tobacco**  
Destination of EU exports



Source: Eurostat

**Table 5: Tobacco**  
**External trade - Cigarettes**

(thousand tonnes)	1989	1990	1991	1992	1993
Imports world	405.6	461.4	525.3	563.6	573.5
EU (1)	122.9	129.8	135.6	144	142.1
Five largest non-EU importers					
Former Soviet Union	55.5	77.7	96.5	91.5	68.8
Japan	45.7	51.8	55.4	57.1	58.7
Saudi Arabia	18.0	18.5	19.0	19.0	19.5
USA	2.6	2.7	5.6	9.4	17.3
Colombia	14.0	13.4	13.9	14.4	14.3
Exports world	506.5	623.6	712.1	801.3	777.5
EU (1)	172.3	196.9	238.1	247.8	218.7
Five largest non-EC exporters					
USA	141.7	164.3	179.4	205.6	195.5
Indonesia	9.9	14.4	15.1	23.0	22.7
Bulgaria	68.8	61.2	60.6	39.0	22.6
Switzerland	12.5	15.4	16.9	18.2	17.8
Former Soviet Union	0.0	2.5	2.5	2.0	2.9

(1) Including former East Germany from 1991.  
Source: FAO

**Table 6: Tobacco**  
**Cigarette consumption, 1992**

(billion)	Total	Per capita (cigarettes / year)
EU (1)	579.2	1 672
Belgique/België, Luxembourg	17.7	1 758
Danmark	8.5	1 641
BR Deutschland (1)	131.2	1 628
Hellas	28.3	2 735
España	84.5	2 159
France	96.3	1 674
Ireland	6.0	1 687
Italia	88.2	1 549
Nederland	17.6	1 155
Portugal	15.7	1 592
United Kingdom	89.6	1 546

(1) Including former East Germany.  
Source: CECCM

**Table 7: Tobacco**  
**Cigarette production**

(millions)	1987	1988	1989	1990	1991	1992	1993
EU	651 767	654 569	661 401	698 924	719 684	719 074	694 057
Belgique/België, Luxembourg	26 877	27 046	25 884	25 977	25 419	27 885	25 492
Danmark	11 162	11 144	11 205	11 387	11 407	11 439	10 980
BR Deutschland	190 340	191 322	189 551	204 651	221 111	222 399	207 714
Hellas	28 853	28 780	28 533	29 430	29 050	29 250	28 800
España	80 500	78 400	79 500	82 500	85 000	89 500	82 135
France	54 160	53 307	54 225	55 495	50 311	53 312	47 912
Ireland	7 700	7 750	7 800	7 850	7 850	7 850	7 850
Italia	70 339	66 486	67 759	61 746	57 642	53 704	54 890
Nederland	52 335	61 724	68 849	78 345	87 078	81 440	84 251
Portugal	14 966	14 610	14 595	15 526	15 659	15 757	15 476
United Kingdom	114 535	114 000	113 500	126 017	127 203	126 538	128 557
USA	689 400	694 500	677 200	709 700	694 500	718 500	661 000

Source: FAO

**Table 8: Tobacco  
Employment by country, 1993**

(units)	
Belgique/België, Luxembourg	4 217
Danmark	1 532
BR Deutschland	15 091
Hellas	7 827
España	9 394
Ireland	1 419
Italia	17 112
Nederland	5 587
Portugal	1 685
United Kingdom	9 924

Source: DEBA

cigarettes, with a preference for Virginia cured and American blend tobaccos.

As regards per capita consumption, in 1992 the biggest quantities were consumed in Greece and Spain, while the other countries show fairly uniform figures. It should be noted that in The Netherlands, despite that country's considerable increase in production, per capita consumption is low, with a significant tendency to export.

### Supply and competition

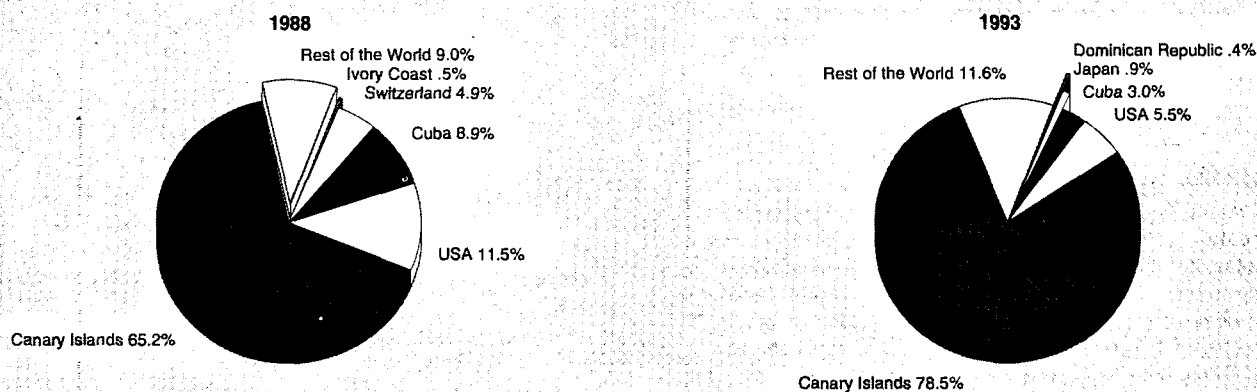
The EU is the world's fifth biggest producer of tobacco with a share of around 9 %. The major producing countries are in Asia (with an overall production of 4.8 million tonnes), specifically China, with a production of 3.5 million tonnes, India (576 000 tonnes), Indonesia (162 000 tonnes) and the Philippines (114 000 tonnes). These are followed by the USA (887 000 tonnes), South America (820 000 tonnes) - including Brazil (600 000 tonnes) and Argentina (107 000 tonnes) - and finally, the former Soviet Union (245 000 tonnes). During

**Table 9: Tobacco  
Acquisitions**

1993 Bidder	Country	Target	Target country
BAT Industries	United Kingdom	American Tobacco Co	USA
BAT Industries	United Kingdom	Seratov Tobacco Factory	Russia
Philip Morris	USA	Tabak Kutna Hora	Czech Republic
Philip Morris	USA	Klaipeda Tobacco Company	Lithuania
Philip Morris (1)	USA	Almaty Tobacco Kombinat	Kazakhstan
Philip Morris (1)	USA	Krasnodar Tobacco Factory	Russia
RJR Nabisco	USA	N/A	España
Universal Corporation	USA	Nyidofer	Hungary
1994 Bidder	Country	Target	Target country
Philip Morris	USA	N/A	Ukraine
Tchibo Holding SUB Reetsma	BR Deutschland	N/A	Ukraine

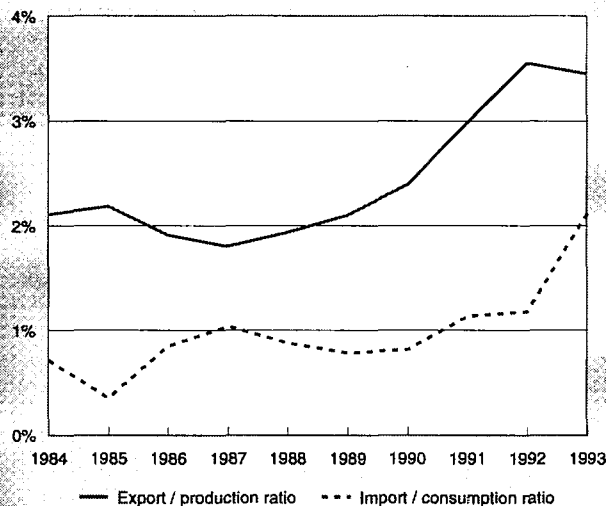
(1) Diversified company.  
Source: Nomisma

**Figure 6: Tobacco  
Origin of EU imports**



Source: Eurostat

**Figure 7: Tobacco Trade intensities**



Source: DEBA

recent decades, there has been a progressive increase in the production of tobacco in the developing countries (i.e. Asia and South America), which have lower labour costs - a factor accounting for about 35-40 % of overall costs - and more favourable weather conditions.

Community production is more focused on oriental tobaccos which, though the demand for these at the world level is on the upswing, have high production costs compared to those of other producer countries. Bigger problems affect the six other types of tobacco produced in the EU (Flue Cured, Light Air Cured, Burley, Dark Air Cured, Fire Cured, Classical Oriental and Oriental Filler), which, for the most part, are not of high enough quality to meet market requirements or do not possess sufficiently distinctive traits to distinguish them from foreign tobaccos (e.g. Burley).

### Production process

Over the last 10 years, the processing industry has concentrated its efforts on introducing innovative production processes through high technology which allows big savings of raw materials. In particular, expanded tobacco and techniques permit the re-use of dusts and shreds.

Generally speaking, consumer preference for light cigarettes has been met without altering blends. Rather, changes to the filters used and the degree of ventilation of cigarette papers and/or cigarette holders have been made. At the agricultural level, varieties of tobacco are being selected which have a low content of nicotine and tar, and are particularly outstanding in terms of flavour.

## INDUSTRY STRUCTURE

### Companies

The tobacco industry is distinguished by a high degree of concentration, with the existence of state monopolies in many EU countries and the presence of multinational companies serving global markets. During the 1991-92 period, the state monopolies of France (Seita), Spain (Tabacalera) and Italy accounted for 50-60 % of domestic markets, while the major private companies were BAT Industries, Hanson Imperial and Rothmans International (UK). Other multinational companies with significant shares of the EU market are Philip Morris, American Brand and RJR Nabisco (USA). At the agricultural level, concentration remains high with 90 % of tobacco leaf

marketing and about 40 % of processing in the hands of transnational tobacco conglomerates.

The highest degree of specialisation is found in Denmark and Greece. From 1984 to 1993, most countries maintained the relative importance of the tobacco industry to the entire economic system. An exception was the United Kingdom, where the sector declined in significance and Portugal, where a significant increase in activity was recorded.

### Strategies

The tobacco industry is distinguished by products that are essentially differentiated through marketing strategies which highlight packaging and associate cigarette smoking with a particular social status. The slowdown in cigarette consumption in most European countries has fostered a process of acquisitions directed primarily towards new markets, e.g. the East European countries where health and consumer safeguarding systems are not yet very developed. Over the 1993-94 period, ten operations were concluded, mainly by US and British multinationals.

### Impact of the Single Market

The creation of the Single Market has been globally positive, albeit small. It has affected in particular trade intensity, thanks to the reduction of controls at internal frontiers. The very limited nature of the impact is mainly due to the fact that the industry has been deeply regulated by tobacco CMO since 1970.

The reduction and the harmonisation of VAT taxation on cigarettes, the harmonisation of advertising towards a less severe legislation, and less constraining policies for smokers are priorities for the industry.

## REGULATIONS

The Common Market Organisation of tobacco became effective with Regulation 727/70, as amended by Regulation 860/92. The regulation of 1970 underwent various amendments through Regulation 2075/92, which represents the new basic regulation.

The most significant aspects distinguishing the new organisation of the sector are:

- since 1993, the Council no longer fixes an institutional price; rather, a system of financial incentives for the various categories of tobacco exists;

**Table 10: Tobacco Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.4	0.4
Danmark	2.0	1.8
BR Deutschland	0.9	0.9
Hellas	2.2	2.1
España	0.7	0.8
France	N/A	N/A
Ireland	N/A	N/A
Italia	0.9	1.0
Luxembourg	N/A	N/A
Nederland	N/A	1.4
Portugal	0.5	1.3
United Kingdom	1.8	1.4

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

- in the raw tobacco sector, customs tariffs ensure limited protection, while the incentive system compensates for the difference between the price of Community tobacco and that of imported tobacco;
- no more repayments are called for on exports, though repayments must still be made on 1990, 1991 and 1992 harvests;
- public storage has been abolished;
- the incentive system is aimed at guaranteeing income for growers, as well as fostering market orientation; and
- a global production ceiling is fixed for the entire Community (370 thousand tonnes in 1993 and 350 thousand tonnes in 1994), split between tobacco varieties and among Member States. Passing this threshold means no longer being eligible for financial incentives for surplus production (the 'guaranteed thresholds' are contained in Regulation 2076/92, as amended by Regulation 164/94).

Procedures for the implementation of quotas in the raw tobacco sector (Regulation 3477/92) have been amended by Regulation 268/94, in consideration of the fact that guaranteed thresholds for the 1994 crop are, compared to those of 1993, higher for some varieties and lower for others.

With the aim of concentrating supply and adapting to the quality needs of the market, aid equal to 10 % of financial incentives is provided in the event of agricultural agreements being signed between a primary processing company and an association of growers, and on the condition that the agreement covers the entire production of the group of growers.

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## OUTLOOK

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The lowering of the overall production ceiling and market redirection policies relating to the varieties of tobacco grown in the EU will lead to greater unemployment, especially in the Mediterranean countries specialising in tobacco production. Production in the EU will furthermore have to be redirected towards tobacco crops with the greatest market demand. This situation is aggravated by the tendency towards a drop in consumption and production mainly affecting France, Spain, Germany and Denmark.

An increase in the number of acquisitions aiming at greater penetration and consolidation in new markets is expected. At the same time, European tobacco companies will have to concentrate their research on low-tar and nicotine production.

Written by: **NOMISMA**





Overview

NACE 43, 44, 45

The sector can be divided into the upstream industries of textiles and leather and the downstream industries of clothing and footwear. The links between the industries are strong, with the clothing industry being the destination of about half the output of the textile industry and the footwear industry accounting for almost half the leather production.

In terms of employment, the sector is very important, with a labour force of about 2.5 million units in 1994. However, employment in the sector has declined by about 30 % during the 1984-94 period.

After the fall in production recorded for two consecutive years, in 1994 the sector's output has risen slightly, and forecasts for the medium term are encouraging. As growth in production will lag behind growth in consumption, however, the trade balance deficit for the EU textiles, clothing, footwear and leather industry is bound to increase in the medium term.

INDUSTRY PROFILE

Description of the sector

The textiles and clothing industries represent together about 86 % of total production of the sector, the footwear and leather industry accounting respectively for about 9 % and 5 %. Hence, the analysis in this overview will concentrate on textiles and clothing, whose trends affect the entire sector of textiles, clothing, leather and footwear. For details on the footwear and leather sector, the reader should refer to the specific chapters.

The textile and clothing industries cover all production processes required for the manufacture of garments, from fibre preparation to clothing finishing. The textile industry also covers the manufacture of household and technical textiles.

In 1993, the two industries employed nearly 2.4 million, which represents about 10 % of manufacturing employment in the EU. Together, they accounted for 5 % of the manufacturing industry's value added. The industry is mainly concentrated in Italy, Germany, France, and the UK.

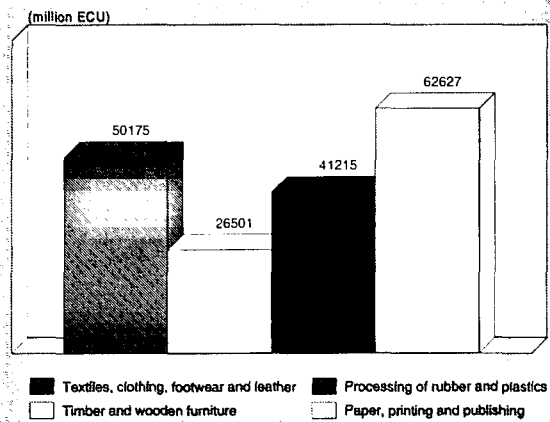
In the future, industry will have to face a changing international environment, as 1994 has seen the final conclusion of the GATT Uruguay Round negotiations. This means that quantitative limitations on imports of textiles and clothing will be gradually phased out over a ten-year period starting in 1995. This liberalisation is expected to increase competitive pressure on EU producers, partly via a reduction in import prices.

Recent trends

Both the textile and clothing industries were badly hit by recession. Apparent consumption of textiles and clothing decreased in 1993 by 9 % in current prices, while 1994 is expected to have experienced a slight rise. Consequently, production fell by 10.2 % in 1993 in current prices, while production for the manufacturing industry as a whole fell by 4.5 %. In constant prices, production fell by 6.3 % in 1993. This reduction in production was accompanied by a fall in employment of 139 000 (5.4 %) in 1993. The two industries thus shed employment of 731 000 between 1984 and 1993, of which 492 000 in textiles and 239 000 in clothing.

The two industries had a trade deficit around 13 billion ECU between 1991 and 1993, which is expected to worsen further

Figure 1: Textiles, clothing, footwear, leather Value added in comparison with related Industries, 1993



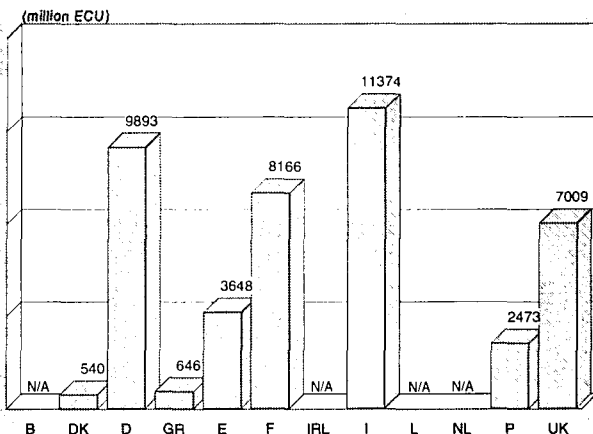
Source: DEBA

in the next years. This deficit is mainly due to large imports of clothing and the inclusion of raw material imports. The export/import ratio for clothing was 39 in 1993, compared to a ratio of 87 for textiles. In addition, as textile imports used here include raw materials and knitwear, the export/import ratio for textiles becomes 127 in 1993 when excluding these imports.

International comparison

The EU is a much larger producer of textiles and clothing than the USA and Japan. In 1993, EU production was 43 % higher than in the USA and more than double the production in Japan. The market for textiles and clothing in terms of consumption indicates even larger differences, as EU apparent consumption in 1993 was 66 % higher than in the USA and nearly three times higher than in Japan.

Figure 2: Textiles, clothing, footwear, leather Value added by Member State, 1993 (1)



(1) Data is for enterprises with 20 employees and more only. Excluding leather tanning and finishing.

Source: DEBA



**Table 1: Textiles, clothing, footwear, leather  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)
Apparent consumption	146 306	179 619	188 335	198 072	205 888	204 414	187 439	163 424	194 980
Production	146 435	174 444	183 958	190 992	192 789	191 938	174 274	176 791	180 500
Extra-EU exports (4)	20 786	22 678	26 730	27 566	27 367	28 489	30 021	32 256	33 500
Trade balance (4)	130	-5175	-4377	-7080	-13099	-12476	-13165	13367	-14480
Employment (thousands)	3528	3279	3231	3118	3012	2839	2683	2528	2450

(1) Some country data for apparent consumption, production and employment have been estimated. Production, employment and trade data are for all sizes of firms.

(2) DRI, OETH and Cotance estimates.

(3) DRI, OETH and Cotance forecasts.

(4) Including raw materials and knitwear.

Source: OETH, Cotance, DEBA, Eurostat

**Table 2: Textiles, clothing, footwear, leather  
Breakdown by major industries of the sector, 1993**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Textiles	94 053	91 497	17 094
Clothing	70 336	59 438	7 086
Footwear	16 718	16 270	4 349
Leather	6 332	7 069	1 492

Source: OETH, Cotance, DEBA, Eurostat

**Table 3: Textiles, clothing, footwear, leather  
Average real annual growth rates (1)**

(%)	1984-89 (2)	1989-93	1992-93
Apparent consumption	2.6	-0.1	1.4
Production	2.3	-1.6	0.5
Extra-EU exports	-1.5	-1.2	-2.6
Extra-EU imports	5.1	7.3	12.7

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Extra-EU exports and extra-EU imports: 1985-89.

Source: OETH, Cotance, DEBA, Eurostat

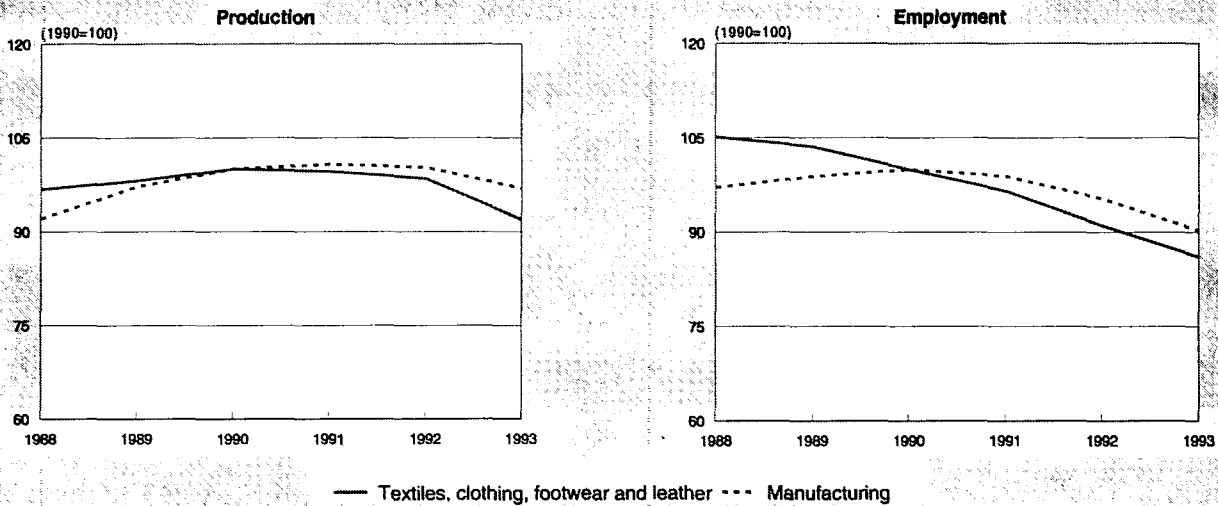
**Table 4: Textiles, clothing, footwear, leather  
External trade in current prices (1)**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	23 669	22 310	21 886	22 678	26 730	27 566	27 367	28 489	30 020	N/A
Extra-EU imports	22 293	22 192	25 605	27 854	31 107	34 646	40 467	40 965	43 185	N/A
Trade balance	1 375	117	-3 719	-5 175	-4 376	-7 080	-13 100	-12 476	-13 165	N/A
Ratio exports/imports	1.06	1.01	0.85	0.81	0.86	0.80	0.68	0.70	0.70	N/A
Terms of trade index	93.2	92.8	98.2	98.8	97.5	100.0	108.0	107.6	109.3	N/A

(1) Trade data on textiles includes raw materials and knitwear.

Source: DEBA

**Figure 3: Textiles, clothing, footwear, leather  
Production and employment compared to EU total manufacturing industry**



1993 are DEBA estimates.  
Source: OETH, Cotance, DEBA, Eurostat

In 1993, production of textiles and clothing decreased strongly in the three trading blocks, although slightly more in the USA than in the EU and Japan. Between 1984 and 1993, apparent consumption expanded most in Japan, followed by the EU and the USA. The slow growth of apparent consumption in the USA was partly compensated by exports to third countries which have doubled between 1984 and 1993, while EU exports are 50 % higher in 1993 compared to 1984. Exports of textiles and clothing from Japan are even lower in 1993 than in 1984.

#### Foreign trade

Between 1985 and 1994, EU exports of textiles and clothing grew at an annual average rate of 4.4 % in current prices. Imports, however, expanded by an annual average of 11.3 % during the same period, which resulted in a worsening trade balance, expected to have reached a deficit of more than 14 billion ECU in 1994. This trend is mainly explained by the continuously deteriorating trade position of the clothing industry, as EU imports of clothing increased by an annual average of 11 % between 1984 and 1988 and 14 % between 1989 and 1993, against 5 % for exports between 1984 and 1993.

In 1993, about 25 % of EU consumption of clothing relied on extra-EU imports, compared to 14 % in 1984. In contrast, the textile industry has kept a higher share of EU textile consumption. In 1993, only 20 % of EU textile consumption relied on extra-EU imports (including raw materials imported by the industry itself). This difference is partly due to the fact that labour costs account for a lesser share of production costs in the textile industry and that a large share of the industry does not primarily compete on the grounds of costs but factors such as product innovation and quality, as is the case in industrial textiles.

In 1993, around 66 % of EU exports of textiles and clothing went to only 10 countries, compared to 58 % in 1988. The major foreign markets were the USA, Switzerland, Austria, Japan and Poland. Poland's high position in textile and clothing exports stems from the fact that Poland has developed into the EU's main foreign partner for the manufacture of garments on the basis of outward processing trade (OPT), as fabrics of EU origin are sent to countries like Poland, to be processed into garments for re-importation.

The main sources of EU imports of textiles and clothing in 1993 were China, Turkey, Hong Kong, India and Austria, imports from the latter mainly being man-made fibres. The importance of major suppliers has increased significantly in recent years. In 1993 the ten major countries of origin supplied 63 % of all textiles and clothing exports to the EU, compared to 46 % in 1988. Among these countries, China stands out with the highest growth rate of exports to the EU, as imports from China grew 2.6 times between 1993 and 1988.

#### MARKET FORCES

##### Demand

The EU textile and clothing industry has had to suffer decreasing market shares within the EU as well as fierce competition internationally, exacerbated by the fact that its labour costs are among the highest in the world. In 1992 and 1993, EU apparent consumption of textiles and clothing decreased in current prices, while imports continued to grow. The EU's import/consumption ratio for textiles and clothing thus continued to increase, and reached in 1993 a level of nearly 23 %.

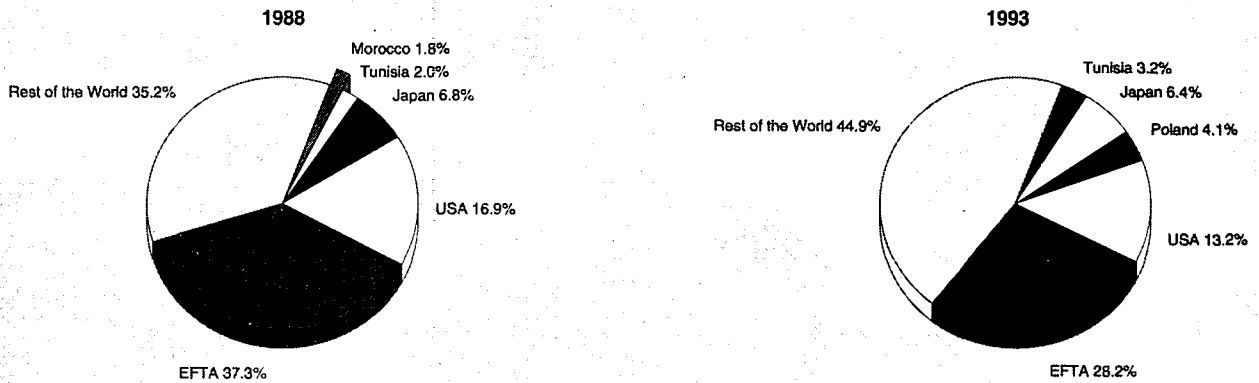
In the face of decreasing market share and the recent fall in consumption of textiles and clothing within the EU, the industry has explored ways to develop sales outside the EU. While exports of textiles and clothing expanded steadily in recent years despite the recession, the export potential of EU textiles and clothing, notably to the rapidly growing economies in Asia, has not yet been fully realised.

##### Supply and competition

Both the EU's textile and clothing industries have to compensate for the high labour cost content of their production costs in the international competitive environment. Within the textile industry, some sectors such as carpets are much less exposed to this problem, as their production is highly capital-intensive. In the clothing industry, most companies are heavily exposed to this competitive pressure, although this is less the case for high-quality products and goods which are supplied to retailers within very short delays (i.e. less than a week from order to delivery).

While a significant share of EU clothing production has already been lost to foreign competitors, clothing manufacturers are

**Figure 4 : Textiles, clothing, footwear, leather  
Destination of EU exports**



Source: Eurostat

increasingly delocalising part or all of their EU production to lower-cost countries, mainly in locations close to the EU such as Poland and Morocco. While the assembly of clothing, a very labour-intensive operation, is thus moving gradually outside the EU, fabrics tend to be mainly of EU origin. This means that the textile industry has, to date, maintained most of their customers. But this situation could change dramatically in the future if EU textile producers supplying the clothing industry were not able to safeguard these supply links against foreign competition.

#### Production process

Unlike the clothing industry, the textile industry has become a technologically advanced industry during the 1980s, through restructuring and important investment in modern machinery. Spinning, weaving and knitting processes have been highly modernised in many companies in the recent past, which has allowed them to reduce the share of labour in production costs and to increase quality and speed.

The clothing industry has not succeeded in significantly reducing the labour content of its production, as research into alternative production techniques, such as fully automated production, have not led to applicable methods of clothing production. However, modern technologies have been applied to some processes such as design and cutting. The clothing industry is at present much more influenced by innovations which do not relate directly to new production techniques, but to the organisation of production via the use of new information technologies such as EDI (electronic data interchange). These allow for the increasingly flexible organisation of production, reduced delivery times and the management of shorter production runs.

### INDUSTRY STRUCTURE

#### Companies

In terms of turnover and employment, more than three quarters of the EU textile and clothing industry is concentrated within firms employing more than 20 people. However, nearly 600 000 people are employed by small firms, of which 353 000 are in the clothing industry. The clothing industry employs an average 17 people per firm, compared to 27 for the textile industry. In the textile industry, given higher capital requirements and technological skills, the average size of firms is greater.

Among the largest textile and clothing companies in the EU, several are active in both textiles and clothing. Examples are

Coats Viyella (about 21 % of turnover is clothing), Courtaulds (50 % in clothing) and Marzotto (25 % in clothing). Other major companies, however, specialise in certain fields only, such as Beaulieu (carpets) or Triumph (underwear).

#### Strategies

In the EU clothing industry, in recent years a growing number of companies have adapted their organisation of production to concepts such as quick response, just-in-time and lean production. The number of collections has expanded from two per year in the past to up to six collections today for some articles. This implies that order times have shortened on average, which partly favours manufacturers closely located to the market.

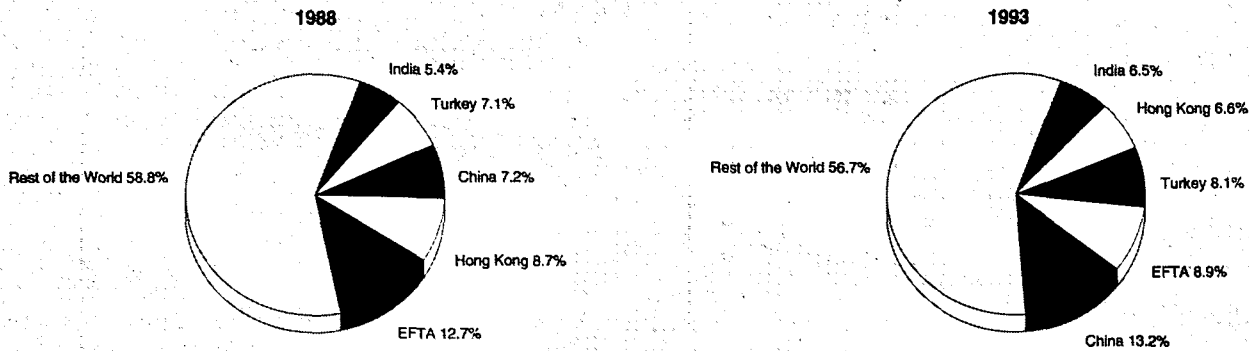
The time required to produce a garment is conditioned not only by the organisation of clothing production, but also by the delivery in due time of the fabric, and yarn. In the extreme, quick response to clothing orders implies high reactivity from the whole textile pipeline. Therefore, the strategies followed by clothing producers also imply adjustments by the textile industry.

The clothing industry also increasingly uses delocalised production in lower-cost countries as a response to decreasing market shares and strong price competition from lower-cost countries, mainly in Asia. Again, the textile industry as the principal supplier has to adjust to these policies in order to maintain its customer base.

#### Impact of the Single Market

The Internal Market programme has been globally positive for the sector so far. Free movement of goods has been the most important issue for the sector. On one hand side, the abolition of national import quotas increased the market share of low cost producing countries. However, on the other side, the abolition of controls at internal frontiers has reduced delays and transport costs, which has allowed the EU clothing companies to specialise in higher quality and fashion-led segment of the market, where consumer demand is more dynamic. Other positive effects of the common market are coming from the Community trade mark, the opening of public procurement markets, the support policy to SMEs and the training and education programmes. However, the legislation on environmental protection should take more into account the ability of EU companies to achieve ever increasing standards. The main priorities for the future are the elimination of the national non-tariff barriers to goods trade, most of them having been recently adopted for purposes of consumer protection, an ac-

**Figure 5: Textiles, clothing, footwear, leather  
Origin of EU imports**



Source: Eurostat

**Table 5: Textiles, clothing, footwear and leather  
Labour productivity, unit costs and gross operating rate (1)**

(1990=100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.4	84.3	85.7	89.0	91.6	96.9	100.0	102.1	107.5	109.4
Unit labour costs index (3)	93.3	94.9	96.4	96.1	98.4	99.5	100.0	104.9	104.8	101.1
Total unit costs index (4)	88.2	90.8	90.6	91.4	94.8	99.7	100.0	103.2	104.1	100.1
Gross operating rate (%) (5)	8.8	9.5	9.9	10.2	9.8	8.8	9.1	8.9	8.9	8.9

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA

celerated fiscal harmonisation (more particularly, the harmonisation of the VAT regimes), an accelerated harmonisation of monetary policies in order to avoid exchange rates fluctuations, and a fairer competitive environment not only within the EU but also in relation to extra-EU trade.

## REGIONAL DISTRIBUTION

The textile industry is located in a relatively small number of regions, with a heavy population of workers. The clothing industry is more widely spread, in relatively smaller pockets of employment.

When the two industries are considered together, a number of regions stand out for their heavy concentration of employment. Employing more than 150 000 workers are Lombardia (I) and Cataluna (E). Employing between 100 000 and 150 000 are four regions - Veneto (I), Bayern and Nordrhein-Westfalen (D), and Norte (P).

There are eight regions employing between 50 000 and 100 000, three each in Italy and France, one in Germany and one in the UK. There are fourteen regions employing between 25 000 and 50 000.

The figures are more significant when looked at as a proportion of all industrial employment in a region. Regions with over 30 % of industrial employment in textiles and clothing are Norte (P), Kentriki Makedonia (GR), Dytiki Ellada (GR), and Castilla-La Mancha (E). It is noteworthy that the last three are not included in those areas with the heaviest absolute level of employment.

Regions with 20-30 % in textile and clothing employment, as a proportion of industrial employment, are nine in number, including two in Portugal and two in Greece. Two further Greek regions have textile and clothing employment of 15-20 %. It is evident that in Greece and Portugal, two of the EU's least prosperous Member States, regional dependence on the textile and clothing industries is of considerable importance.

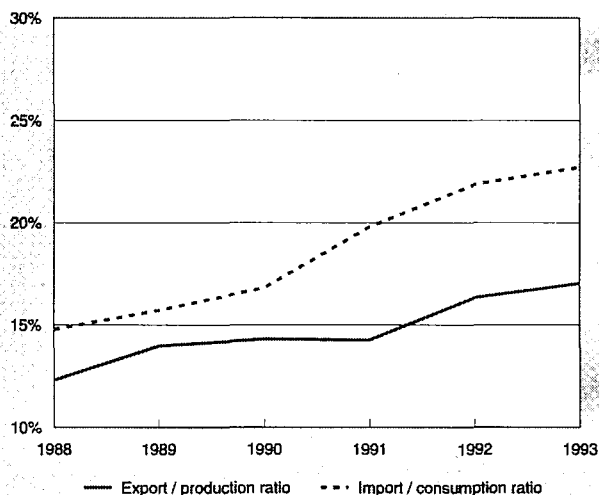
## ENVIRONMENT

The manufacture of textiles poses greater problems for the environment than the manufacture of clothing. There is heavy use of energy in man-made fibres, and many cleaning processes with natural fibres (as well as the use of pesticides etc. in their growth). The danger of pollution in water - used widely for many textile processes - has been countered by EU and national regulations (which affect industry generally) on effluents discharged to water.

Clothing manufacture raises fewer environmental problems. Here however the question of the final disposal of garments raises difficulties for synthetic fabrics, because these are not biodegradable, unlike fabrics made from natural and cellulosic fibres.

There are heavy costs involved in improving environmental standards. The EU Commission has estimated that environmental costs in dyeing and finishing account for between 3.5 % and 9.2 % of total costs, depending on the Member State involved.

**Figure 6: Textiles, clothing, footwear, leather  
Trade Intensities (1)**



(1) Trade data includes raw materials and knitwear.  
Source: OETH, DEBA

## REGULATIONS

The Uruguay Round of multilateral trade negotiations was successfully concluded in December 1993 and the Final Act signed at the Marrakech Ministerial meeting in April 1994. In the area of textiles and clothing, the object of the negotiation was to secure the eventual integration of the textiles and clothing sector - where much of the trade is currently subject to bilateral quotas negotiated under the Multifibre Arrangement (MFA) - into the GATT, on the basis of strengthened GATT rules and disciplines.

Integration of the sector into the GATT will be in four phases. The first started on 1 January 1995. The second will be on 1 January 1998, and the third on 1 January 2002. During this process, products will be progressively integrated into the GATT, i.e. bilateral restrictions on imports into the EU of different groups of products will be phased out. All products will be integrated into the GATT by all members after 10 years, i.e. on 1 January 2005. The Uruguay Round Final Act, apart from the agreement on textiles and clothing, also contains protocols and agreements some of which are of major importance to textiles and clothing under the aspect of strengthening GATT rules and disciplines, as a basis for the integration of the textile and clothing sectors into the GATT.

In this framework, the European Commission prepares the modification of regulations regarding the implementation of the Agreement on Textiles and Clothing (ATC) of the Uruguay Round. In particular, this refers to the product coverage, the integration of products into the GATT in the 3 stages described above, the new safeguard clause and the new administrative arrangements with partner countries.

For textile imports from third countries not covered by bilateral agreements or other arrangements, a regulation has been approved which establishes a new autonomous regime for these imports, including Community quotas for non-MFA products for China, North Korea and the Republics of former Yugoslavia. Legislation has also been passed on different aspects regarding textile imports from China, in particular the implementation of a new bilateral agreement on imports of products made of silk, ramie, linen and other vegetable fibres (in preparation) and the adjustment of existing quotas in order to compensate fraudulent imports.

In connection with the MFA and the related bilateral trade agreements, a textile anti-fraud initiative (TAFI) for the detection of anomalous imports, launched by the European Commission, is currently in progress. This initiative aims at preventing certain economic operators from subverting the intentions of the MFA agreements.

In 1991, The European Commission also launched an export promotion scheme (EXPROM), which seeks to develop new markets outside the EU, including those for EU textile and clothing products, by investigating the potential of new markets and supporting exploratory missions and trade fairs. A further major objective is to promote a clearly defined European image for the products concerned in third markets.

The establishment of OPT quotas at EU level from 1st January 1993, as part of the Single Market process, required the elimination of disparities in the interpretation of OPT regulation 636/82 between Member States. The Council of the EU has adopted in December 1994 a new regulation (3036/94) establishing economic OPT arrangements for certain textile and clothing products. According to the new regulation, OPT authorisations can only be granted to EU manufacturers of similar products as the compensating ones, and for a total quantity of compensating products with a value of the processing carried out in third countries no higher than 50 % of the value of the applicant's Community production.

The European Commission currently prepares legislation to take into account the enlargement of the EU to Austria, Finland and Sweden, in particular the adaptation of existing EU12 quotas, after conclusion of negotiations with all textile exporting countries which have concluded a bilateral textile agreement with the Community.

The European Commission continues its efforts regarding the RETEX initiative, which has been defined for the period 1993-1997. This initiative aims at a diversification of economic activities in those regions which are strongly dependent on the textile and clothing industries. RETEX mainly focuses on 'soft' measures, i.e. on the improvement of know-how within firms, co-operation between firms in the same region or sector, and the use of new technologies to improve quality. A specific initiative has been taken by the European Commission and the Council regarding the textile and clothing industry in Portugal, which has been identified as a vital sector for this economy, notably in terms of employment and exports.

The European Commission is currently exploring ways to support initiatives regarding subcontracting activities in the textile and clothing sectors in the EU, as these activities have been recognised as an essential feature of the industry.

The textile and clothing sector is also concerned by the European Commission's initiative in favour of SMEs, among other sectors of activity. This initiative is aiming to help SMEs, particularly in regions covered by Objective 1 of the Structural Funds, to adapt to the conditions of the Single Market and to improve their international competitiveness. Other horizontal initiatives, also applying to textiles and clothing, have been developed by the European Commission to help SMEs, among which are programmes such as INTERPRISE, EUROPARTENARIAT, BC-NET or the Euro Info Centres (EIC).

In the area of research and development, the textile and clothing sectors are active in the framework of the new Brite-Euram III programme launched by the European Commission. The global objective of this programme is to help reinforcing the competitiveness of the European industry by developing targeted technological research and development actions on priority industrial objectives. In previous versions of this programme, the textile and clothing sectors already achieved much success and were one of only two sectors to have been invited to coordinate their research as part of a targeted programme under the Brite-Euram.

**Table 6: Textiles, clothing, footwear and leather  
Production specialisation (1)**

(ratio)	1984	1993
Danmark	0.73	N/A
BR Deutschland	0.71	0.65
Hellas	2.33	2.42
España	1.17	1.10
France	0.89	0.83
Italia	1.81	2.01
United Kingdom	0.82	0.80

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

The European Commission has also taken an initiative regarding training. The LEONARDO DA VINCI vocational training programme will support and complement actions in member states to improve the quality of training policy and practice and its capacity to find new ways of learning, including in textiles and clothing.

In the course of 1995, the European Commission will publish a practical guide on programmes and measures of support open to the EU textile and clothing industries.

## OUTLOOK

Both the textile and clothing industries of the EU have been badly hit by the recent recession. In 1993, by far the worst year, textile and clothing production was 10 % lower than in 1992 in current prices and employment was reduced by nearly 140 000.

Improving economic conditions have already started to bring some relief to textiles and clothing in 1994. Production increased again in current prices, although by a mere 0.9 % compared to 1993. This upturn is forecasted to improve slightly further in the following years with an annual average growth rate of about 2 % between 1994 and 1997, in current prices. Apparent consumption is expected to increase slightly more, by an annual average of 2.6 %. The difference in growth would be made up largely by increased imports.

Written by: Observatoire Européen du Textile et de l'Habillement (OETH)

# Textiles

## NACE 43

The textile industry, as defined by NACE 43, covers the preparation, spinning, weaving and knitting of a number of natural (wool, cotton, silk, linen, flax, ramie, jute) and man-made fibres (synthetic or cellulosic). It also covers the process of textile finishing and the manufacture of carpets. The textile industry accounted for 3.1 % of value added generated by EU manufacturing industry in 1993, with employment of nearly 1.3 million people.

Production in the textile industry has been falling since 1991 and even decreased by 10 % in 1993, in current prices. Apparent consumption of textiles followed a similar trend as extra-EU imports and exports only changed slightly in recent years. In constant prices, apparent consumption fell by 5.5 % in 1993. Employment was reduced accordingly, of which 90 000 in 1993 alone.

The largest export markets are developed countries, of which the USA and Switzerland, although a growing portion of textiles are exported to Eastern Europe and the Mediterranean rim, for subsequent processing into clothing for re-import into the EU (known as outward processing trade). Imports of textiles (including raw materials and knitted products) come increasingly from a limited number of third countries, as Turkey, China and India nearly doubled their import share to the EU between 1988 and 1993, to account for one-third of EU textile imports. When excluding raw materials and knitted products, major suppliers of textile products to the EU in 1993 were Switzerland, India and Austria.

A large share of the EU textile industry is concentrated at a regional level. As a supplier to the clothing industry, the industry has had to adjust to production and marketing strategies such as quick-response and just-in-time as these are increasingly adopted by clothing producers and distributors. The development of outward processing and sourcing strategies also represents a major challenge for textile producers to maintain the use of EU-produced textiles in garments assembled outside the EU.

As the EU economy emerges from recession, prospects for the textile industry as a whole improve. Estimates for 1994 indicate that production rose again by 4 % in current prices, a trend which is projected to continue at least until 1997. Prospects are, however, not equally positive for all segments of the industry. Much depends on the health of the EU's clothing industry, which itself has been depressed.

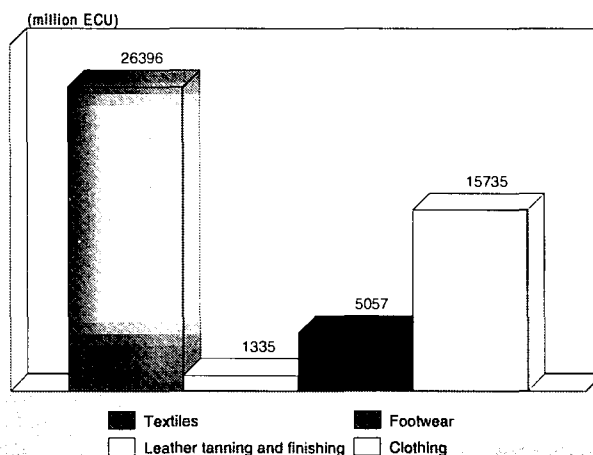
### INDUSTRY PROFILE

#### Description of the sector

The textile industry, as defined by NACE 43, covers the preparation, spinning, weaving and knitting of a number of natural (wool, cotton, silk, linen, flax, ramie, jute) and man-made fibres (synthetic or cellulosic). It also covers the process of textile finishing and the manufacture of carpets. The industry produces intermediate products such as woven fabrics for the clothing industry and industrial textiles, as well as final products such as household textiles and knitwear.

The textile industry accounted for 3.1 % of value added generated by EU manufacturing industry in 1993. Although employment decreased strongly in recent years, the industry employed nearly 1.3 million people in 1993. The industry is largely concentrated in the larger EU member states. Italy, Germany, France and the UK accounted for nearly 80 % of EU textile production in 1993. Italy alone, the biggest producer, generated 32 %.

**Figure 1: Textiles**  
Value added in comparison with related industries, 1993 (1)



(1) Data is for enterprises with 20 or more employees.  
Source: DEBA

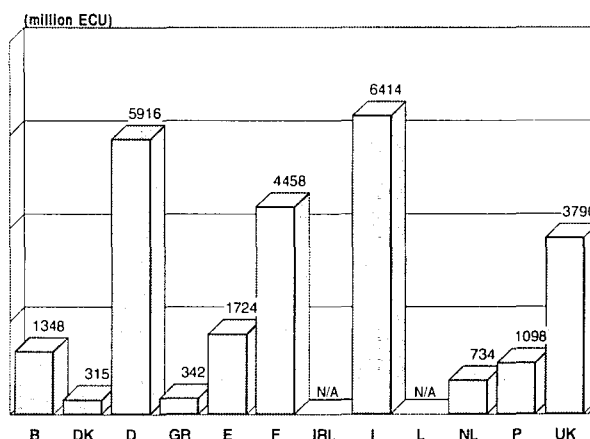
#### Recent trends

Production in the textile industry has fallen since 1991. Between 1984 and 1989, in real terms, it expanded at an average annual rate of 2.1 %. Production started to decrease slightly in 1991 and has declined increasingly since then. In 1993, it fell by 10 %, in current prices. Production in constant prices fell by nearly 6 % in 1994. This trend has to be placed in the context of the general economic recession and preliminary figures for 1994 indicate a reversal of this trend as production has increased again by 4 % in current terms.

Apparent consumption followed a similar trend to production as extra-EU imports and exports have changed only slightly in recent years. Thus, 1993 stands out as a very difficult year for the EU textile industry with a fall in apparent consumption of 5.5 % in real terms.

As output in the textile industry has fallen, employment has also declined. The textile industry has undergone a process of restructuring in recent years in order to reduce costs and

**Figure 2: Textiles**  
Value added by Member State, 1993 (1)



(1) Data is for enterprises with 20 or more employees.  
Source: DEBA



**Table 1: Textiles**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	79 370	97 670	102 782	105 633	107 739	104 610	94 053	97 200	100 500	103 000	106 600
Production	79 849	97 102	102 822	104 841	104 825	101 713	91 497	95 200	99 000	102 000	106 100
Extra-EU exports (4)	12 007	13 349	15 245	15 543	15 574	16 181	17 094	18 300	19 200	20 200	21 200
Trade balance (4)	479	-568	40	-792	-2 914	-2 897	-2 556	-2 000	-1 500	-1 000	-500
Employment (thousands)	1 762	1 626	1 602	1 525	1 468	1 360	1 270	1 200	1 160	1 130	1 100

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards. Production, employment and trade data are for all sizes of firms.

(2) Eurostat and OETH estimates.

(3) OETH forecasts.

(4) Including raw materials and knitwear.

Source: OETH, DEBA, Eurostat

**Table 2: Textiles**  
**Breakdown by product line, 1993**

(thousand tonnes)	Production	Extra-EU exports	Extra-EU imports	Apparent consumption
Man-made fibres	2 189.5	513.0	589.1	2 265.6
Yarns	2 294.0	174.5	539.8	2 659.3
Woven goods and fabrics	2 438.0	595.3	747.8	2 590.5
of which:				
Woven goods	1 905.7	538.6	681.4	2 048.5
Knitted fabrics	532.3	56.7	66.4	542.0
Textiles' final uses (1)	2 726.6	1 143.4	889.9	2 473.1
of which:				
Carpets	690.2	298.6	170.2	561.8
Household textiles	750.7	62.5	194.9	883.1
Industrial textiles	389.8	197.8	147.9	339.9
Other textiles (2)	895.9	584.5	376.9	688.3

(1) Excluding knitwear.

(2) Including non-woven goods.

Source: CIRFIS, COMITEXIL calculations, CITH, OETH

**Table 3: Textiles**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1992-93
Apparent consumption	1.6	-2.1	-5.5
Production	2.1	-2.2	-5.7
Extra-EU exports	-0.5	-0.1	-1.3
Extra-EU imports	-2.7	0.1	0.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.

Source: DEBA, Eurostat

**Table 4: Textiles**  
**External trade in current prices (1)**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Extra-EU exports	13 335.2	12 439.8	12 396.6	13 348.8	15 245.0	15 543.2	15 573.3	16 181.1	17 093.7	18 300.0
Extra-EU imports	12 522.4	11 676.1	13 012.2	13 917.3	15 204.6	16 335.0	18 488.0	19 078.1	19 650.0	20 300.0
Trade balance	812.8	763.7	-615.6	-568.5	40.4	-791.8	-2 914.7	-2 897.0	-2 556.3	-2 000.0
Ratio exports/imports	1.1	1.1	1.0	1.0	1.0	1.0	0.8	0.8	0.9	0.9
Terms of trade index	77.9	85.0	95.4	98.9	94.6	100.0	113.0	112.1	107.9	N/A

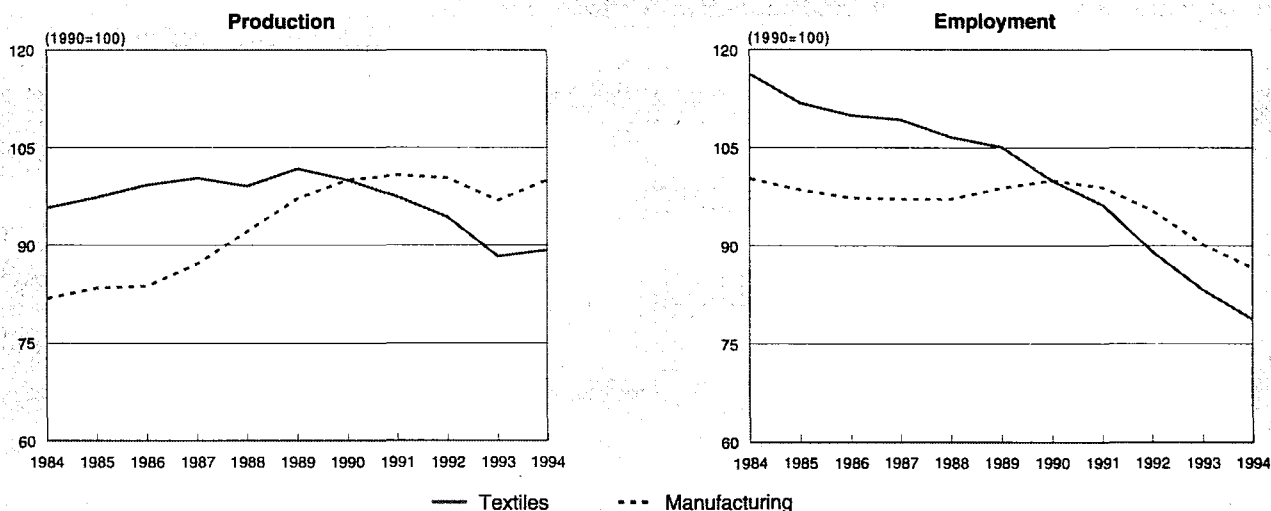
(1) Trade data includes raw materials and knitwear.

(2) OETH estimates.

Source: DEBA, Eurostat



**Figure 3: Textiles**  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
Source: DEBA

increase productivity. Between 1988 and 1993, the EU textile industry raised its productivity by 17 %, in constant prices. This has contributed to important reductions in employment, reinforced by the effects of the economic recession towards the end of this period. The industry lost nearly 500 000 jobs between 1984 and 1993 (28 %), of which 90 000 were lost in 1993 alone (6.6 %). Estimates indicate that a further 70 000 job losses occurred in 1994.

The EU trade balance in textiles (including raw materials) reached a trough in 1991, when the deficit amounted to nearly 3 billion ECU. Since then, the trade balance has improved steadily and is estimated to have reached a deficit of around 2 billion ECU in 1994.

**International comparison**

Compared to other major trading blocks, EU textile production was 84 % higher than in Japan and 13 % higher than in the USA in 1993. Between 1984 and 1993 textile production in current prices increased most strongly in the EU (15 %), fol-

lowed by Japan (13 %), while production in the USA only increased by 7 %. These evolutions, expressed in constant prices, indicate the strongest volume reductions in the USA, followed by Japan and the EU.

The EU had the highest apparent consumption of textiles in 1993, 12 % more than in the USA and double that in Japan. However, apparent consumption expanded most in Japan between 1984 and 1993 (20 %), followed by the EU (18 %) and the USA (6 %).

Among the three trading blocks, the EU exported three times more textile products than the USA or Japan in 1993. Export growth was, however, highest in the USA at 66 %, over the ten years from 1984 to 1993, followed by the EU (42 %). In Japan, exports to third countries actually decreased by 16 % during the same period.

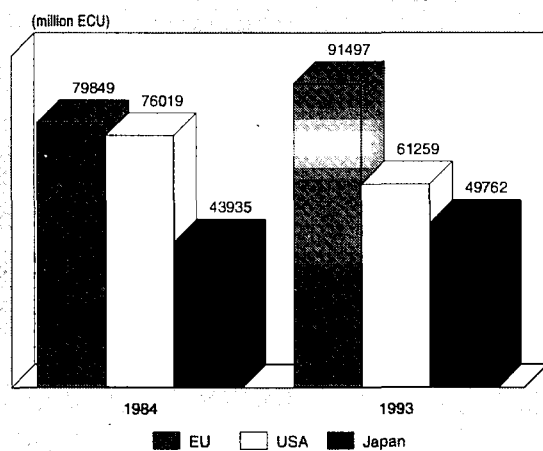
**Foreign trade**

Extra-EU exports and imports of textiles both expanded between 1985 and 1994, although imports grew faster than exports. This trend translated into a larger trade deficit since 1990. The EU textile industry has to import most of its raw materials (wool, cotton, silk, etc.). The data shown in the tables also includes knitted clothing. The exclusion of these trade flows shows that the EU textile industry has a trade surplus in manufactured textile trade. In 1993, the trade balance in EU exports and imports of textiles (excluding fibres and knitwear) amounted to a surplus of 3.1 billion ECU.

Although EU textile imports grew more than exports for most of the period between 1985 and 1994, this pattern started to change in 1992 as exports began to grow faster than imports. Between 1992 and 1994, EU textile exports increased by roughly 18 %, compared to 10 % for imports. Accordingly, the export/import ratio has improved.

The largest export markets for EU textiles are the USA, Austria and Switzerland with export shares between 9 % and 11 % in 1993. They are followed by Poland, Japan, Tunisia and Morocco. Apart from Japan, these three export markets draw their importance from outward processing trade. EU companies export textiles to these countries to be processed into garments which are then re-imported into the EU. Between 1988 and 1993, the major ten export destinations for the EU took an increasing share of the overall textile exports, from 51 % in 1988 to 64 % in 1993.

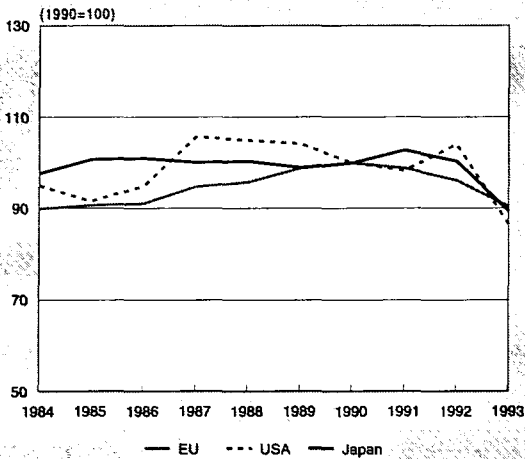
**Figure 4: Textiles**  
International comparison of production in current prices



Source: OETH, DEBA



**Figure 5: Textiles**  
International comparison of production in constant prices



Source: DEBA

Imports of textiles are even much more concentrated, as the ten major countries of origin for EU textile imports represent 70 % of all textile imports in 1993. Main countries of origin are Turkey, China, Austria and India. Between 1988 and 1993, Turkey, China and India nearly doubled their import share to the EU, to account for one-third of EU textile imports in 1993.

## MARKET FORCES

### Demand

The textile industry has had to face decreasing consumption in several end-markets in recent years. Apparent consumption of clothing, which accounts for about half of textile end-use (followed by technical and other textiles, household textiles and carpets), decreased by nearly 6 % in volume terms during 1992-93. EU consumption of household textiles and floor coverings contracted by 1.3 % in volume between 1992 and 1993.

These trends are compounded by the fact that in recent years the share of household expenditure on clothing has tended to decrease slightly, combined with the worsening balance of trade in clothing and depressed general economic conditions.

As a supplier to the clothing industry, the EU textile industry has had to adjust to production and marketing strategies such as quick-response and just-in-time as these are increasingly adopted by clothing producers and distributors. The development of outward processing and sourcing strategies also represents a major challenge for textile producers to maintain the use of EU-produced textiles in garments assembled outside the EU.

About one-fifth of textile production consists of technical and other textiles (including non-woven goods). These textiles include carbon, glass, aramid and other special fibres, in addition to conventional textile fibres. The products go into such high-tech uses as defence equipment, high-speed trains, aircraft and racing cars, as well as leisure products such as mountain bikes, tennis racquets and golf clubs. Technical textiles are often divided into industrial textiles, transportation, geotextiles, technical apparel, medical and leisure textiles. The demand for technical textiles are not only determined by demand, but also by the development of new applications and uses on the supply-side.

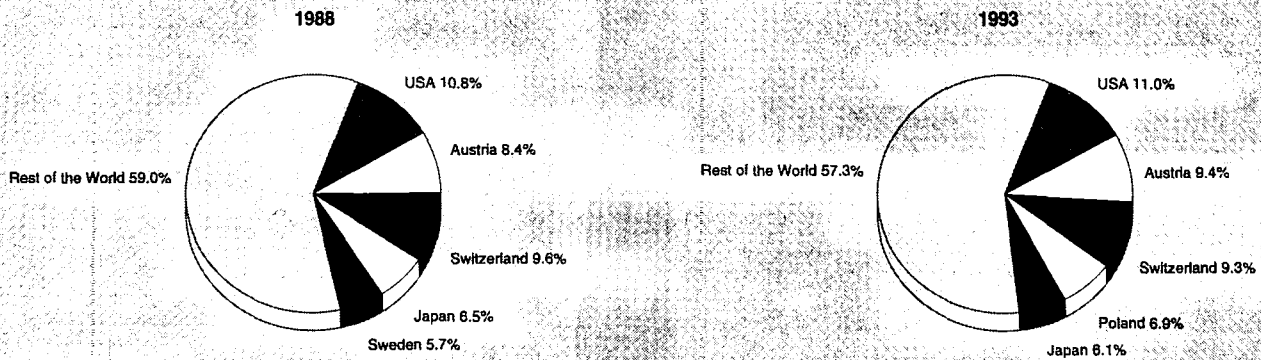
The consumption of technical textiles is part of intermediate consumption of textiles by service and non-service industries. This includes textiles consumed by non-service industries such as pharmaceuticals, electronics or furniture as well as service industries such as hotels or retail services. This consumption has been recently estimated for the first time and represented a market of 26.6 billion ECU at the EU level in 1993 (Report on Consumption and Distribution commissioned by the OETH in the framework of its prospective scenarios on textiles and clothing).

### Supply and competition

The textile industry is relatively capital-intensive compared to the clothing industry. The labour content in manufacturing costs, however, varies strongly between different products. While the share of labour costs in the spinning of cotton yarn accounts for about one-third of total manufacturing costs in the EU, in the production of carpets this share is below 10 %. Labour cost differences around the world are therefore of differing relevance to the competitiveness of the different segments of the textile industry.

After several years of sustained growth, the value of investment in the EU textile industry has shown a steep fall in recent years. Investment decreased by an annual average of nearly 6 % between 1990 and 1993, in current prices. In 1993, investment was at its lowest since 1988. Overcapacity in the highly capital-intensive short-staple sector of the textile in-

**Figure 6: Textiles**  
Destination of EU exports



Source: Eurostat

**Table 5: Textiles**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990=100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	77.8	81.6	83.3	87.2	90.4	94.5	100.0	103.0	108.1	110.1
Unit labour costs index (3)	91.5	93.3	94.5	94.4	96.5	99.2	100.0	104.7	104.2	102.0
Total unit costs index (4)	90.8	92.7	90.9	91.5	94.9	99.8	100.0	102.2	102.0	98.3
Gross operating rate (%) (5)	9.1	10.1	10.9	11.4	10.8	9.4	9.7	9.1	9.3	9.0

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA

dustry, at a time of recession, has been among the main reasons for the fall. The biggest cuts in capacity have occurred in the cotton industry, which is one of the most modern sectors in the EU, but suffers from overcapacity worldwide.

While the industry reduced investment into new machinery and shed employment in recent years, it succeeded in rising labour productivity continuously between 1984 and 1993 by more than a third.

### Production process

In the spinning and weaving processes, the quantity of installed textile machinery and its geographical location worldwide have changed significantly in recent years. In the past twenty years (1973-93), the EU spinning industry reduced the number of spindles installed by 14 %, while the number of open-end rotors increased from 24 000 in 1973 to 506 000 in 1993. In terms of production capacity these trends are even more relevant, as open-end rotors are judged to be 5 times more productive than spindle machinery. Worldwide, the EU textile industry only accounts for 6.4 % of open-end rotors, as the bulk of capacity is to be found in Asia, Eastern Europe and the USA. Open-end rotors are, however, relatively less important in the EU than in other regions as they are mainly used for fibres other than wool. The EU is one of the largest wool producers in the world.

In weaving machinery, the EU textile industry mainly uses shuttleless looms (65 % of all looms in 1993). These are the most modern machinery used in the weaving process. The

number of looms installed in the EU has decreased in recent years, while in Asia, capacity has expanded strongly. Asia now accounts for 35 % of shuttleless looms and 74 % of shuttle looms worldwide, compared to 10 % and 2 % respectively in the EU.

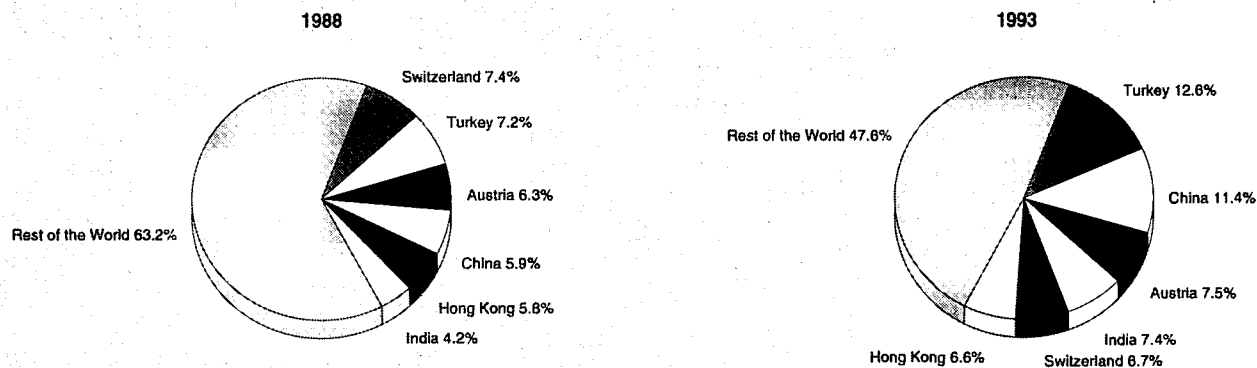
## INDUSTRY STRUCTURE

### Companies

In 1993, the EU textile industry was made up of nearly 47 000 firms, of which 72 % were firms with less than 20 employees. These smaller firms employed 18 % of the total workforce (233 000 employees) and generated 15 % of total turnover. From the early 1980s, small textile firms increased their share of both employment and turnover in all major EU countries. In the case of employment, this pattern is explained by the fact that the reduction in employment has been greater in larger companies. Smaller firms in the textile industry reduced their employment by 14 % between 1988 and 1993 compared to 18 % for larger firms. Over the same period, the number of smaller firms fell by 9 %, compared to 11 % for larger firms.

In terms of turnover, the ten largest textile companies account for about 11 % of the EU textile industry's total turnover in 1993. The five largest companies alone account for 8 % of the total (Coats Viyella, Beaulieu, DMC, Marzotto, and Chargeurs). Among these, Coats Viyella and Marzotto also produce clothing products.

**Figure 7: Textiles**  
**Origin of EU Imports**



Source: Eurostat

**Table 6: Textiles**  
**Breakdown by size of enterprise, 1993**

(%)	Number of employees (thousands)	Number of enterprises (units)	Share in employment	Share in turnover
Less than 20 employees	233	33 655	18.3	14.6
20 employees or more	1 037	13 122	81.7	85.4
Total	1 270	46 777	100.0	100.0

Source: OETH, DEBA

## Strategies

Textile companies in the EU have reduced investment continuously over recent years, while extensive technological modernisation took place in the past. In 1993, investment was 18 % lower than in 1990, when investment was at its peak. Among member states, Italian companies generated 27 % of total EU textile investment, followed by German, French and UK firms (respectively 18 % and 13 % for the two latter). In terms of investment per head, major investment efforts were made by Dutch, Belgian and German firms, while firms in the Southern EU member states indicate the lowest levels.

The strategies of EU textile firms are determined by various objectives depending on their place in the so-called textile pipeline. Producers of cotton yarn do not operate in the same competitive environment as producers of knitwear, for example. Their strategies will also differ according to company size and location within the EU. However, textile companies tend to specialise in a limited number of production processes, relying partly on subcontracting in some segments of the industry. A growing number of EU textile companies will also have to determine strategies capable of safeguarding their position as suppliers to an increasingly delocalised EU clothing industry. These strategies result in a change of organisation and methods to encourage globalisation and flexibility.

## Impact of the Single Market

The textiles sector was already very open to trade before the Internal Market programme was launched. So, the latter has not changed the degree of competition in the market. The recent overcapacity problems in the sector reflect the fact that intra-EU trade increased during the eighties and that the beginning of the nineties was characterised by a recession. The abolition of national import quotas has nevertheless reduced the competitiveness of EU companies with respect to non-EU competitors.

The sector is mainly composed of small and medium-sized firms, and the European market has remained fragmented due

to cultural and linguistic differences, and to differences in consumer preferences. So, there has not been volume effects from the Internal Market. Main issues for the EU textiles companies include an environment protection legislation which takes into account the specificities of SMEs, an extension of the training and the education programmes available to EU textiles companies, the abolition of the national non-tariffs barriers to trade, a simplification and an acceleration of the mutual recognition of rules on procedures of conformity certification and a level-playing field for of competition both within the EU and with respect to third country producers.

## REGIONAL DISTRIBUTION

A large share of the EU textile industry is concentrated at a regional level. Regional industries in textiles are generally organised around specific product groups (knitwear, technical textiles, and the like), and present significant degrees of local subcontracting.

The main textile regions of the EU can be classified by size of employment. According to Comitextil data, the largest regions, those employing 100 000 or more, are Lombardia (I), Cataluna (E) and Norte (P). The next largest textile regions, employing between 50 000 and 100 000, are both in Germany - Baden-Württemberg and Nordrhein-Westfalen. The five largest regions represent nearly 30 % of total EU employment in textiles.

## ENVIRONMENT

The textile industry uses natural fibres, as well as man-made fibres (cellulosic and synthetic). Wood pulp is the basic element in producing cellulosic fibres, while synthetic fibres are produced from oil derivatives (the main synthetic fibres are polyamide, acrylics, and polyester). The production process therefore uses natural resources - water, land, animals, wood pulp, and oil.

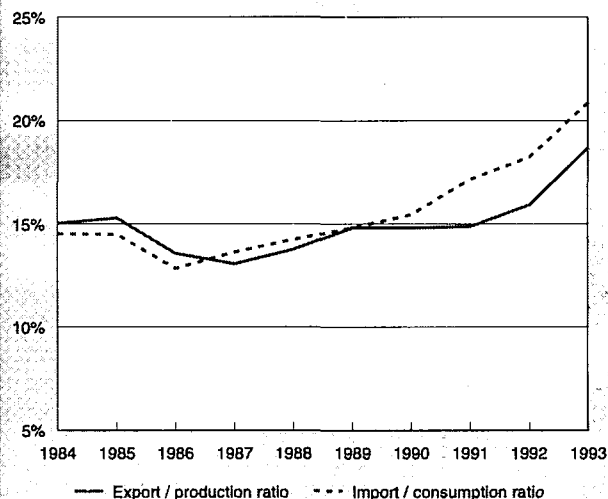
**Table 7: Textiles**  
**The ten largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Employment (thousands)
Coats Viyella Group	UK	3 074	62 000
Beaulieu	B	1 779	N/A
DMC	F	1 203	10 188
Marzotto	I	1 059	N/A
Chargeurs - Textile	F	938	7 250
Freudenberg Textile	D	928	6 000
Gruppo Miroglio	I	721	6 514
Hartmann Gruppe	D	673	5 237
Gamma Holding	NL	637	6 289
KBC Gruppe	D	572	3 137

Source: Comitextil, Textilwirtschaft



**Figure 8: Textiles  
Trade Intensities (1)**



(1) Trade data includes some raw materials and knitwear.  
Source: OETH, DEBA

The production of textiles requires considerable volumes of water - in the production of fibres, in processing fibres and in fabric finishing, among which dyeing and finishing require the most water.

During processing wool has to be cleaned and degreased and cotton has to be washed. Chemical applications are used in the processing of both man-made and natural fibres, to obtain easy-care properties, fast colour, stain and crease resistance, handle, flame retardancy etc. Dyes may sometimes cause unnatural colouring of streams and rivers, although this is more of an aesthetic problem than an environmental one.

Then there are the environmental problems, common to all consumer products, connected with packaging. And once the textile product is in the hands of consumers, repeated laundering consumes much energy and detergent, and gives rise to a great deal of water-borne effluent.

Final disposal is another problem. Products made from natural fibres, and also from cellulose, biodegrade effectively. However, polyester, nylon, polypropylene and acrylics are persistent, yet account for 65 % of total fibre usage in textiles.

The growing level of pollutants in the environment, including those connected with the textile industry, are being increasingly controlled by legislative control on discharges to water, air emissions and waste production, by active regulatory bodies on national and EU levels. There has for example been much EU legislation on emissions to water, and this has affected the textile industry, with its heavy water usage.

The Fifth Framework Programme for the Environment, proposed by the EU Commission in 1992, encompasses all environmental issues manufacturer and users will have to integrate into their strategy in the future.

According to Comitextil, the industry is responding positively to the different aspects of this framework programme, in particular the voluntary eco-auditing scheme which it sees as the key to continuing the reduction of the environmental impact of textile manufacturing over and above legislative requirements. Fully integrating environmental considerations into the general management of the fifty thousand or more small plants that make up the European textile sector, is the major environmental challenge facing this industry.

**Table 8: Textiles  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.47	1.57
Danmark	0.69	0.62
BR Deutschland	0.68	0.64
Hellas	3.03	2.83
España	0.96	0.81
France	0.89	0.87
Ireland	0.77	0.69
Italia	1.64	1.83
Luxembourg	0.05	0.53
Nederland	0.44	0.55
Portugal	3.16	3.13
United Kingdom	0.75	0.75

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## OUTLOOK

The textile industry had to experience falling apparent consumption during 1992 and 1993, in the context of a general economic recession. While production rose during the 1980s, it started to fall slightly in current prices in 1991 and decreased strongly in 1992 and 1993.

As the EU economy emerges from recession, prospects for the textile industry as a whole improve. Estimates for 1994 indicate that production rose again by 4 % in current prices, a trend which is projected to continue at least until 1997. Production is forecasted to increase by an annual average of 3.7 % in current prices during that period. In comparison, apparent consumption should increase by an annual rate of about 3.6 %, with extra-EU exports expanding at a rate of 3.8 %. Thus, imports are expected to increase less than exports (by an annual rate of about 2.2 %), which will result in an improvement of the trade balance.

Prospects are, however, not equally positive for all segments of the textile industry. The EU knitting industry will have to face continuing competition from lower-cost countries outside the EU, reinforced by the gradual liberalisation of textile and clothing trade. The growing delocalisation of EU clothing production mainly to locations close to the EU will also pose a threat to textile manufacturers who are traditional suppliers to the EU clothing industry. Textile production with a relatively high content of labour (as in the low to medium quality production of fabrics) is expected to experience decreasing market shares as competition from lower-priced imports continues.

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# Clothing

## NACE 453

The clothing industry, as defined by NACE 453, covers the manufacture of garments and clothing accessories, but does not include the manufacture of knitwear. Many of the industry's inputs are supplied by the textile industry, 55 % of which are based on man-made fibres, 45 % on natural fibres such as cotton, wool and silk.

The industry is an important employer. It employs 1.1 million people, 5.2 % of total EU manufacturing employment. It also generates 1.8 % of manufacturing industry value added. Clothing production and employment, however, have been declining in recent years. The volume of production fell by 20 % between 1990 and 1994. Employment has fallen by 16 % over the same period.

EU clothing manufactures have faced, on the one hand, weak levels of domestic demand for their output and, on the other hand, increasingly fierce competition from producers in low-wage countries. The industry has a substantial balance of trade deficit amounting to over 12 billion ECU in 1994, over four times its level in 1984.

Clothing exports have also increased in recent years, but at a more gradual pace than imports. The main export markets for EU producers are other developed countries. Internal trade in clothing between member states is also significant. Another important feature of the industry has been the growing practice of Outward Processing Trade (OPT), whereby more labour-intensive processes are transferred to lower-cost countries close to the EU borders.

The outlook for the industry is expected to improve on the performance of the last two years, although production volume and employment are likely to continue to fall, but at more modest rates, as domestic demand strengthens with economic recovery. Much will depend on the effects of the phasing out of the Multi-Fibre Agreement (MFA), which was agreed upon in the Uruguay Round of the GATT. This is likely to intensify competition in the world clothing market. EU firms may be forced to increase their moves towards improved quality, new fibres, flexible production and quick response to defend their market share.

### INDUSTRY PROFILE

#### Description of the sector

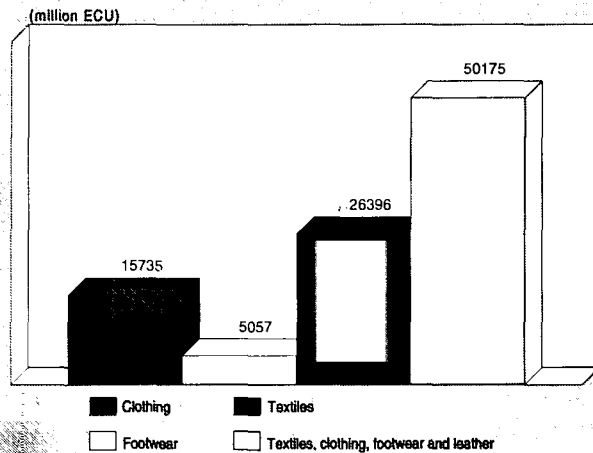
The clothing industry covers the manufacture of garments and clothing accessories. It does not include the production of knitwear which, for statistical purposes, is included in textiles. The industry is closely linked to the textile industry which supplies the bulk of its inputs. The EU's production of apparel is based 55 % on man-made fibres and 45 % on natural fibres such as cotton, wool and silk.

The production of clothing involves a number of different stages: design (styling, prototyping, the choice of collections); development (the sourcing of fabric, making of patterns, planning of cutting); and manufacture (cutting, sewing, pressing, finishing).

The industry's products can be classified in a number of ways, for example, into men's, women's and children's wear, into outerwear and underwear, or into low, medium or high quality wear.

The clothing industry has remained relatively labour intensive. It employed 1.1 million people in 1993, 5.2 % of EU manufacturing employment. In 1993 the clothing industry's value added was 15.7 billion ECU, 1.8 % of total value added by EU manufacturing industry. This was generated mainly by

Figure 1: Clothing Value added in comparison with related industries, 1993 (1)



(1) Data is for enterprises with 20 or more employees only.  
Source: DEBA

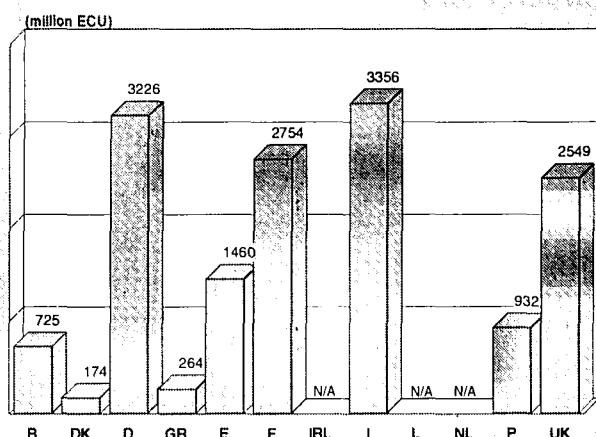
the four largest producing countries - Italy (22 %), Germany (21 %), France (18 %) and the UK (17 %).

#### Recent trends

The volume of EU clothing production has fallen steadily from a peak in 1986. The decline appeared to accelerate in 1993 and 1994 bringing the volume of production to 20 % below its 1990 level. This is a different trend to that followed by the value of production measured in current prices, which rose gradually to a peak in 1992 before falling in 1993. The difference between the two trends can be explained in part by the fact that the production figures are derived from turnover, which can include production subcontracted outside the EU, and in part by improvements in the quality of EU production, which is not fully reflected in the price index used as a deflator.

In current price terms, production rose until 1992 before falling in 1993 and 1994. Apparent consumption also fell in the last two years, but grew more strongly in the period to 1992 as rising imports replaced EU production.

Figure 2: Clothing Value added by Member State, 1993 (1)



(1) Data is for enterprises with 20 or more employees only.  
Source: DEBA

**Table 1: Clothing**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	49 171	60 475	63 408	68 525	73 749	76 040	70 336	69 200	69 500	70 700	72 700
Production	46 630	55 172	57 689	61 471	63 747	66 301	59 438	57 100	56 000	55 500	55 500
Extra-EU exports	4 240	5 093	6 218	6 727	6 682	6 853	7 086	7 300	7 500	7 900	8 200
Trade balance	-2 541	-5 303	-5 719	-7 054	-10 002	-9 739	-10 898	-12 100	-13 500	-15 200	-17 200
Employment (thousands)	1 358	1 304	1 287	1 251	1 210	1 166	1 119	1 050	1 020	990	970

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards. Production, employment and trade data are for all sizes of firms.

(2) DEBA and OETH estimates.

(3) OETH forecasts.

Source: OETH, DEBA, Eurostat

**Table 2: Clothing**  
**Breakdown by product line, 1993**

(thousand pieces)	Production	Extra-EU exports	Extra-EU imports	Apparent consumption
Shirts (1)	530 044	130 904	1 253 072	1 652 212
Blouses	193 647	37 756	270 731	426 622
Men's coats and raincoats	8 012	3 214	24 731	29 529
Women's coats and raincoats	42 612	11 079	57 750	89 283
Men's suits	13 194	4 513	17 473	26 154
Women's suits (2)	39 015	12 624	48 655	75 046
Skirts	146 704	19 407	79 768	207 065
Dresses	110 746	114 000	103 104	99 850
Pullovers	573 724	80 896	350 720	843 548

(1) Knitted and woven, excluding Greece for woven shirts.

(2) Knitted and woven.

Source: European Commission (DGIII), CITH

**Table 3: Clothing**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1992-93
Apparent consumption	0.6	1.4	-5.6
Production	-0.5	-0.4	-7.2
Extra-EU exports	5.5	4.0	6.1
Extra-EU imports	14.1	11.7	5.0

(1) Except for trade figures, estimates are used if country data is not available, especially from 1990 onwards.

Source: DEBA, Eurostat

**Table 4: Clothing**  
**External trade in current prices**

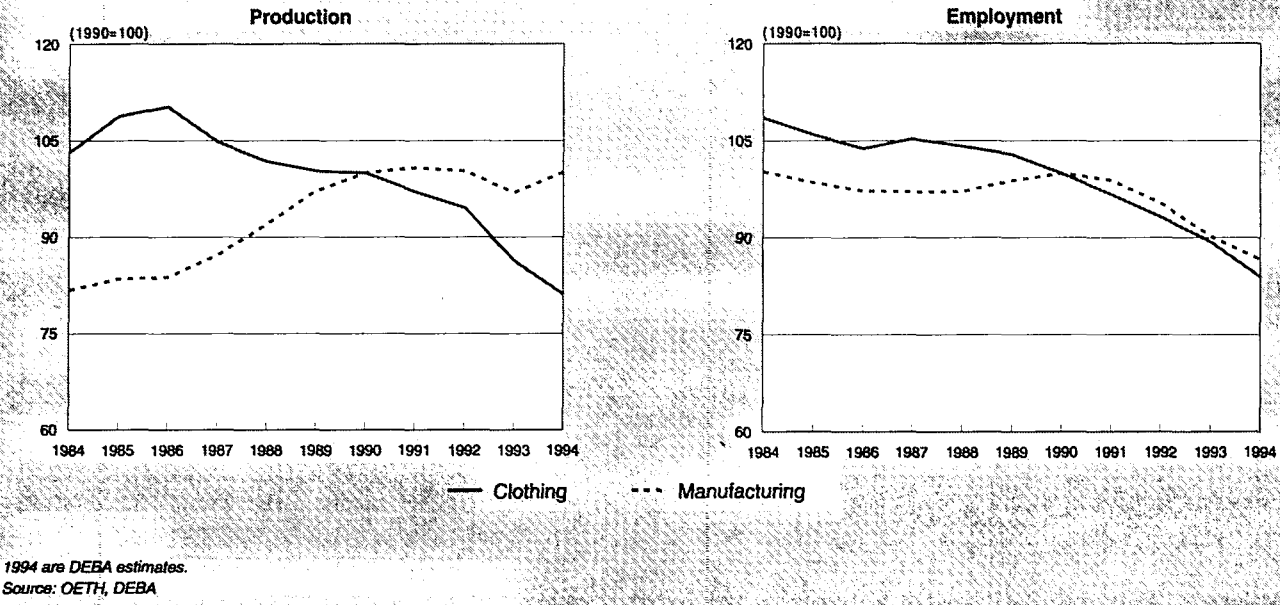
(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)
Extra-EU exports	5 057.5	5 132.6	5 039.8	5 093.2	6 218.4	6 727.1	6 682.4	6 853.2	7 085.8	7 300.0
Extra-EU imports	7 156.5	7 882.0	9 432.3	10 396.4	11 936.7	13 781.3	16 684.4	16 592.1	17 983.6	19 400.0
Trade balance	-2 099.0	-2 749.4	-4 392.5	-5 303.2	-5 718.3	-7 054.2	-10 002.0	-9 738.9	-10 897.8	-12 100.0
Ratio exports / imports	0.71	0.65	0.53	0.49	0.52	0.49	0.40	0.41	0.39	0.38
Terms of trade index	87.9	96.7	96.2	99.4	99.3	100.0	98.8	100.7	95.0	N/A

(1) OETH estimates.

Source: DEBA



**Figure 3: Clothing Production and employment compared to EU total manufacturing industry**



EU trade in clothing, already in deficit in 1984, moved further into deficit by 1991 as the growth in imports exceeded growth in exports. Over this period the deficit increased by four times, before falling in 1992 and widening once again in 1993 and 1994.

There have been significant job losses in the EU clothing industry over recent years. Between 1984 and 1994 around 300 000 jobs were lost - a fall of 23 %. It is estimated that 70 000 jobs were lost to the industry in 1994 alone. This has been the result, not only of the loss of production in the face foreign competition and the general economic recession, but also to gradual improvements in productivity.

**International comparison**

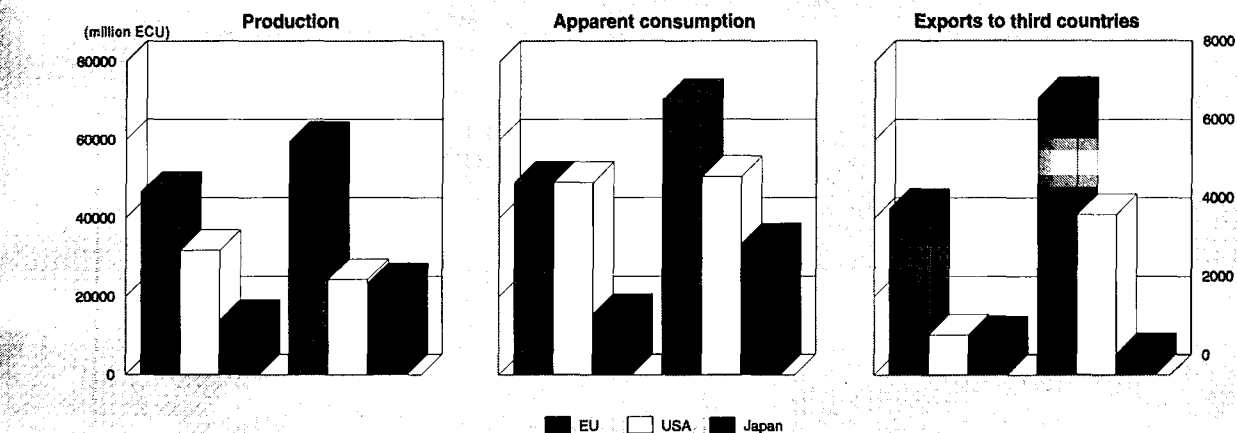
Of the three main trading blocks - the EU, the USA and Japan - the EU is by far the largest clothing producer. Its production, in 1993, was greater than that of the USA and Japan combined. The EU is also the most important exporter. The EU's clothing exports to third countries in 1993 were

1.7 times those from the USA and 13 times those from Japan. However, the USA exported a greater proportion of its production.

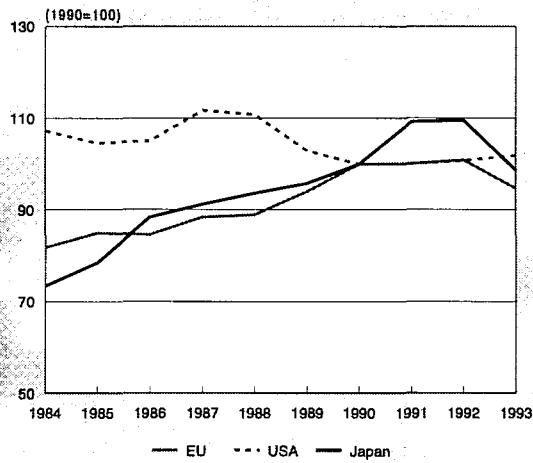
Measured in constant prices, production in the EU and Japan increased gradually between 1984 and 1992, but in 1993 fell to below its 1990 level. In the USA, in contrast, production fell between 1985 and 1990 and then remained relatively stable. In current prices, production rose in both the EU and Japan between 1984 and 1993, but fell in the USA. Likewise, while apparent consumption, in current prices, grew significantly in the EU and Japan, the increase was barely perceptible in the USA.

However, the recent export performance of the USA has been much stronger than that of the EU and Japan. Exports from the USA, in current prices, increased fourfold between 1984 and 1993, compared to an increase of 67 % for the EU and a fall of 45 % for Japan. This can be partly explained by a weakening dollar during the second half of this period.

**Figure 4: Clothing International comparison of main indicators in current prices**



**Figure 5: Clothing**  
International comparison of production in constant prices



Source: DEBA

### Foreign trade

The EU has seen consistent increases in both imports and exports of clothing between 1985 and 1994, although imports have grown much faster than exports. Compared to an average annual rate of growth in exports of 4 % between 1984 and 1988 and 6 % between 1989 and 1993, imports grew at an average annual rate of between 11 % and 14 % over the same two periods, in constant prices. The result has been a widening in the trade deficit to over 10 billion ECU in 1994, over four times the level in 1985.

The EU clothing industry has faced considerable competitive pressure from lower-cost countries, mainly in the Far East, the Mediterranean rim and Eastern Europe. This has been particularly severe in the low and medium quality segments of the market. The terms of trade index, comparing the prices received for exports to those paid for imports, increased between 1985 and 1992 by 15 % before slipping slightly.

The main destination for EU clothing exports are other developed countries. The main customers are Switzerland (15.5 %), the USA (13.1 %) and Austria (12.2 %). With the

exception of Japan, these countries' share of total EU exports has fallen since 1988. As a result the share of the EU's top ten customers has fallen from 79 % to 72 %.

The major origins of EU imports of clothing are low-cost countries in the Far East, the Mediterranean rim and Eastern Europe. The principal suppliers in 1993 were China (15.3 %), Hong Kong (9.9 %) and Turkey (7.6 %). The origins of EU clothing imports are less concentrated than the destination of its exports. The ten most important suppliers accounted for 66 % in 1993. This is considerably higher than their 52.5 % share in 1988, suggesting a concentration of imports in the hands of a small number of major suppliers.

The share of many of the more important suppliers increased over this period, with the exception of Hong Kong which saw a significant fall in its share of the EU market. Much of this has been taken up by China which has seen a rapid increase in its share of EU clothing imports since 1988. This has been the result of the transfer of production away from Hong Kong to China, and other countries in the region, in response to rising wage costs.

This is similar to what has taken place in the EU, where production has shifted to neighbouring countries, such as Tunisia, Poland and Morocco. For countries such as these, production of clothing for the EU is often conducted by or on behalf of EU manufacturers. Fabrics are exported from the EU, to be made up into clothing for subsequent re-importation within the framework of Outward Processing Trade (OPT). This practice has expanded in recent years. In 1993, OPT imports of clothing accounted for 15 % of total EU imports of clothing, in tonnes.

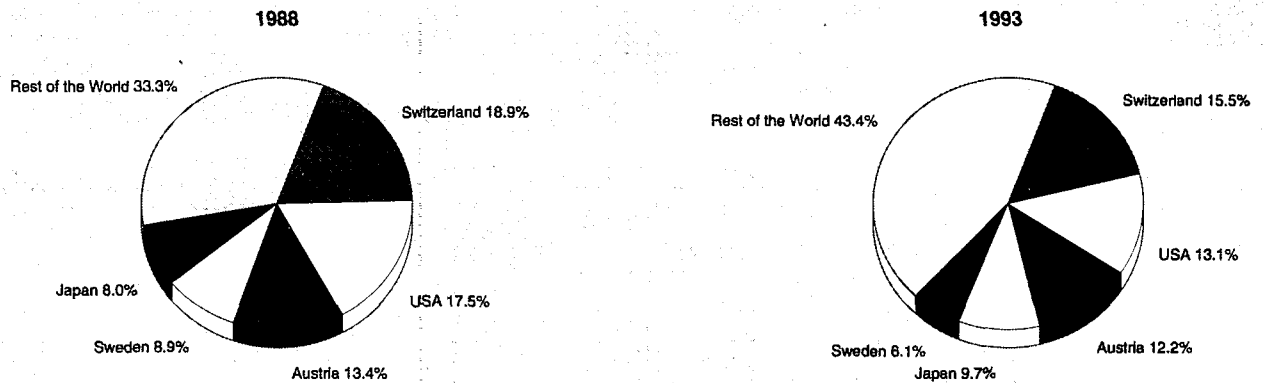
## MARKET FORCES

### Demand

The EU clothing industry has faced weakening demand conditions for much of the last decade. Consumer spending on clothing (and footwear) as a proportion of total consumer spending has fallen gradually from 8.4 % in 1980 to 7.4 % in 1993. This is still higher than in the USA and Japan where the proportions are 5.5 % and 6.5 % respectively.

Part of this decline in the share of consumer spending on clothing can be explained by the downward trend in the price of clothing relative to other consumer goods. Some of this change in relative prices is a consequence of the increase in lower priced imports. It also stems from recent changes in

**Figure 6: Clothing**  
Destination of EU exports



Source: Eurostat

**Table 5: Clothing**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990=100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	81.0	86.1	87.4	90.2	91.6	98.6	100.0	102.4	110.3	110.0
Unit labour costs index (3)	97.1	97.6	98.9	98.6	101.1	100.7	100.0	104.4	103.8	100.9
Total unit costs index (4)	84.0	87.7	89.9	91.0	94.3	99.1	100.0	104.7	107.1	103.5
Gross operating rate (%) (5)	8.1	8.4	7.9	8.4	8.4	8.3	8.9	8.8	9.0	9.0

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, OETH

**Table 6: Clothing**  
**Breakdown by size of enterprise, 1993**

(%)	Number of employees (thousands)	Number of enterprises (units)	Share in employment	Share in turnover
Less than 20 employees	353	57 078	31.5	24.9
20 employees or more	766	10 328	68.5	75.1
Total	1119	67 406	100.0	100.0

Source: OETH, DEBA

the structure of clothing retailing throughout much of the EU. This has seen a growing concentration of retailing in the hands of a small number of larger companies in many EU countries. As an example, the relative price of clothing has fallen further in the UK where retailing is highly concentrated, than in Italy where it remains relatively fragmented.

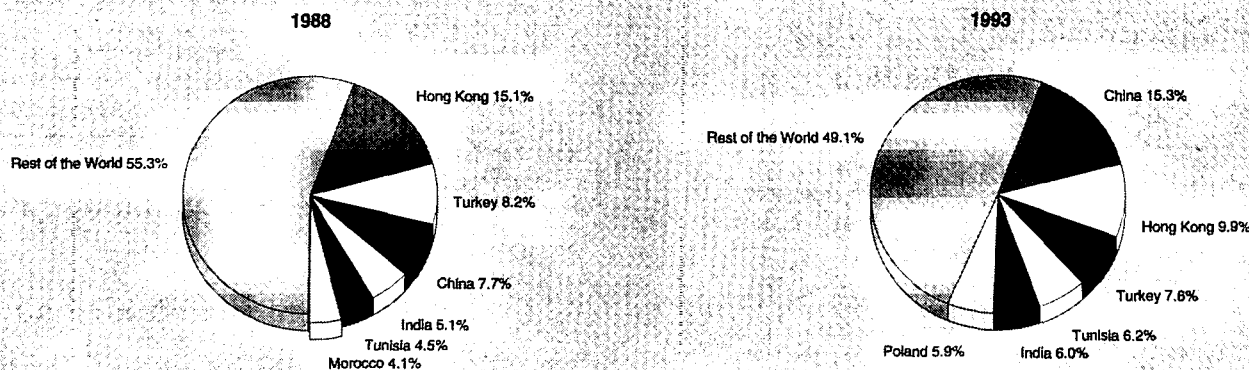
Over recent years, demand for clothing has required a growing number of styles and new collections each year. This has put much greater emphasis on the speed and reliability of response to orders by retailers. In addition, moves towards the maintenance of lower stocks by retailers has increased recourse to repeat orders. Because of the importance this places on speed, it is thought to favour EU production, especially by subcontractors.

### Supply and competition

The EU clothing industry is characterised by a very high level of competition. There are a number of reasons for this: firstly, EU companies face fierce competition from other countries whose low wage costs give them a considerable competitive advantage; secondly, low barriers to entry make it relatively easy for small firms to enter the industry; finally, increased price pressure has also been exerted by traders and organised retailers.

The industry has reacted to these pressures by consistently improving productivity and by seeking other ways to improve its competitiveness. Labour productivity increased by 37 % between 1984 and 1993 in comparison to an increase in unit labour costs of 4 % over the same period.

**Figure 7: Clothing**  
**Origin of EU imports**



Source: Eurostat

**Table 7: Clothing**  
**The ten largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Employment
Benetton	I	1 496	5 895
Triumph Gruppe	D	1 185	N/A
Courtaulds Textiles	UK	1 182	21 900
Levi Strauss Europe	B	1 135	N/A
Steilmann Gruppe	D	924	N/A
Groupe Damart	F	810	5 712
Gruppo GFT	I	801	N/A
Groupe Bidermann	F	708	N/A
William Baird	UK	605	16 512
Escada Konzern	D	602	4 121

Source: Comitexil, Textilwirtschaft, DABLE

Another response by EU clothing manufacturers has been to relocate production to low-wage countries close to the EU. This has taken the form both of directly controlled production and subcontracted production. This is often conducted with the framework of Outward Processing Trade. (OPT). Fabrics of EU origin are exported to countries such as Tunisia, Poland and Morocco, to be made up into garments for subsequent re-importation into the EU. Such production may be granted more favourable tariff and quota treatment.

### Production process

The manufacture of clothing involves a number of different stages, from design to final packaging. At the design stage, the garments are styled, materials are selected, and a prototype is developed. Once collections have been defined in this way, they enter the development stage where manufacturing is prepared. This involves the making of patterns, the purchasing of materials, and the planning of cutting. The final garments are manufactured in three stages, including the cutting of the fabric, sewing and pressing.

The drive, begun in the 1980s principally by Japan, to develop totally automated garment production has largely been abandoned. Automation of fabric handling and sewing operations has proved to be more difficult than anticipated. Greater emphasis has recently been placed on design, the development

of new fabrics, and the development of new methods of working so as to achieve more rapid and flexible production.

Significant technological advances have been applied in recent years in the application of computer technology in controlling pattern layout and cutting, in improving fabric handling, the management of stocks, and in the use of Computer Aided Design (CAD) systems in the design stages. New telecommunications technology is also likely to be increasingly adopted by the industry, facilitating more direct links between retailers, designers and manufacturers.

## INDUSTRY STRUCTURE

### Companies

There were 67,400 enterprises in the clothing industry in 1993. Of these, the majority (85 %) employ less than 20 people. The remaining companies, however, are much more important in terms of employment (68.5 %) and turnover (75 %).

The existence of returns to scale in the industry is evident from the presence of a number of large companies. The largest among them, in terms of turnover, are Benetton (I), Triumph Gruppe (D), Courtaulds Textiles (UK) and Levi Strauss Europe (B).

However, a ranking on this basis must be treated with caution. Some companies such as Coats Viyella (UK) produce their own fabrics, while others such as Gruppo GFT (I) and Steilman (D) use mainly bought-in fabrics.

### Strategies

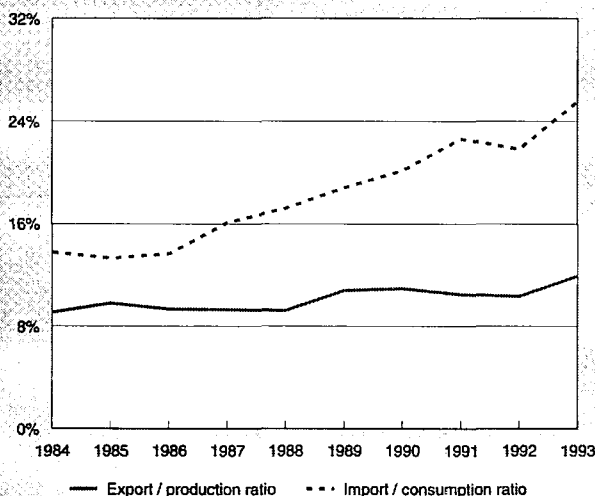
Clothing manufacturers pursue a range of different production strategies. While some companies focus on the production of a specialised, narrowly defined range of products, others have diversified into a range of activities, which can include the production of textiles.

An increasingly important aspect of clothing companies' production strategies over recent years has been the widespread growth in subcontracting. Often firms choose to subcontract certain stages of the production process to outside contractors. These can be situated locally, in other countries in the EU, or outside the EU. The choice of strategy depends on criteria such as price, quality and the need for quick response times.

The importance of subcontracting in the industry was recognised by the European Commission, who commissioned a study of subcontracting in the EU clothing industry. The study found that European subcontractors have taken advantage of the changing strategies in distribution and disinvestment by existing clothing manufacturers.

The study estimated that clothing subcontractors employed approximately 800 000 workers. Declared workers in sub-

**Figure 8: Clothing**  
**Trade intensities**



Source: OETH, DEBA

**Table 8: Clothing  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.88	1.14
Danmark	0.84	0.54
BR Deutschland	0.92	0.75
Hellas	1.32	2.20
España	1.02	1.32
France	0.94	0.89
Ireland	0.90	0.59
Italia	1.64	1.82
Luxembourg	0.11	0.29
Nederland	0.24	0.25
Portugal	N/A	4.27
United Kingdom	0.92	0.82

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA, OETH

contracting represented almost 60 % of total employment in the clothing industry. Of this number 200 000 were artisan and an estimated 150 000 were illicit workers (Estimate by Mercer Management Consulting).

Subcontracting has grown rapidly in recent years, largely because the main-contractor - subcontractor relationship confers a number of advantages for both parties. This can include the cases where a subcontractor can achieve lower unit costs, or can offer greater reactivity and flexibility, or special expertise and services; or the cases where manufacturers can increase their capacity utilisation by combining their own production with that done on a subcontracted basis.

Subcontracting can also benefit from the proximity of the subcontractor, and the ability to form long-term relationships. This has favoured the development of subcontracting in a number of regions such as the 'Sentier' in Paris and Prato in Tuscany. Here subcontractors have exploited their ability to produce runs with short lead times.

### Impact of the Single Market

The Internal Market programme has been globally positive for the sector so far. Free movement of goods has been the most important issue for the sector. On the one hand side, the abolition of national import quotas has increased the market share of non-EU countries (mainly low wage producers). On the other hand, the abolition of controls at internal frontiers has reduced delays and transport costs, which has allowed the EU clothing companies to specialise in higher quality and fashion-led segment of the market, where demand is more dynamic. Other positive effects are coming from the Community trade mark representing a guarantee to trade marks, the opening of the public procurement such as cloths supplies to public institutions (army, hospitals), the support policy to small and medium-sized firms and the training and education programmes.

However, the downward trend in employment represents a serious problem for this sector. Also, companies in this sector feel that the environmental protection legislation should take more into account the ability of EU companies to achieve ever increasing standards. Among, the priorities for the future are the elimination of national non-tariff barriers to trade, most of them having been recently adopted for purpose of consumer protection, an accelerated fiscal harmonisation (more particularly, the harmonisation of VAT regimes), an accelerated harmonisation of monetary policies in order to avoid exchange rates fluctuations and a level playing field for competition with third country producers.

## REGIONAL DISTRIBUTION

The clothing industry is relatively widely spread throughout the EU in a number of small pockets. According to Comitextil, the largest clothing producing region in the EU is Lombardia (I) with 75 000 employees, followed by Veneto (I) and Bayern (D) each with between 50 000 and 75 000.

There are a six regions with between 25 000 and 50 000 employees, four of which are in Italy. There remainder are Nordrhein-Westfalen (D), Île de France (F), Cataluna (E), Norte (P) and Greater Manchester (UK).

There are around 25 regions with 10 000 - 20 000 people employed in the clothing industry. Among these, six are in the UK, four each in Italy, Spain and France, three in Germany, and two in Portugal.

## ENVIRONMENT

While the manufacture of clothing gives rise to fewer environmental problems than the manufacture of textiles, the day-to-day use of clothing has a significant impact on the environment. The pollution caused and the energy consumed in the washing and cleaning of items of clothing can be considerable.

The recycling of clothing is commonplace, especially for woollen garments. Recycled wool does not have to be scoured and may not need dyeing, thereby saving on water and energy. The final disposal of clothing can give rise to environmental problems, since synthetic fabrics are not bio-degradable, although natural and cellulosic fabrics are.

The EU is introducing a system of 'eco-auditing', by which firms can monitor the environmental effect of their production processes. This affects all industries. Another scheme which may affect clothing is the European 'eco-labelling' scheme, whereby products whose manufacture meets certain strict environmental criteria may bear the EU eco-label logo, thereby informing the consumer of this point.

Much work has been done to analyse the full life-cycle of two pilot products - T-shirts and bed linen made from cotton or cotton/polyester blends. The process has taken longer than expected, but criteria for the pilot products are close to being finalised. It remains to seen to what extent this market instrument will contribute to reducing the environmental impact of clothing manufacture.

## OUTLOOK

The demand conditions facing the EU clothing industry are not expected to improve significantly even with recovery in the EU economy as a whole. Apparent consumption is expected to increase by a modest 5 % between 1994 and 1997, in current prices.

Production will continue to be adversely affected by foreign competition, in the form of increased imports, and sluggish demand conditions. However, it will benefit from higher exports. The fall in production, in current prices, is expected to be 3 % between 1994 and 1997. Much, however, will depend on the effects of the conclusion of the Uruguay Round of the GATT which will bring about greater competition for EU clothing markets.

Employment will suffer from the decline in production. With productivity gains expected to continue their present course, employment is anticipated to fall by over 7 % by 1997.

Written by: Observatoire Européen du Textile et de l'Habillement (OETH)

The industry is represented at the EU level by: European Clothing Association (ECLA). Address: Rue Montoyer 24, B-1040 Brussels; tel: (32 2) 230 7420; fax: (32 2) 230 7119.

# Footwear

## NACE 451, 452

The EU is one of the world's largest footwear markets. Consumption increased steadily throughout the 1980s until the recession caused demand to fall. In 1993, production increased much more slowly in value terms and dropped in volume terms. A rapid growth of extra-EU imports, in both value and volume terms, outstripped modest export growth. Italy accounts for almost half of the value of EU production and over half of extra-EU exports. Increased competition from countries with cheap labour has led to the relocation of EU manufacturing facilities to third countries. The structure of distribution is changing - a number of large manufacturers are developing their own retail chains as well as factory outlets, while some of Europe's large fashion groups now have manufacturing interests in footwear. Technological developments in the industry, particularly computer-based applications, have shortened production times, thus enabling a quick response to fashion trends and the introduction of just-in-time (JIT) manufacturing. In addition, these developments have helped make shoe manufacture environmentally safer.

### INDUSTRY PROFILE

#### Description of the sector

The different types of footwear produced within the Community are classified under NACE codes 451 and 452 as follows: mass produced outdoor footwear (451.1) mass-produced indoor footwear (451.2), special types of footwear (451.3), and hand-made footwear (452). It is also common to classify footwear into broad groups by the major material of the upper - leather, synthetic, rubber, textile and other. Some of Europe's large fashion groups have an interest in the manufacture of footwear, which is sold through their own outlets.

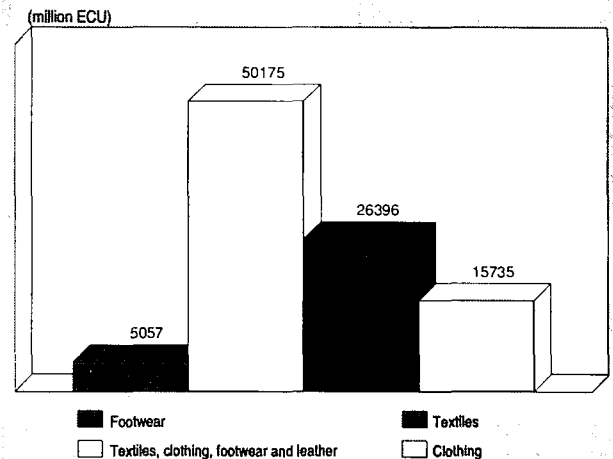
#### Recent trends

The EU footwear industry employed approximately 288 000 workers in 1993 (including firms with less than 20 employees) according to the Confédération Européenne de l'Industrie de la Chaussure (CEC). Eurostat data, which excludes firms with less than 20 employees, estimated total employment in 1994 as 224 400 workers, a decrease of 7 % in 1993 and of almost one-third since 1984. The difference between CEC and Eurostat estimates reflects the importance of small enterprises in the footwear sector.

The industry is relatively labour-intensive. The value of production in 1994 was 16.9 billion ECU including labour costs of 3.4 billion ECU, equivalent to 20 % of production value. Total value added for the industry in 1994 was estimated as 5.1 billion ECU. Apparent consumption in 1993 was higher than production, reflecting a small deficit on extra-EU trade.

The deficit in the EU footwear trade balance in 1993 was 448 million ECU. This is only the third deficit ever to be recorded; and while larger than the 1992 figure, it is lower than that of 1991. The emergence of the trade deficit on footwear is symptomatic of the increasing vulnerability of the EU footwear industry to low-cost extra-EU producers, even though the growth of imports slowed in the early 1990s. At the same time, while production value data for the EU footwear industry points to stagnation during the 1980s there has been some recovery in recent years. This recovery has mainly reflected very strong growth in Italy, although some of this may be more apparent than real. In addition to trade data, other indicators such as volume of production, employment and value-added show a less favourable trend in the devel-

**Figure 1: Footwear**  
Value added in comparison with related industries, 1993

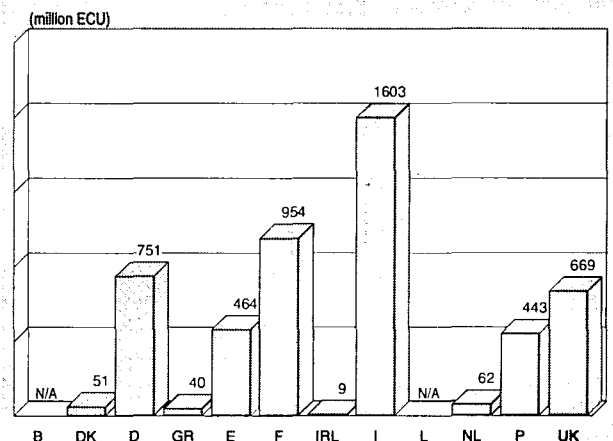


Source: DEBA

opment of the EU footwear industry. In particular, employment has fallen almost continuously over the last decade with particularly sharp decreases over the last three years.

Italy is Europe's major footwear producer, accounting for 42 % of the total volume of EU production in 1993. The next largest producer, Spain, accounted for 17 %. Other major producers are France (14 %), the United Kingdom (10 %) and Portugal (9 %). The only other country with somewhat significant production is Germany (5 %). EU production is dominated by production of leather footwear, 1.09 billion pairs, accounting for more than two out of every three pairs of shoes produced in the EU in 1992. The importance of different types of footwear production varies across Member States. The production of leather footwear accounted for 90 % of footwear produced in Portugal, 83 % in Germany, 69 % in Italy and 74 % in the Netherlands in 1993. Over 50 % of Belgian output is in slippers and approximately 30 % of footwear produced in the United Kingdom is synthetic- or rubber-uppered. In France, slippers account for 33 % of production while cloth uppered and synthetic uppered footwear account for 12 % and 10 % respectively.

**Figure 2: Footwear**  
Value added by Member State, 1993



Source: DEBA

**Table 1: Footwear**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	11 297	13 421	14 240	15 768	17 472	17 317	16 718	17 344	18 070	18 600	19 240
Production	13 297	13 881	15 139	16 548	16 991	17 029	16 270	17 291	18 000	18 500	19 100
Extra-EU exports	3 643	3 192	3 923	4 116	3 938	4 176	4 349	5 173	5 500	5 700	6 100
Trade balance	2 000.7	460.4	898.6	779.7	-481.1	-288.2	-447.9	-53.4	-70.0	-100.0	-140.0
Employment (thousands)	328.4	277.2	272.4	279.3	273.6	258.4	241.6	228.0	225.0	220.0	220.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Footwear**  
**Production in volume by Member States**

(million pairs)	1992	1993
EU (1)	1 081.6	1 087.0
Belgique/België, Luxembourg (1)	3.2	2.3
Danmark (1)	5.5	5.5
BR Deutschland	65.0	56.3
Hellas (1)	12.0	10.0
España	193.7	185.5
France	159.7	154.5
Ireland (1)	1.0	1.0
Italia	418.8	451.7
Nederland (1)	5.7	6.4
Portugal (1)	106.2	101.2
United Kingdom	110.8	112.7

(1) Estimates.

Source: CEC

The 1980s was a difficult decade for the European footwear industry. Modest growth resumed in recent years following substantial rationalisation in the early 1990s. However, import penetration by low-cost producers remains a key feature of the sector, rising in each of the ten years to 1993. Overall, import penetration rose 29 % in value terms, in the ten years to 1993.

While production by EU companies increased in recent years, the apparent EU consumption grew more rapidly, with EU producers continuing to lose considerable market share to extra-EU imports. In the decade to 1993, the value of apparent consumption increased by 48 % in current prices, while the value of EU production over the same period rose by 22 %. There was a brief turnaround in the footwear industry in the 1988-91 period, with strong real annual average growth rates of EU production and extra-EU exports, but the onset of economic recession in 1992 reversed this trend. The rapid fall in employment in the last three years reflects both the effects of the recession and another round of rationalisation within the industry.

An analysis of trends for individual Member States indicates that the value of production in constant prices fell in most Member States in recent years and only Italy and Denmark recorded significant increases. A substantial portion of the growth in the value of production in Italy is a result of adding value - often through marketing - to finished or semi-finished shoe imports and then re-exporting them at much higher prices. This practice exists in all Member States, particularly in relation to shoe uppers. The added value is also generated by high levels of quality control, one of the keys to the "brand"

image of European footwear. Value added in constant prices fell slowly, but almost continuously, over the last decade, falling by 19 % between 1984 and 1994. Similarly, employment in firms with over 20 workers declined by 104 000 over the ten years to 1994.

The footwear industry within the EU is dominated (in value terms) by six Member States - Italy, France, Germany, the United Kingdom, Spain and Portugal. Their relative importance has declined marginally, however. Together, they accounted for 95 % of the value of EU production in 1994, compared to 96 % in 1984. However, the relative importance of Italy and Portugal increased considerably while that of the other five, particularly France and Germany, decreased. Almost all of the growth in production recorded over the 1988-92 period was in Italy, with an overall increase in the value of production in constant prices of 39 %. In contrast, Germany, France, Spain and the United Kingdom all recorded falls in the value of production in both current and constant prices over the same period.

CEC data indicates the volume of all footwear remained almost constant between 1988 and 1992, but that the quantity of non-leather footwear production decreased by 6 % to 706.7 million pairs. Most of this decrease occurred during 1992 and is reflected both in the overall fall in footwear production of 36.5 million pairs and a rise in slipper production of 9.7 million pairs.

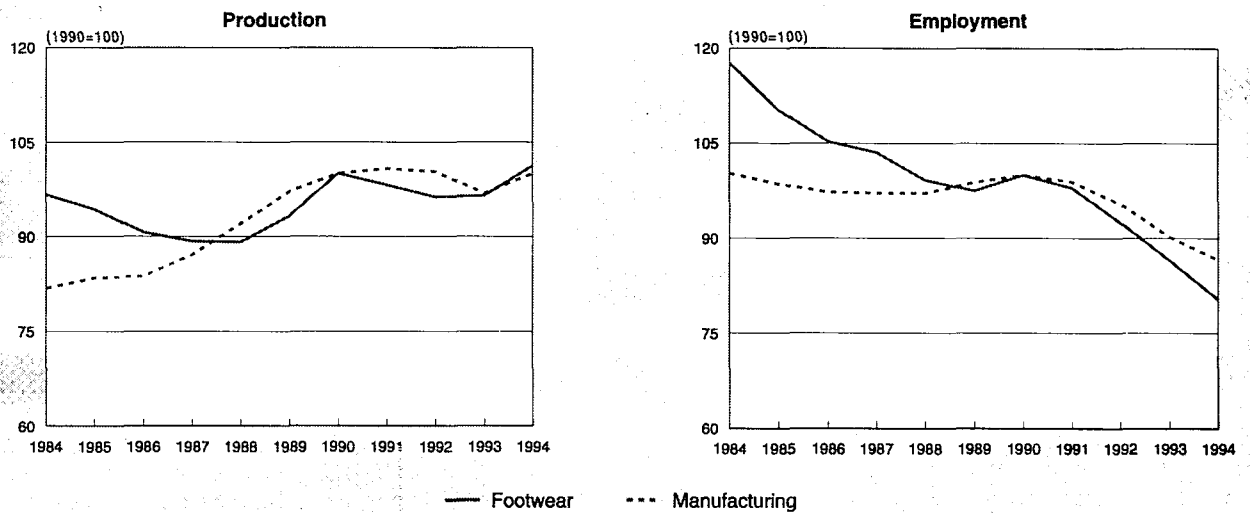
#### International comparison

The EU is a major producer of footwear, accounting for around 10 % of global footwear production and 20 % of world footwear exports. Footwear production is, however, dominated by low-cost developing countries and newly industrialised countries (NICs), with the United States and Japan accounting for only 3 % and 4 % of world footwear production respectively. In contrast to the European experience, the footwear industry in the USA has contracted considerably over the last ten years, with the value of production in current prices falling by over one-half in the 1984-94 period. The corresponding statistic for the EU showed a growth of 27 %. Similarly, while production value in constant prices increased by 5 % over the 1984-94 period in the EU, it fell by 44 % in the USA. Production in the highly protected Japanese market, however, has risen about twice as fast as in the EU over the last ten years.

#### Foreign trade

International trade in footwear is not covered by the Multi-Fibre Arrangement (MFA), which governs trade in the textile and clothing sectors. The EU footwear sector is heavily dependent on international trade, with 26 % of EU production exported to extra-EU destinations in 1993. In current prices, extra-EU exports increased by 19 % between 1984 and 1993, while the current price value of extra-EU imports almost trebled

**Figure 3: Footwear  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

led over the same period. By 1993, extra-EU imports accounted for 29 % of apparent consumption in the EU in value terms, compared to 21 % and 15 % in 1989 and 1984 respectively. In volume terms, import penetration was much higher at 48 %. However, some of this increase includes growth in imports of semi-finished shoes for further production.

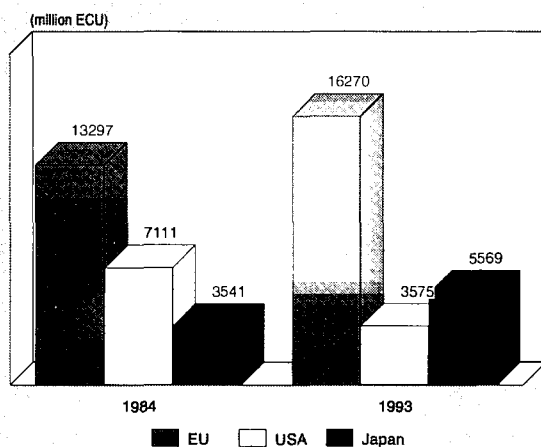
Increasing import penetration of the internal EU market is now reflected in an overall footwear trade deficit. Traditionally, the EU has recorded a surplus in footwear trade but deficits have been recorded now since 1991.

Extra-EU imports are spread across several footwear varieties, with textile uppered footwear accounting for 32 % of the total by volume in 1993. Leather footwear accounted for a further 30 % of the volume of extra-EU imports, with slippers and synthetic-uppered footwear accounting for 17 % and 16 % respectively. In contrast, the majority of extra-EU exports were leather-uppered in two out of every three pairs in 1993.

In 1993, the EU had a trade surplus in footwear with the USA, Japan and what then constituted the EFTA countries. However, it has a large trade deficit in footwear trade with developing countries. The leading market for extra-EU exports was the EFTA countries, the other main market being the USA, although the relative importance of both has declined as the market for EU products diversified in recent years. Italy is the EU's major exporter. With the accession of Sweden, Finland and Austria in 1995, the USA will become the most important extra-EU export destination.

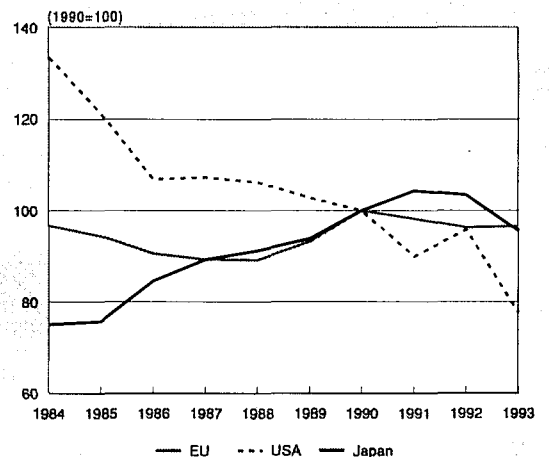
The majority of extra-EU imports come from developing countries, and their value has been increasing steadily. The largest growth in imports to the EU in nominal terms has come from China, which, followed by Indonesia, is the largest exporter of footwear to the EU. Germany is the largest importer of extra-EU footwear, importing 34 % of the total value of extra-EU imports in 1992. Italy, the United Kingdom and France, are also major importers in value terms.

**Figure 4: Footwear  
International comparison of production in current prices**



Source: DEBA

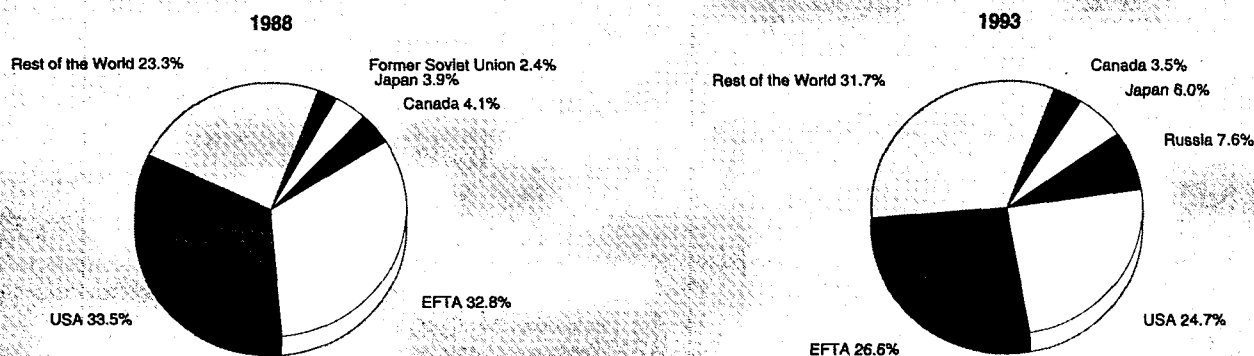
**Figure 5: Footwear  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Footwear  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

Most footwear is purchased by individual consumers. Spending on footwear tends to be cyclical, being reduced or deferred in times of recession, with a compensating upturn during economic recovery. Contract sales to major customers such as the military, or industries requiring specific work or safety footwear are important niche markets.

Footwear is seen primarily as a necessity, and a smaller proportion of income is spent on footwear as income rises. Some niches within footwear, in particular the market for trainers and certain segments of the ladies' footwear market are strongly influenced by fashion trends. In addition, demand for sports footwear has been boosted by higher levels of sports participation. Increased fashion demand has also boosted the usage of coated fabrics and textiles, rather than leather, for uppers or lining material. Reflecting the impact of the recession and the gradual ageing of the European population, the profile of the average shoe buyer is changing, with purchasers being less fashion-conscious and placing greater emphasis on quality and durability. In the sports shoe market there has been a move towards specially developed shoes for specific sports. The 15-24 age group (which is the most fashion-conscious and makes up the bulk of the most frequent purchasers) is contracting. The tendency among the upper-middle-aged, on the other hand, is to buy fewer shoes of a much higher quality.

Both volume and value figures show the largest markets for footwear in the EU to be Italy and Germany, each accounting for 26 % of the value of consumption in 1992. France (20 %) has the highest per capita consumption of footwear: 5.99 pairs per annum in 1992 compared to an EU average of 4.63 pairs.

A comparison between Member States shows significant differences in prices paid per pair - reflecting to some extent where a greater quality- and fashion-consciousness exists in Europe. The price paid per pair is highest in Italy.

Innovations in manufacturing technology have helped maintain the competitiveness of European footwear producers. While Computer Aided Design (CAD) has been available since the 1970s, it was only in the late 1980s and early 1990s that its use became widespread. An increasing use of both CAD and Computer Aided Manufacture (CAM) has allowed European manufacturers to introduce quick response and JIT manufacturing to compete with countries offering cheap labour, as well as to produce high-quality, low-volume runs to take account of fashion trends. A recent trend in CAD technology has been the development of modular systems, so that purchasers can buy only what they need, rather than investing an entire CAD package.

The importance of these technological developments for the competitiveness of EU manufacturers is closely linked to their proximity to the large European market. Footwear technology, by comparison with many industries, is relatively basic. Most technological advances are embodied in capital equipment and the machinery manufacturers readily sell their product to buyers in NICs and developing countries. The key for EU manufacturers is the utilisation of such advances to maximise their proximity to the world's most lucrative footwear market and to the footwear industry's leading fashion centres. Even these advantages are being cancelled out. Low-cost producers close to the European market in North Africa and Eastern Europe may become more important in the medium term. However, European manufacturers can now use CAD systems

**Table 3: Footwear  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.90	2.12	2.00	-1.20
Production	-0.71	0.85	-0.02	0.26
Extra-EU exports	-3.63	2.94	-0.76	5.18
Extra-EU imports	9.71	9.09	9.43	-0.47

(1) Some country data for apparent consumption and production have been estimated.  
Source: DEBA



**Table 4: Footwear  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 643	4 189	3 801	3 393	3 192	3 923	4 116	3 938	4 176	4 349	5 173
Extra-EU imports	1 642	1 827	1 935	2 367	2 732	3 024	3 336	4 420	4 464	4 796	5 226
Trade balance	2 001	2 362	1 866	1 026	460	899	780	-481	-288	-448	-53
Ratio exports / imports	2.22	2.29	1.96	1.43	1.17	1.30	1.23	0.89	0.94	0.91	0.99
Terms of trade index	87.0	85.3	93.2	96.8	100.1	97.2	100.0	96.4	93.4	85.7	N/A

Source: DEBA

to transmit new designs on-line to production facilities in low-cost countries.

### Supply and competition

The distribution of footwear traditionally has been mainly through independent retailers, but the retailing sector has become more concentrated. The importance of larger department stores and multiple retail chains has increased at the expense of independent retailers, whose relative bargaining strength has shifted as a consequence.

Some large manufacturers such as the Bata Organisation (F) and Bally (UK) also have established retail establishments in a number of European countries. Other manufacturers such as André (F), Charles Jourdan (F), Clarks (UK), Eram (F) and Salamander AG (D) also operate retail units both within their domestic markets as well as in other Member States. In addition, footwear manufacturers are becoming increasingly involved in direct selling to customers through factory outlets and second-hand stores. Manufacturers also are seeking to benefit from the trend of retailers to combine their clothing lines with accessories. Thus, more and more footwear companies are attempting to link with retailers or operate in-store concessions.

The key competitive advantages of the EU footwear manufacturers - under pressure from lower priced imports - is their timely and high-quality service, along with design, styling and other creative features. All successful EU manufacturers are committed to offering the best price, delivery performance and flexibility. In response to the ever-changing needs of the retail groups, footwear manufacturers are increasingly adopting quick response strategies, although the number of com-

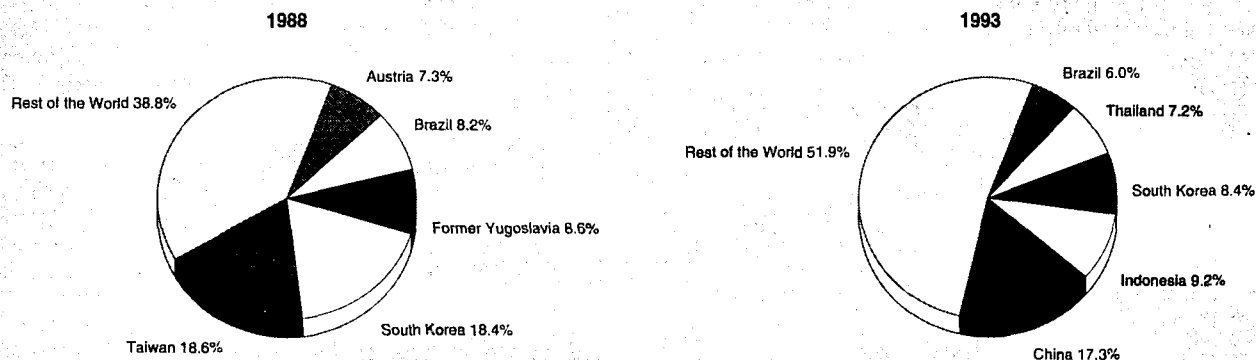
panies using them remains relatively low compared to the clothing sector. Many SMEs have adopted these strategies, for example.

A large number of firms, combined with few restrictions on extra-EU imports and barriers to intra-EU trade make the internal EU footwear market relatively competitive. Internal EU competition increased in the run-up to the completion of the Single Market in 1993, with some of the larger retail chains expanding into other EU Member States. However, the ongoing recession in major EU markets dampened the impact of the Single Market during 1993.

The removal of customs and other physical barriers to intra-EU trade has led to a reduction in transport cost and delivery time. This benefits firms who are dependent on markets in other Member States, as well as those competing on the basis of delivery performance and quick response. The approximation of VAT on footwear will not now take place until at least 1997, at which time Member States which currently have a low VAT on footwear - Ireland, Spain, Italy and Luxembourg - will experience price increases.

Imports of footwear to the EU originate mainly from countries with low labour costs, most notably China, South Korea, Indonesia, Thailand and Taiwan, although imports from other developing countries, such as Vietnam, India and Brazil, are growing. Imports from China have grown the most rapidly in recent years, but this growth will be halted by new quotas on certain types of shoes (adopted in March 1994), which are based on the average level of trade over the last three years.

**Figure 7: Footwear  
Origin of EU Imports**



Source: Eurostat

Following a complaint from the industry alleging dumping of footwear in the EU from some countries in the Far East, the Commission has recently announced the opening of enquiries into imports of specific leather shoes from China, Thailand and Indonesia and certain textile uppper shoes from China and Indonesia. Many developing countries exporting to the EU benefit from GSP (Generalised System of Preferences) regulations with around 40 % of total EU imports falling under this regime. Since January 1995 and until the end of 1998, a revised GSP will operate. The quotas and ceilings of the previous regime will be replaced by a series of duties and the new system will target preferential margins to specific country/product group combinations based on their sensitivity and specialisation. Footwear is classified as a sensitive product which implies a basic preferential duty rate of 70 % of the MFN rate for most beneficiary countries. However, those countries which are very specialist, such as South Korea, Thailand, Brazil and Indonesia, will have their preferential margin phased out during the duration of the regulation. In addition, countries such as China and South Korea, which were excluded for most footwear products under the previous regime, will remain outside the new GSP, while the least developed countries will continue to enjoy duty-free access.

Extra-EU exports are generally high-quality, leather footwear to developed countries such as the USA, Canada, Switzerland, Austria and Sweden. The volume of exports to destinations such as the USA and Canada has fallen, partially explained by the depreciation of the dollar during the latter half of the 1980s. The long-term competitiveness of the EU footwear industry will depend on its ability to continue to supply high-quality products, not only to high income countries but also to consumers in developing countries with high levels of disposable income. In common with the leather industry upstream, expansion into some extra-EU markets is blocked by high duties and tariff barriers (particularly in Japan), while restricted access to some of the raw materials necessary for higher value-added European production is also a problem.

To help improve the prospects of EU footwear firms, a budget for export promotion was voted by the European Parliament in 1993 with the aim of improving access to the markets of non-EU countries. This budget was increased by more than 65 % for 1995. This increase dovetails with the "market-opening" benefits of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). In general, while the results

of the GATT were not totally satisfactory with regard to improving access to the fast-growing markets in Asia, some progress was made, particularly in Thailand and Korea. In Japan, the most lucrative market, there is an agreement to significantly lower tariffs over an eight-year period. However, non-tariff barriers still need to be addressed by the World Trade Organisation (WTO).

The fragmented nature of the footwear industry makes it difficult for manufacturers to benefit from economies of scale. Pressure from cheap imports, coupled with increases in the cost of labour, has led to a decline in profitability in the sector. European manufactures trying to compete with cheap imports have tried to maintain their market share by expanding their existing line of products, while companies responsive to changing fashions are producing smaller production lots and recouping increased product costs through higher prices.

**Production process**

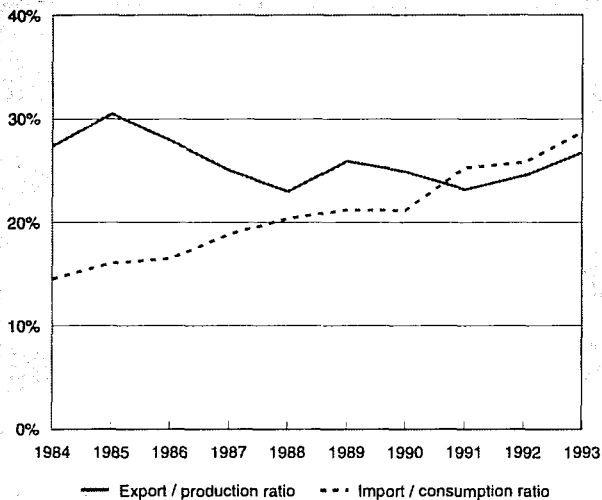
The traditional production process for footwear is a relatively simple, yet labour-intensive manufacturing process, which can be divided into a number of stages. The first stage, called "clicking", involves the cutting out and preparation of components for the upper and the sole. This is followed by "closing", when the components are stitched together to produce an "upper." The upper is then shaped and an insole and a sole are affixed. Finally, the shoe is finished by cleaning, inspecting and boxing.

Mechanised footwear production usually has been organised in a track system along which progressively assembled shoes are carried and lifted from the track by operators to perform the next stage. The introduction of the "rink" system has increased productivity and led to a significant reduction in the volume of rejects. This system involves arranging the various steps in the shoe-making process in sequence, generally in the shape of a horseshoe. Each function is the responsibility of an operator, although each operator should be capable of performing a number of tasks. Work is passed from one operator to the next, one pair at a time. The team is responsible for quality control and inspects its own work.

Footwear production within the EU is becoming more mechanised and specialised. The introduction of computer-aided design (CAD), which allows a shoe to be designed on a computer and the detail-work to be downloaded to production machines, has been one of the most important developments. CAD reduces the time span between design and production to only a few hours, thus enabling a quick response to style changes for fashion footwear. The use of CAD systems has been accompanied by computer-aided manufacture (CAM) and computer-integrated manufacture (CIM). CAD systems are increasingly being linked with computer-aided cutting systems using water jet, laser or die cutters. Operators can view a piece of leather with the use of video and computers and create shoe patterns, taking into account any blemishes on the raw material.

Labour productivity in the EU footwear industry increased steadily over the ten years to 1993, registering an overall increase of 36 %. The increase was particularly sharp in 1993. Unit labour costs have fallen slightly against a background of an overall rise in total unit costs. The need to rationalise costs to maintain competitiveness with developing countries has led larger companies in some Member States to transfer production facilities to those countries within the EU where the cost of labour is lower, including Portugal.

**Figure 8: Footwear Trade intensities**



Source: DEBA

**INDUSTRY STRUCTURE**

**Companies**

The footwear industry within the Community is highly fragmented, characterised by a large number of small business. According to the CEC, there were about 14 225 footwear



**Table 5: Footwear  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.3	85.6	86.1	86.2	89.9	95.7	100.0	100.3	104.1	111.6
Unit labour costs index (3)	100.7	102.3	104.4	105.6	106.3	103.6	100.0	105.5	104.8	94.3
Total unit costs index (4)	84.0	87.9	89.9	91.5	94.1	100.0	100.0	106.2	107.7	102.9
Gross operating rate (%) (5)	8.88	9.19	9.41	9.13	8.98	7.20	7.08	7.87	7.44	8.03

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

firms in the EU in 1993, employing an average of 20 workers, compared to 14 730 firms in 1992. More than half of these firms, 55 % to be exact, were in Italy. Major EU footwear manufacturers include Salamander AG (D), Romika & Co. KG (D), Eccolet Sko (DK), Eram (F), André (F), Clarks (UK), Church & Co (UK), Simod SpA (I) and Filanto SpA (I).

### Strategies

Available investment data on the EU footwear industry is dated, with 1989 being the latest year for which information is available for most Member States. In 1989, the value of investment in current prices for all Member States, except the Netherlands, was 295 million ECU, roughly equivalent to the levels in 1985 and 1986 in nominal terms. This was less than 2 % of the value of production and gives an indication of the low level of confidence in the future of footwear manufacturing in the EU during the second half of the 1980s.

Some of the companies which transferred their production to the lower-cost countries include the French company, Charles Jourdan, which transferred production from the Rhône valley to Spain. Eram, one of France's largest producers and distributors of footwear, operates ten plants within France along with one in Portugal and one in Spain. Likewise, many German producers have transferred their production to Portugal, as well as Austria, while the United Kingdom manufacturer Clarks has two plants in Portugal. The Danish footwear manufacturer, Eccolet, operates plants in Portugal and the former Czechoslovakia, as well as in Denmark.

Many EU producers have shifted their operations to developing countries outside of the EU, where cheaper labour can also be found. South Korea, China and Thailand are the most popular countries for sourcing, since some of the other developing countries are not yet as well-organised or reliable.

Some French manufacturers now sub-contract to Tunisia, Morocco and China. The German company Wortmann has factories which manufacture inputs in Taiwan, Hong Kong, China, Thailand and Brazil. Europe's leading sports footwear manufacturers such as Adidas and Puma also transferred substantial proportions of their production facilities to the Far East during the second half of the 1980s. This was done in order to remain competitive with their main rivals who already manufacture the majority of their footwear in the Far East. Puma closed its last German manufacturing facility during 1993. Vietnam is, however, becoming increasingly popular. Italian companies Diadora and Simod both established manufacturing facilities in China during 1994, while Ferragamo extended its operations there by opening a second boutique in Shanghai.

The import of uppers and other labour-intensive parts from low labour cost countries for assembly is also common. While this practice is less popular in Italy, it is most popular in Germany, which pioneered such outward processing in Eastern Europe. However, the trend of locating production facilities in Eastern Europe is likely to slow down, as labour costs in

these countries have been increasing and therefore any benefit to footwear manufacturers will exist only in the short term.

Conversely, some quality- and image-conscious footwear companies almost completely refrain from sourcing production in low-cost locations. While Bally's in-house production contracted rapidly during the 1980s, most of the subsequent sub-contract work is in high-cost locations with the major portion of the company's sub-contractors located in Italy. Bally's fashion studios in Milan, Paris and London cooperate closely with these sub-contractors. Some leading German retailers also source the production of their private label shoes with Italian sub-contractors.

The integration of retailing and manufacturing has been an important feature of the footwear sector over the last decade, although many footwear companies are now placing greater emphasis on the retailing aspects of their operations. France's Groupe André, for example, which has been increasing its retail presence in France and other EU markets sold Jallate, a world leader in the manufacture of safety shoes, in early 1993.

In addition, strategies both in terms of capital investment and new organisational structures place increasing emphasis on quick response, flexibility and other aspects of delivery performance. In France, Bata's computerised manufacturing system can provide customers with a coated sample in real time, and can achieve a three-day turnaround for urgent repeat orders. Similarly, Bally recently introduced a computerised merchandise information system aimed at minimising stocks, shortening order delays and improving cooperation between production units, sub-contractors and retailers.

### Impact of the Single Market

The impact of the Single Market programme on the footwear sector has been mixed. By abolishing national import quotas, the Single Market programme has contributed to a further increase in import penetration by low-cost countries. In addition, in Europe opportunities for economies of scale are rare in this sector as the EU footwear market is very fragmented. As a result, many EU producers have shifted operations to low labour cost producing countries. The imports of uppers and other labour-intensive parts from low labour cost countries for assembly is common. However, increasing use of Computer Added Design (CAD) and Computer Added Manufacture (CAM) has allowed European manufacturers to introduce quick-response and just-in-time manufacturing to compete with low-labour cost countries. This has also made possible the production of high quality low-volume runs well adapted to fashion trends. In this context, the removal of customs and other physical barriers to intra-EU trade has led to a reduction in transport cost and delivery time.

The future priorities of the sector are the elimination of the remaining national non-tariff barriers to trade, an accelerated harmonisation of monetary policies in order to avoid exchange

**Table 6: Footwear  
Number of firms, 1993**

	(units)
EU (1)	14 225
Belgique/België, Luxembourg	50
Danmark	15
BR Deutschland	186
Hellas	N/A
España	2 145
France	274
Ireland	N/A
Italia	8 100
Nederland	77
Portugal	1 110
United Kingdom	650

(1) Estimates.  
Source: CEC

**Table 7: Footwear  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.14	N/A
Danmark	0.61	0.71
BR Deutschland	0.48	0.41
Hellas	1.07	1.26
España	1.67	1.28
France	1.05	0.79
Ireland	0.58	0.10
Italia	2.44	2.89
Luxembourg	0.00	0.00
Nederland	N/A	0.19
Portugal	2.32	7.27
United Kingdom	0.65	0.63

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

rates fluctuations, a legislation on environment protection which takes more into account the ability of the EU companies to achieve ever increasing environmental standards and a level-playing field for competition both within the EU and with respect to third countries.

## REGIONAL DISTRIBUTION

Much of the EU footwear industry is concentrated in specific regions in a few countries. These regions are often areas with little alternative employment to the footwear industry. The industry is the most regionally concentrated in the Iberian peninsula. In Portugal, Aveiro accounts for over half of all footwear production, while Porto and Braga account for a further 31 % and 11 %, respectively. Meanwhile, in Spain 62 % of footwear firms were located in the Valencia region in 1991.

Three Italian regions - the Marches, Tuscany and Veneto - account for almost two-thirds of the all footwear employment in Italy, and one-fifth of the total footwear employment in the EU. Similarly, over 60 % of the shoes produced in France in 1991 came from the Pays de la Loire and Aquitaine regions.

The industry can also be concentrated even further in towns and areas within regions such as Herzogenaurach and Pirmasens in Germany, and Northamptonshire in the United Kingdom. The impact of any adverse developments for the industry therefore heavily impact these specific areas of the EU.

## ENVIRONMENT

Environmental issues are more important in industries supplying the footwear industry than in the industry itself. The leather and tanning industry is a major source of raw materials to European producers. Suppliers in this sector are under pressure to use water and chemicals more carefully to reduce the level of effluents. The need to install water effluent treatment equipment to meet increasing environmental standards will lead to increased tanning costs and therefore higher supply costs for the footwear industry, although there is already sourcing of materials outside the EU.

Further problems for the industry are caused by the divergence between existing national legislation and the EU Directive on PCP (pentachlorophenol), with the maximum permitted limit set at very low levels in some Member States. The lack of standardised testing procedures exacerbates the situation. Suppliers of raw materials for non-leather footwear production

are likely to face increasing constraints from regulations on the usage of polyurethane and polyvinyl chloride (PVC).

Environmental problems with traditional materials has accelerated the search for alternatives such as fish skins. Most fish skins can be tanned and cured, are available in a greater range of colours than traditional hides and can often be both tougher and easier to clean. Another alternative is to use frog skins, which are very elastic. New man-made fibres are being developed, both as alternatives to traditional hides and as insoles and other shoe components. Their advantages would include not only comfort and general functionality, but environmental appropriateness as well. Finally, components are being produced using recycled materials, particularly insoles.

Discussions have begun regarding an eco-label for shoes. A CEN Working Group is also working on specific functional requirements for shoes. These will provide a further "quality" guide to help brand and market EU-produced shoes.

## REGULATIONS

With the arrival of the Single Market and the dismantling of border protection, the national quotas for footwear imports from some low-cost producers have become more or less redundant. Previously, national quotas could be protected through Article 115 of the Treaty of Rome. This Article helped to circumvent national import controls by routing goods through another Member State. With no physical internal border controls since January 1993, the use of this article has become very problematic and it is now being phased out.

An EU Directive concerning the labelling of the materials used in the main components of footwear for sale to the consumer was adopted by the Council in March of 1994. It will enter into force in March 1996. The Directive deals primarily with indicating the composition of footwear by either "pictograms" or text.

## OUTLOOK

The EU footwear industry faces a difficult future, although there are some encouraging factors. These include the possibility that some of the trade restrictions which EU manufacturers face on some lucrative extra-EU markets will ease following the GATT agreement. New markets for EU footwear will emerge in the increasingly prosperous Asian NICs. The mixed outcome of the GATT negotiations, however, complicates any forecast on how soon and how deeply EU companies

will penetrate these markets. Recovery in the key extra-EU markets of Japan and the USA, as well as better prospects for Member State economies from 1994, will drive growth in consumption over the next few years.

However, recovery in the EU will also lead to resumed growth of extra-EU imports of footwear from low-cost competitors. The rate of growth of sourcing production in lower-cost countries slowed in recent years, but is unlikely to end anytime soon. The industry's fundamental difficulty is that it is caught in a shift of comparative advantage in labour-intensive industries. This shift is accentuated by the fact that footwear is a basic commodity for which there is traditionally strong local demand, and also that it is a major part of the industrial sector in developing countries which are at early stages of industrialisation. Thus, as labour costs in countries such as Taiwan and South Korea rise as a result of their ongoing economic development, new locations such as Vietnam, China and Indonesia will become more important.

The full impact of the Single Market, initially dulled by the impact of the recession on consumer demand, should become more apparent as EU Member States enter a strong growth phase over the next few years. The measures taken will have increased competition within the EU and may cause a further squeeze on the margins of European manufacturers. How competitive the internal market becomes also will depend on the evolution of EU trade policies, not only in the context of the GATT but also with regard to arrangements vis-à-vis Eastern Europe. In addition to the improved access to the EU for East European footwear, easier access to Eastern Europe will make it easier for EU manufacturers to locate production facilities in these countries. Provided that political stability is maintained, the volume of extra-EU footwear imports from Eastern Europe seems likely to increase, as does the volume of imports of uppers or semi-finished inputs.

Growth in consumption is, however, expected to lag behind overall economic growth. With increasing import penetration both employment and production in the EU are expected to fall in the medium term. While the increasing use of technology will help the industry to regain its competitiveness, it will not provide the complete solution. Increased cost effectiveness will also be needed, along with a greater emphasis on marketing and satisfying the changing demands of the consumer.

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# Leather tanning and finishing

NACE 441

Improved business prospects in the leather industry is bringing dynamism back to the tanning sector after several years of a depressed market situation. EU tanners optimism may be frustrated due to critical shortages in the supply of raw materials and alarmingly rising prices in hides and skins. Export orientation, fashion and quality remain the factors of strength and competitiveness for EU tanneries.

## INDUSTRY PROFILE

### Description of the sector

Tanning hides and skins is possibly one of the oldest trades of mankind. Down through history it has evolved into a modern industry blending high technology and fashion to satisfy the demanding needs of today's consumers. Production of leather consists of industrial processes where raw hides and skins are converted into a durable material which suits the requirements for the manufacture of a wide range of consumer products. Leather is thus an intermediate product resulting from the valorisation of a residue from the abattoirs and meat industry and serving as a major input for sectors such as footwear, clothing, furniture, leather goods etc.

Tanning is a relatively small and capital intensive sector which has to be considered in connection with its upstream (abattoirs, hides and skins dealers, tanning chemical and machinery suppliers) and downstream (footwear, clothing, furniture and leather goods manufacturers) counterparts in order to understand its actual economic weight. Together with those other labour intensive activities, the global EU leather industry represents an industrial sector comparable with the clothing industry in terms of production and employment. Southern EU Member States predominate in the geographical distribution of production with Italy being by far the most important leather producer accounting for 4 266 million ECU and some 60 % of total output.

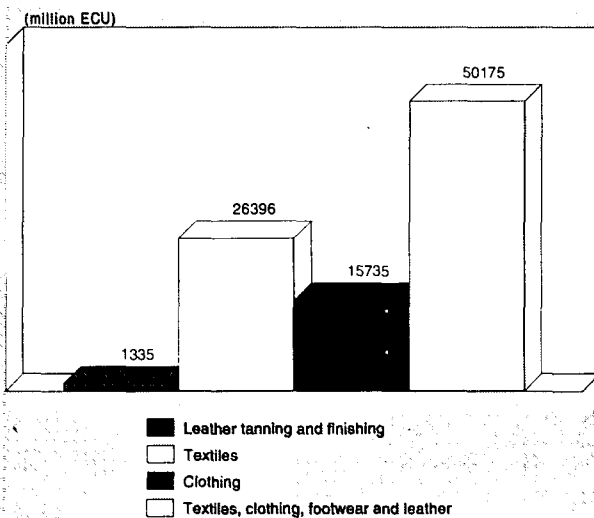
### Recent trends

Leather production by volume in the EU is experiencing a continuing contraction. Today the EU leather production totals some 250 million m<sup>2</sup>, down 15 % compared to a decade ago.

The trend of relocation of traditional sectors in other regions of the world following a general pattern from north to south and from west to east has eroded much of the EU leather sector's production capacity. Mediterranean Member States have benefited from this trend during the 1970s. Their level of production rose in relative terms but they are now increasingly facing the same difficulties as their northern counterparts. Closures due to the inability to compete in an international environment where unfair trade practices proliferate, increased non productive costs for environmental protection are some of the reasons behind the contraction of the EU tanning sector.

It has lost over 1 000 production units and about 30 000 workers since 1983, a trend which is likely to continue in the future. As bulk leather production shifts more and more to NIC's and developing countries, European tanneries concentrate in producing less volume but more value in order to maintain the sector's high level in terms of turnover. Consumption of leather is dropping in the EU as an increasing number of downstream manufacturers disappear either relocating their factories in low cost countries or closing down their businesses because of the fierce and often unfair com-

Figure 1: Leather tanning and finishing  
Value added in comparison with other industries, 1993



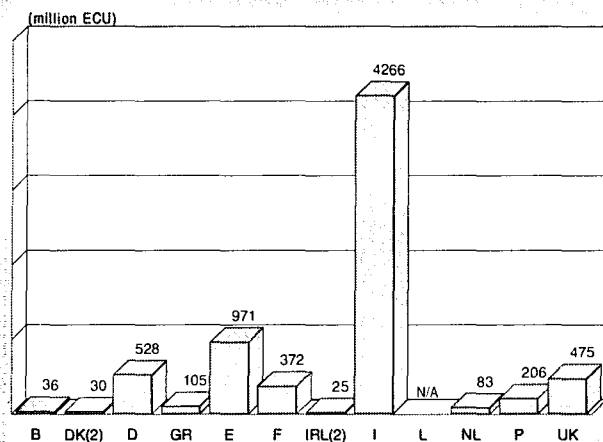
Source: DEBA

petition from extra EU producers. The EU leather market, once the world's largest, is losing ground progressively with the emergence of new, dynamic, and exponentially growing leather consuming regions notably in Asia.

With a shrinking internal market and rising opportunities in foreign markets, EU tanners have spent considerable efforts in developing exports. The EU tanning sector's export performance has improved continuously doubling in current prices since 1983 and reaching about 1 500 million ECU.

The most recent sectoral data reflect these long term trends but also a slight recovery from the recession which depressed the leather sector since the beginning of the decade. Leather production in value reached 7 069 million ECU in 1993, an increase of 2.5 % compared to the year before. Italy, Spain, Portugal and Greece were the EU member States who performed the best with increases of 5 %, 4.5 %, 3 % and 16 % respectively.

Figure 2: Leather tanning and finishing  
Turnover by Member State, 1993 (1)



(1) Provisional data.

(2) Estimates.

Source: Cotance

**Table 1: Leather tanning and finishing**  
**Main indicators in current prices (1)**

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)
Apparent consumption	7 041	6 791	6 949	8 053	7 905	8 146	6 928	6 447	6 332	6 555	7 100
Production	7 341	7 028	7 212	8 289	8 308	8 132	7 226	6 895	7 069	7 200	7 500
Extra-EU exports	1 087	936	1 057	1 044	1 344	1 180	1 173	1 279	1 492	1 400	1 200
Trade balance	300	237	263	236	403	-14	298	448	737	645	400
Employment (thousands)	78	77	75	72	70	63	60	55	52	50	48

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Cotance estimates.

(3) Cotance forecasts.

Source: Cotance, Eurostat

**Table 2: Leather tanning and finishing**  
**Breakdown of finished leather by major product line, 1993**

(million m <sup>2</sup> )	Apparent consumption	Production	Extra-EU exports
Cattle and calf	123.2	171.1	47.9
Sheep and goat	23.3	69.4	46.1
Others	0.9	5.0	4.1

Source: Cotance, Eurostat

**Table 3: Leather tanning and finishing**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	1.5	-3.0	-0.5	7.3
Production	1.7	-2.1	0.0	10.1
Extra-EU exports	3.3	2.4	2.9	6.4
Extra-EU imports	2.2	-3.3	-0.2	-15.0

Source: Cotance, Eurostat

**Table 4: Leather tanning and finishing**  
**External trade in current prices**

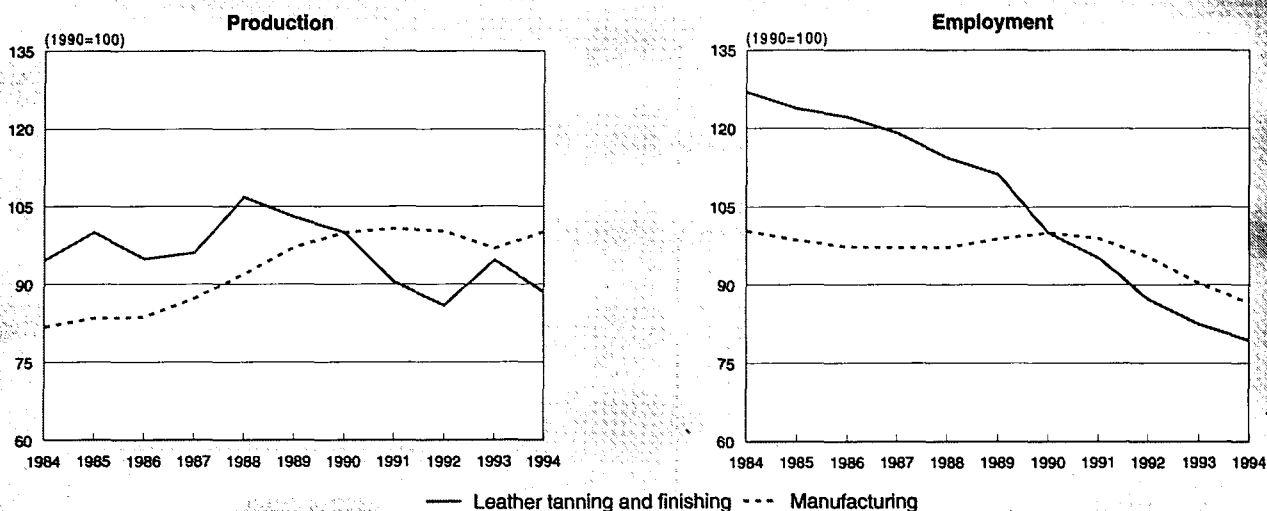
(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	896	1 087	936	1 057	1 044	1 344	1 180	1 173	1 279	1 492
Extra-EU imports	705	787	699	794	808	941	1 194	875	831	755
Trade balance	191	300	237	263	236	403	-14	298	448	737
Ratio exports / imports	1.27	1.38	1.34	1.33	1.29	1.43	0.99	1.34	1.54	1.98
Terms of trade index (1)	92.6	90.8	101.6	97.7	97.7	98.9	100.0	102.2	106.2	108.9

(1) NACE 441.

Source: Eurostat



**Figure 3: Leather tanning and finishing  
Production and employment compared to EU total manufacturing industry**



1994 are Cotance and DEBA estimates.  
Source: Cotance, DEBA

### International comparison

The leadership of the EU in the worldwide leather industry remains unchallenged. Its traditional image of quality and reliability combined with excellence in the field of fashion secures EU tanners a privileged position in the international marketplace.

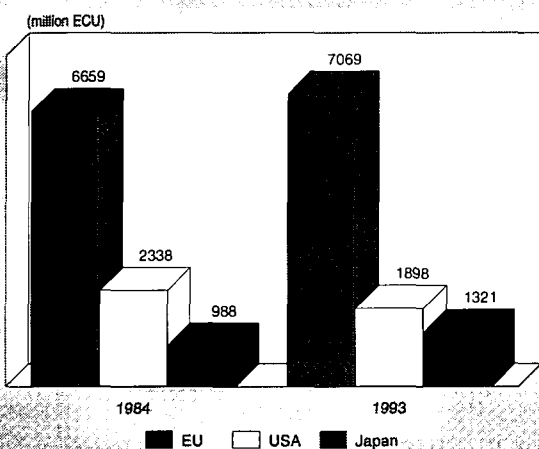
Compared to the USA and Japan, the EU appears particularly important in terms of production. It is to be noted however that Japan has managed to improve significantly its position during the last decade behind the wall of protection provided by prohibitive import tariffs (Tariff Quota system). Inversely, the USA continued to loose ground in the domestic leather production. More serious competition for EU tanners comes from India and Pakistan in Asia and Argentina and Brazil in South America. Central and Eastern European Countries (CEECs) are also emerging players. All those countries however are stemming up production on the basis of protectionism.

### Foreign trade

The EU leather industry has managed to maintain its position as the world's largest supplier of leather accounting for slightly over 50 % of total supplies. Its importance in relative terms tends however to decline in the long term with the emergence of new players notably in Asia. Whereas in 1983 Asia and Oceania contributed with 20 % to the global availability of leather, in 1992 this figure rose to 24 % and by the year 2000 it is likely to be in the range of 30-40 %. So far this region's expansion has been to the disadvantage of the American continent whose relative performance has been less positive over the years.

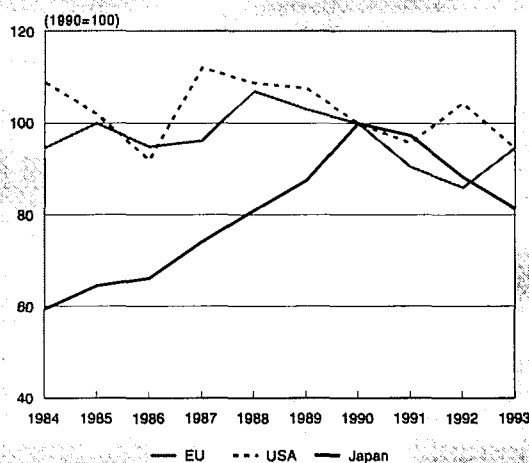
The development of extra EU exports since 1988 has been particularly significant with Hong Kong and South Korea. The former generally acts as a distribution centre for the markets around the Pacific Rim. Exports to China look quite promising considering this country's potential. The USA and

**Figure 4: Leather tanning and finishing  
International comparison of production in current prices**



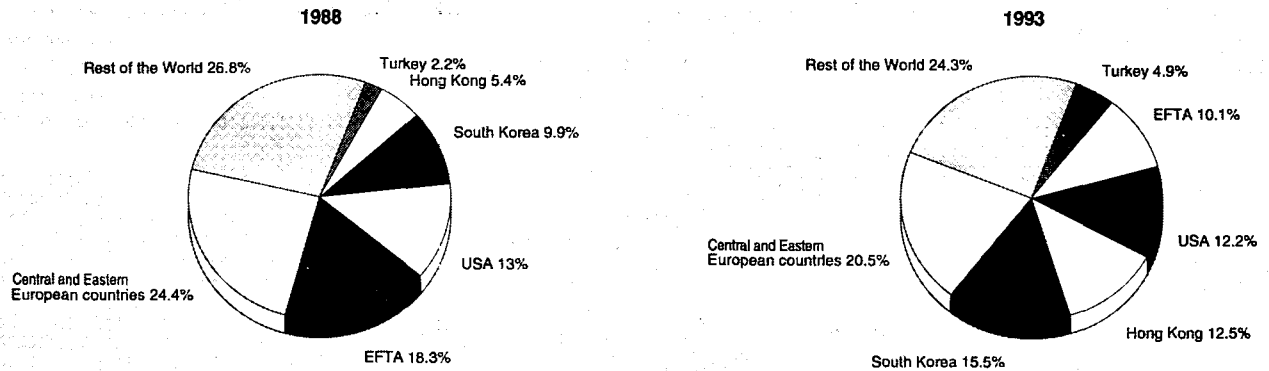
Source: Cotance, DEBA

**Figure 5: Leather tanning and finishing  
International comparison of production in constant prices**



Source: Cotance, DEBA

**Figure 6: Leather tanning and finishing  
Destination of EU exports**



Source: Eurostat

EFTA have remained important trade partners for the EU in the leather sector.

In extra EU imports the most striking development is the improvement of the relative share of CEECs whose leather exports to the EU have slightly eroded those of India and Pakistan.

## MARKET FORCES

### Demand

Fashion and consumer spending patterns are the main factors affecting the demand for leather in developed economies. Footwear, garments, leather goods, upholstered furniture and cars constitute the most classical outlets for this material. Their relative importance as a market for EU tanners varies from country to country. Shoe production remains however the most important client sector overall for the leather industry with a share of 50 % of the total EU production. Next follows the clothing industry with 20 %, the furniture sector with 17 % and finally the leather goods sector with 13 %.

Geographically the demand for leather shifts to the emerging economies in Asia where a wealthy middle class appreciate increasingly the appeal of leather.

### Supply and competition

Reduced slaughter due to the reform of the Common Agricultural Policy (CAP), the increase of extra-EU exports of live animals and the proliferation of protectionism in the form of export restrictions of hides and skins by an ever increasing number of trade partners is causing damaging supply shortages to the EU tanning industry. Prices of raw materials on free markets are rocketing and threaten to put EU tanners out of business.

Export restrictions of raw materials are particularly damaging unfair trade measures which artificially distort competition to the benefit of those countries tanners' implementing them. The ultimate consequence is a forced transfer of production from competitive businesses operating according to free market rules to non competitive operators which only manage to overcome their handicap through measures diverting the optimal allocation of resources. Protectionism in the leather industry of Central and Eastern European Countries (CEECs) is causing great disarray among EU tanners because the threat is so close and the impact so tangible.

## Production process

EU tanneries' competitiveness relies on a successful blend of quality and fashion achieved through the optimisation of the production processes. Product innovation generally starts in the EU where the major fashion centres anticipate the trends and the most important specialty chemical suppliers develop new techniques in cooperation with the tanning industry.

## INDUSTRY STRUCTURE

### Companies

The total number of tanneries in the EU continued to decline in 1993 leaving the sector with only 3 002 companies and 52 026 workers, a drop of 9.7 % and 9.5 % respectively compared to 1992. Since 1983 1 000 tanneries have closed down and 28 000 workers made redundant.

SMEs predominate in the tanning sector. In a recently created databank of the EU tanning industry recording the 1 000 most important companies of the sector, only 10 tanneries appear to employ more than 200 people, 28 are listed in the range of 101 to 200 employees, 82 in the range of 51 to 100, 175 provide work for 21 to 50 people and the rest has less than 20 workers. Companies are often family businesses transmitted from generation to generation and some can proudly show a centenary tradition in the industry.

The EU tanning industry databank gives also an indication of the sector's breakdown in terms of company turnover: 4 tanneries present a turnover of more than 30 million ECU; 20 tanneries are in the range of 20 to 30 million ECU; 71 tanneries are in the range of 10 to 20 million ECU; 129 tanneries are in the range of 5 to 10 million ECU; the bulk

**Table 5: Leather tanning and finishing  
Destination of output, 1993 (1)**

(%)	
	Footwear industry
50	Clothing industry
20	Furniture upholstery
17	Other industries
13	

(1) Provisional.  
Source: Cotance

**Table 6: Leather tanning and finishing**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	88.1	89.8	86.6	92.3	93.0	103.0	100.0	98.1	92.7	99.5
Unit labour costs index (3)	80.5	81.9	88.8	86.2	91.5	88.9	100.0	109.7	120.2	104.0
Total unit costs index (4)	88.4	91.8	91.6	93.2	97.7	101.1	100.0	98.0	101.9	92.9
Gross operating rate (%) (5)	8.7	8.3	8.3	8.4	7.3	7.4	7.0	9.1	6.8	8.4

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA

of EU tanneries present a turnover of less than 5 million ECU.

Leading EU tanneries in different member States include: Mastrotto, David, Dal Maso, Arno, Industria Conciaria Europea SpA and Russo di Cassandrino in Italy; COSTIL Tanneries de France and Tannerie PECHDO SA in France; Curtidos CODINA and Grupo Lederval in Spain; Kon. Hulshof's Ver Fabrieken BV in the Netherlands; Swewi Svendborg A/S in Denmark; The British Leather Co Ltd in the UK; Lederfabrik Louis Schweizer GmbH & Co and Ludwig Lindgens GmbH & Co. KG in Germany.

### Strategies

Mergers and acquisitions are not common features in the EU leather industry and strategic alliances are usually developed in key foreign markets with the objective of boosting exports. Company strategies focus, among others, on certification to quality assurance systems, product innovation and improved customer service adapting constantly to the demand of the market.

### Impact of the Single Market

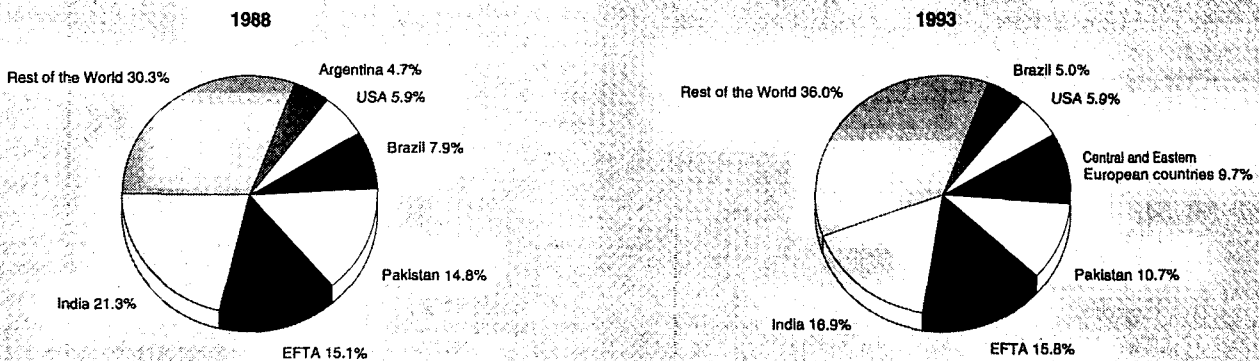
The impact of the Internal Market has been globally positive for this sector. By better defining the characteristics of leather products, the technical harmonisation represents an important measure as it allows economies of scale. However, the reality is that the domestic market is shrinking, mainly due to the fierce competition of extra-EU tanners from countries where the access to raw materials is protected. This competition has been increased with the Generalised System of Preferences,

which makes the access to the European market even easier. Moreover, there is a movement of relocalisation of the client industries to low wage countries. So the EU tanneries have to excel in quality or fashion succeeding in the market segment where price considerations are not the most important factor. Among the future priorities are the fact that environmental regulations should take more into account the ability of the industry to assume ever increasing standards, and a fairer degree of competition in the sector of leather tanning and finishing, both for intra-EU trade and with respect to non-EU producers.

### REGIONAL DISTRIBUTION

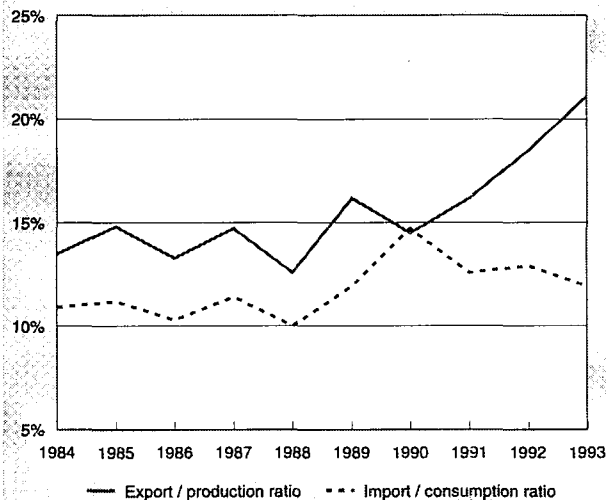
There are regions within EU member States presenting characteristic concentrations of tanneries and municipalities whose local socio economic life depends heavily on this sector's activity. Such areas are more frequent in southern European countries than in the north of Europe where the decline of the tanning industry has led to the isolation of individual tanneries and their loss of influence in generating wealth and employment. Whereas in Germany, Backnang and Müllheim are some of the remaining leather areas in this country, in Italy there are several. Tuscany is a particularly well endowed region for the leather industry. The tanning centres of Arzignano, Santa Croce sull'Arno, San Miniato, Castelfranco, Montopoli and Solofra concentrate most of Europe's sole leather production and a significant share of all the countries soft leathers. Catalonia concentrates in Vic and Igualada an important proportion of Spanish tanneries. Graulhet and Mazamet

**Figure 7: Leather tanning and finishing**  
**Origin of EU Imports**



Source: Eurostat

**Figure 8: Leather tanning and finishing  
Trade intensities**



Source: Cotance, Eurostat

in southern France is the traditional small skins leather area which developed historically due to the abundant supply of sheepskins imported mainly for the wool. Alcanena in southern Portugal has become more recently one of the leather centres in the EU.

## ENVIRONMENT

At present, the challenge for EU tanners consists in combining successfully quality and ecology for securing the sector's future in Europe's industrialised economies and its sustainable development. Initially forced by the regulatory pressure at all governmental levels, EU tanneries have progressively integrated the concept of environmental protection into their management strategies and have adopted consequently measures to prevent pollution rather than to apply "end of pipe" solutions. The sector's operators throughout the EU have understood that sound environmental management and the implementation of cleaner process technologies often lead to considerable savings as waste disposal costs rise. High tanning chemicals exhaustion technologies, water based coatings, enzymatic degreasing, effluent separation techniques are just a few examples of environmental technologies which are more and more widespread in the EU member States' leather sector. This proactive approach to environmental concerns has led to minimise pollution in the EU leather industry so as to reasonably expect to be excluded from the scope of proposed legislation in the field of Volatile Organic Compounds (VOC), or Integrated Pollution, Prevention and Control (IPPC). The administrative costs for the SME's of the sector possibly induced by the proposed instruments would be out of proportion to the nuisances they cause. The fact that only one residue from the leather industry, "degreasing waste containing solvents", has been retained from the European Waste Catalogue (EWC) in the list of hazardous waste, is an indication of the environmental performance of the sector. Environmental consciousness plays indeed an important role in today's EU tanneries. Waste minimisation through prevention, recycling and recovering residues for converting them in inputs to other industries are well established techniques in an increasing number of plants. These efforts could be enhanced by a more homogeneous environmental legislation in the different EU

**Table 7: Leather tanning and finishing  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	0.25
Danmark	0.32	N/A
BR Deutschland	0.39	0.28
Hellas	1.42	1.28
España	2.22	2.27
France	0.50	0.36
Irland	1.33	N/A
Italia	2.82	3.41
Luxembourg	N/A	N/A
Nederland	0.36	0.51
Portugal	2.82	N/A
United Kingdom	0.70	0.67

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

Member States and a EU legislation encouraging a wider use of secondary raw materials.

## REGULATIONS

Only a few EU regulations apply specifically to the leather sector as it is usually covered by the complex and comprehensive set of standards governing all type of industries. Of particular interest are some technical regulations which have been recently adopted by the EU:

- the footwear labelling directive setting requirements for the use of the term "leather" and adopting officially the definition of the International Council of Tanners (ICT);
- the "balai" directive specifying the raw hides and skins needing a veterinary certificate for their circulation within the EU and setting standards for avoiding the spread of pathogens.

It is also worthwhile noting that the new EU scheme of generalised preferences (GSP) has classified the leather industry among the sensitive sectors and the most competitive beneficiaries, such as Argentina, Brazil, India and Pakistan, will be progressively excluded from the granting of preferential access to the EU internal market.

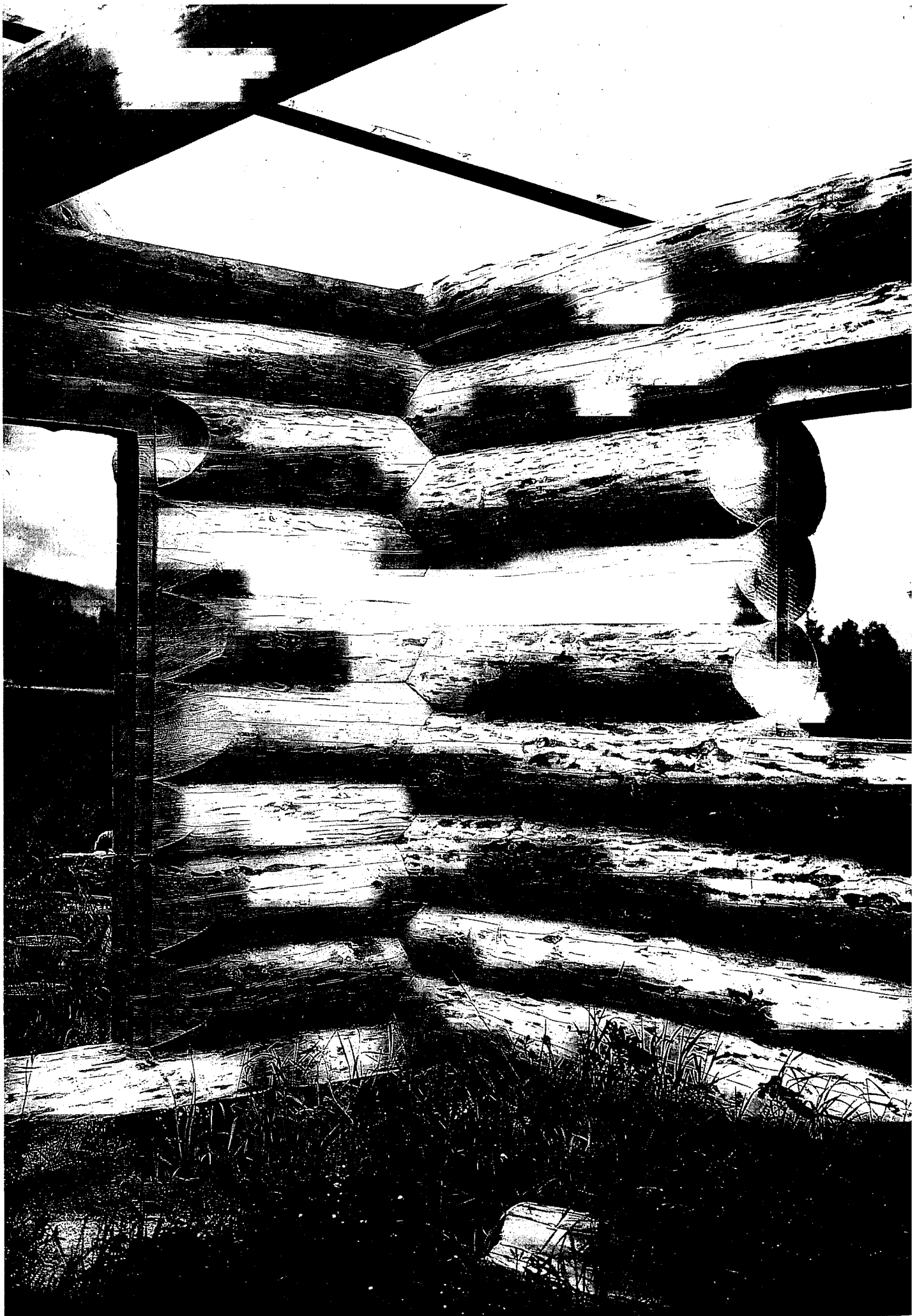
## OUTLOOK

The prospects for the future of the EU tanning industry depend mainly on the developments in the field of raw materials. This factor is of capital importance as it will determine which leather industries in the world may remain in business. With a shrinking availability of hides and skins on free markets and poor prospects for a liberalisation of supplies in those countries with abundant resources, one must forecast a further contraction of the leather production in the EU.

Written by: COTANCE

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## Overview

### NACE 46

In 1994, total production in the wood processing industry (excluding furniture) was estimated to reach 38.1 billion ECU. The sector is highly dependent on developments in building activity and furniture production. The industry is characterised by an abundance of small and medium-sized enterprises (SMEs). Intra-EU trade is still hindered by remaining technical barriers. Over the period 1995-97, demand for goods produced by the wood processing industry is expected to grow by an average nominal rate of 5.7 % per year. With the entry of Austria, Finland and Sweden into the EU in 1995, the relative importance of the wood processing industry in the EU economy will increase considerably.

### INDUSTRY PROFILE

#### Description of the sector

The wood processing industry is divided into the following subsectors :

- sawing and first processing of wood (NACE 461);
- semi-finished wood products, such as particle board, fibre board, plywood and impregnated wood (NACE 462);
- wooden building components, such as doors, window frames and parquet flooring (NACE 463);
- wooden containers and pallets (NACE 464);
- other wood manufactures (NACE 465);
- articles of cork, articles of plaiting materials, brushes and brooms (NACE 466).

The wood processing industry is an important supplier to the building and furniture industries. In 1994, the total production value was estimated at 38.1 billion ECU and employment at around 392 000 people. The largest subsector is the wooden building components industry. At an estimated production value of 14.2 billion ECU in 1994, it represented 37 % of the total wood processing industry. Sawing and first processing of wood accounted for 15 %, semi-finished wood products for 23 %, and other wood products for 25 %. Value added amounted to 12.4 billion ECU in 1993. Germany is the biggest producer, representing nearly 40 % of total EU value added.

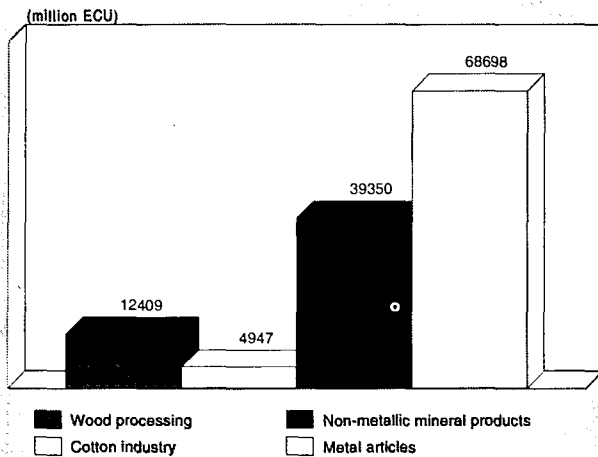
As the sector has a large number of SMEs, production and employment figures are considerably underestimated by most statistical sources, since these generally do not cover smaller businesses (less than 20 employees).

#### Recent trends

Between 1984 and 1993, apparent consumption of wood products increased by an average real growth rate of 1.4 % per year. Over the same period, production in constant prices increased by 25.4 % (2.5 % per year), and thereby outperformed total EU manufacturing industry which grew by 18.5 % (1.9 % per year). Extra-EU exports in current prices remained relatively stable between 1989 and 1992, but in 1993 there was again a significant increase (+8.8 %).

Employment grew by 7.1 % between 1986 and 1990, to reach a peak of 440 500. Since then, however, employment has dropped to a projected 392 100 jobs in 1994. Long-term changes in employment in the wood processing industry par-

**Figure 1: Wood processing Value added in comparison with related industries, 1993**



Source: DEBA

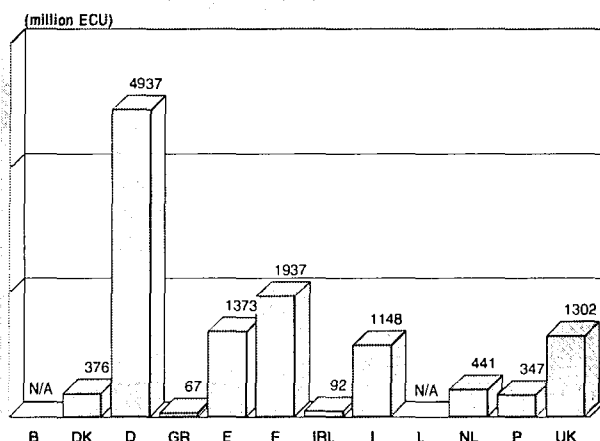
allel those of the EU manufacturing industry. Since production has increased more rapidly than the manufacturing industry average, this means that the wood processing industry has achieved higher productivity growth.

EU consumption and production expanded in 1987-91, but stagnated in 1992 and began to decline in 1993. In 1993, apparent consumption in current prices amounted to 43.6 billion ECU, a decrease by 1.1 % compared to 1992. Production amounted to 35.5 billion ECU in 1993, a decrease by 1.5 % compared to 1992. For 1994, production was estimated to grow by 7.4 %.

#### International comparison

In 1993, EU wood processing equalled only 58 % of US production and 84 % of Japanese production. With an average

**Figure 2: Wood processing Value added by Member State, 1993**



Source: DEBA



**Table 1: Wood processing**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	29 354	36 204	40 265	42 854	43 477	44 094	43 769	48 167	50 600	53 600	56 800
Production	22 862	29 180	32 330	34 562	35 702	36 058	35 648	38 703	40 900	43 300	45 800
Extra-EU exports	1 709	1 776	2 056	2 034	2 019	2 014	2 190	2 991	3 200	3 400	3 600
Trade balance	-6 493	-7 024	-7 935	-8 292	-7 775	-8 035	-8 121	-9 464	N/A	N/A	N/A
Employment (thousands)	447.4	429.8	436.7	440.5	437.3	425.2	399.3	392.5	391.0	392.0	394.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Wood processing**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Wooden building components	13 997	13 112	382
Sawing and processing of wood	10 685	5 399	284
Semi-finished wood products	9 579	8 096	606
Wooden containers	3 065	3 086	71
Cork, plaiting, brushes, brooms	2 095	2 079	501
Other wood products	4 347	3 877	345

(1) Apparent consumption and production have been estimated. Figures are not additive with respect to Table 1, due to double-counting

Source: DEBA

**Table 3: Wood processing**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	2.31	0.35	1.44	-0.31
Production	4.04	0.73	2.55	-1.07
Extra-EU exports	0.16	-4.35	-1.87	-21.91
Extra-EU imports	-2.68	-1.82	-2.30	-2.33

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

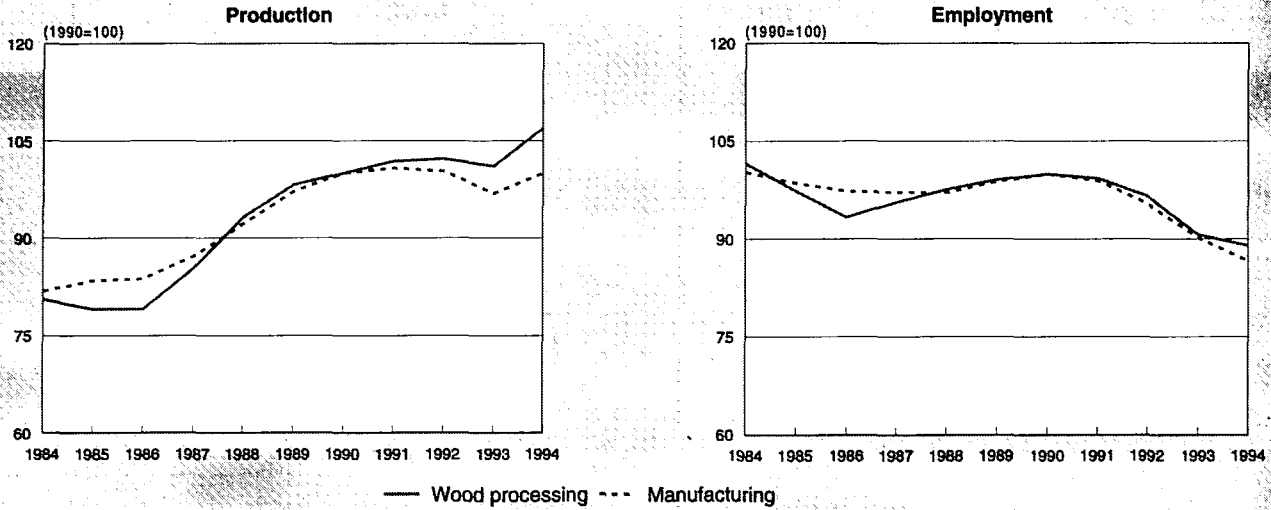
**Table 4: Wood processing**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 709	1 735	1 612	1 652	1 776	2 056	2 034	2 019	2 014	2 190	2 991
Extra-EU imports	8 201	7 761	7 207	7 939	8 800	9 991	10 326	9 794	10 049	10 311	12 455
Trade balance	-6 493	-6 026	-5 596	-6 288	-7 024	-7 935	-8 292	-7 775	-8 035	-8 121	-9 464
Ratio exports / imports	0.21	0.22	0.22	0.21	0.20	0.21	0.20	0.21	0.20	0.21	0.24
Terms of trade index	116.1	135.0	124.4	110.8	102.3	102.9	100.0	100.4	95.9	101.2	N/A

Source: DEBA



**Figure 3: Wood processing  
Production in current prices and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

annual real growth rate of 2.6 % over the period 1984-93, production in the EU grew slightly faster than it did in the USA (where it grew by 2.4 %), but was outperformed by the Japanese (+3.4 %). Production in the USA is evidently subject to cyclical fluctuations to a greater extent than in the EU or Japan.

**Foreign trade**

In constant prices, both extra-EU exports and extra-EU imports are following a long-term negative trend. Between 1984 and 1993, they declined at an average real annual rate of 1.9 % and 2.3 %, respectively. Although imports are decreasing faster than exports, the EU trade balance remains negative. In 1993, the deficit amounted to 8.1 billion ECU.

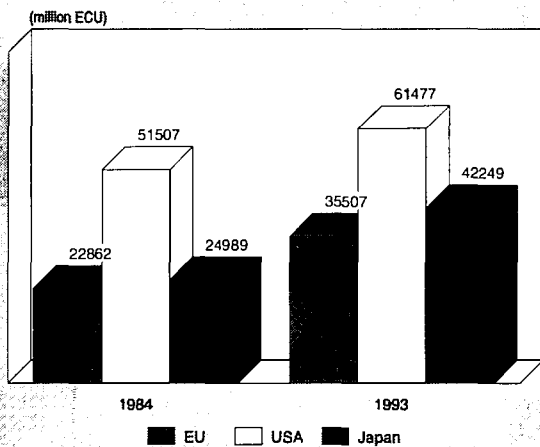
In current prices, extra-EU imports rose by 5.9 % per year from 1985 to 1990, declined by 5 % in 1991 but increased again by 2.6 % in both 1992 and 1993. Extra-EU exports grew rapidly in 1988-89, but then stagnated. In 1993, extra-EU exports grew by 8.8 %.

Between 1984 and 1993, the exports/imports ratio has remained relatively stable at around 20 %. The import/consumption ratio has declined, however, from 28 % in 1984 to 23.6 % in 1993. The export/production ratio fell between 1984 and 1988, but has remained stable since then at around 6 %.

In 1993, extra-EU imports mainly originated in the EFTA countries (41.8 %), the USA (11.3 %), Indonesia (5.9 %), Malaysia (5.8 %) and Canada (4.9 %). Extra-EU exports, on the other hand, mostly went to the EFTA countries (42.2 %), USA (12.2 %), Japan (4.7 %), Saudi Arabia (2.4 %) and Australia (2.0 %).

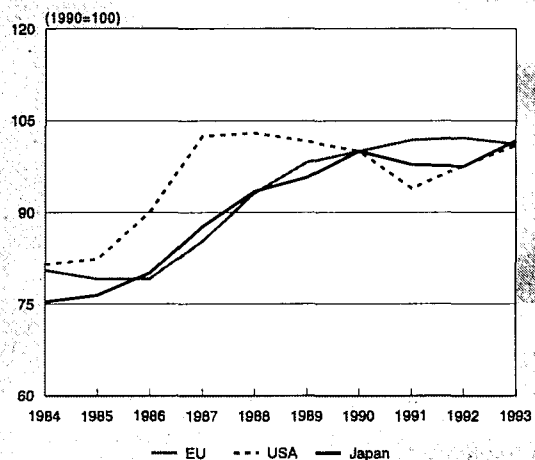
The entry of Austria, Finland and Sweden into the EU in 1995 should bring about a considerable "improvement" in the EU trade balance for wood products.

**Figure 4: Wood processing  
International comparison of production in current prices**



Source: DEBA

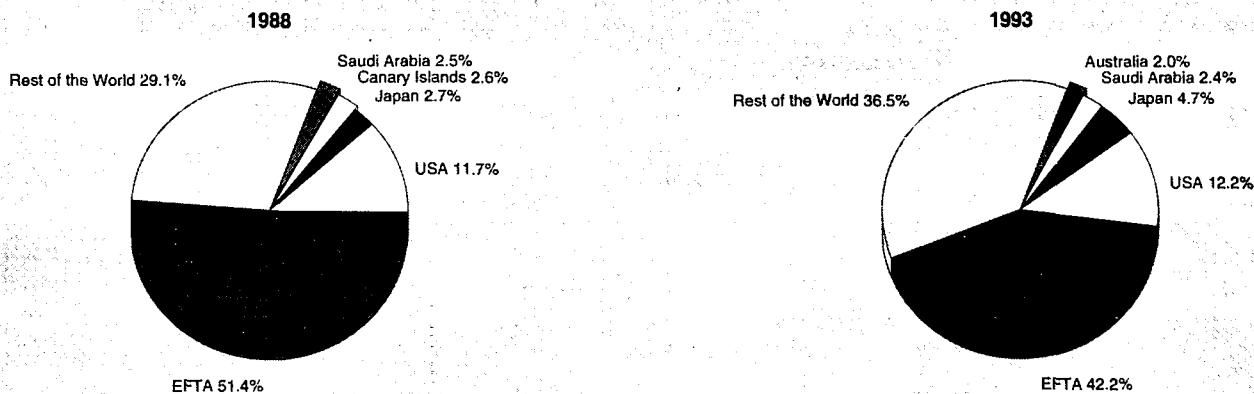
**Figure 5: Wood processing  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Wood processing  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

Since the wood processing industry comprises a wide range of products, these products have different types of buyers, i.e. industrial or final consumers. Demand for the products of the wood processing industry largely depends on two sectors, the furniture and building industries. Since these two sectors are highly cyclical, demand for wood products is largely influenced by the evolution of general income levels and interest rates.

In 1993, the furniture industry, like most parts of the manufacturing industry, suffered considerably from the recession. On average, production of furniture in the EU declined by 2.2 % in value and by 2.8 % in volume in 1993, to reach 38.5 billion ECU. Nearly all EU countries experienced a decrease in furniture production, except for the UK, where private consumption was buoyant, and Portugal. 1993 was worse than 1992, which had already been a poor year for many furniture manufacturers. Weak demand due to a lack of consumer confidence (increasing unemployment), a stagnation or even reduction in disposable income, high interest rates and the contraction of export markets were the key factors behind this situation. Investments were scaled down and in 1992-93 almost 40 000 jobs were lost in the furniture sector (4 % of total employment). This situation did not improve considerably in 1994. Indeed, estimates for 1994 indicated a stagnation in production at the 1993 level and a further loss of around 7 000 jobs.

In the EU, the construction business cycle reached its peak in 1992, after having experienced 5 years of declining growth rates from 1988. In 1993, there was an average decrease of 2.3 % in construction activity, due to negative growth rates in almost all countries, notably -10 % in Italy and, within EFTA, -13.6 % in Sweden and -17.7 % in Finland. Among the subsectors, the most adversely affected was non-residential building (-6 %), although civil engineering declined significantly as well (-5.2 %), whereas house building grew slightly (+1.5 %). These results can be attributed to budget problems in most EU countries, but also to the difficulties in both the manufacturing and the service industries, which have significantly scaled down investments in factories and office buildings. For 1994, estimates indicated a stagnation in EU construction activity (growth at 0.1 %). However, positive

growth rates were projected for Denmark, Ireland, Portugal, Germany and the United Kingdom.

### Supply and competition

The deficit in the EU trade balance can be explained by the dependence of important subsectors on imports of hardwood and softwood timber, sawn plywood from South East Asia (especially from Indonesia) and the USA, hardboard from South America (especially Brazil) and Eastern Europe and imports of miscellaneous wood products from the countries of Central and Eastern Europe at extremely low prices. The political and economic developments in Central and Eastern Europe will continue to have significant implications as these countries have very large wood reserves and much lower labour costs than the EU-countries.

Although imports of raw materials, such as hardwood and softwood timber, are likely to continue, an improvement in the trade balance of the sector could be stimulated by way of forestry policy in the EU. An increase in the domestic supply of wood could be brought about through the use of marginal land. As there are large surpluses of agricultural products within the EU, excess agricultural land is being converted into forest. This could lead to an improvement in the trade balance for the EU wood processing industry and would also have a positive impact on the environment.

Trade flows among Member States are more important than extra-EU exports. This is partly explained by transport costs that limit trade in wood and wood products. In previous years, competition has been affected by a large number of technical barriers to trade between Member States (national standards that have already been in existence for a long time, major differences in procedures for granting technical approval, etc.). Against the backdrop of European integration, the sector will be influenced by the results of the discussions on the short-term implementation of European standards and technical reference documents. This technical integration is expected to result in increased trade between Member States. Thus, it is imperative that the industry follow the activities in the regulatory and technical field. Within the European Committee for Standardisation (CEN), eight technical committees have been created to develop standards for products in the wood processing sector:

- CEN/TC 33: doors, windows, shutters and building hardware;

- CEN/TC 38: durability of wood and derived products;
- CEN/TC 112: wood based panels;
- CEN/TC 124: timber structures;
- CEN/TC 173: brushware;
- CEN/TC 175: round and sawn timber;
- CEN/TC 207: furniture;
- CEN/TC 261: packaging.

Thanks to rationalisation and automation investments, labour productivity in the wood processing industry is rising rapidly. Between 1984 and 1993, labour productivity increased by roughly 40 %. The gross operating rate has averaged approximately 10 % in the 1990s. Profitability deteriorated in 1989-92, but improved in 1993.

## INDUSTRY STRUCTURE

### Companies

The wood processing industry (including wooden furniture) comprises around 244 000 companies, of which 94.4 % have less than 20 employees, and 5 % have between 20 and 99 employees. Companies with less than 20 employees represent 48 % of employment and 36 % of turnover. This indicates that most official industry statistics significantly underestimate the importance of the wood processing industry, as they usually do not include units that have less than 20 employees. Companies with more than 99 employees represent only 0.6 % of the total number of enterprises, but account for 32 % of total turnover and 24 % of employment. In all, the 244 000 companies in the sector employ 1.7 million people in the EU, and represent a total turnover of 123.1 billion ECU.

Since wood processing started as an artisan activity, the family structure of SMEs in the sector remains an important characteristic. The EU countries which are the most specialised in the processing of wood are Portugal (with a production specialisation ratio of 2.37), Denmark (1.69) and Spain (1.47).

### Strategies

The wood processing industry underwent a crisis in the early 1980s. During the second half of the decade there was a rapid expansion in the demand for wood products. The companies in the wood processing industry made substantial investments in order to respond to this larger demand. Since new machines normally outperform older ones, new invest-

ments resulted in a rationalisation of the production process and an improvement in efficiency and productivity. The capital intensity of the production process increased considerably over the past decade. As demand slowed down in the beginning of the 1990s, investments were focused on the introduction of new products (e.g. medium density fibre board and oriented strand board) and new production technologies. In order to stave off extra-EU competition, many SMEs have adopted a strategy of specialisation.

### Skill shortages

Due to the fast changes in production techniques, the sector is having increasing difficulties in finding properly trained staff. This implies that considerable attention will have to be paid to raising training standards in this field, to meet the need for skilled workers and qualified executives. In the context of the Eurofortech/EU-Comett programme, a training and education programme in the area of timber engineering and design known as STEP (Structural Timber Education Programme) has been developed. STEP aims at organising more than 100 Euro-wide courses, seminars and workshops on the structural use of timber. Its budget is nearly 1.5 million ECU.

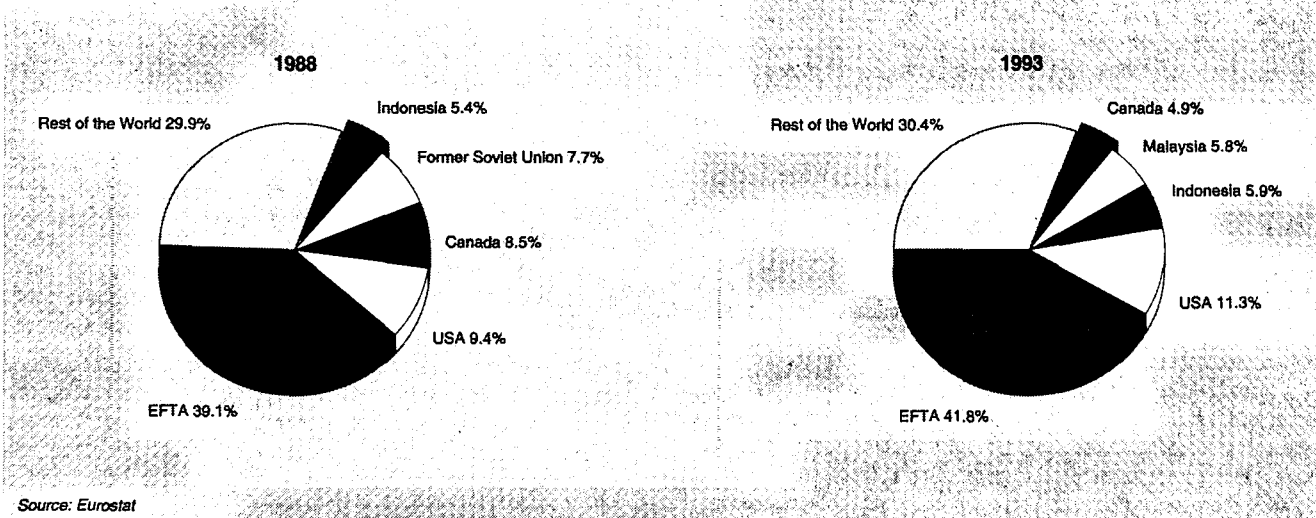
### Impact of the Single Market

The impact of the Single Market on the wood processing industry varies between the different measures of the programme, as well as across the sectors of the industry. The overall effects are difficult to distinguish as they have been obscured by the impact of the recession. With increasing harmonisation, intra-EU trade has grown, as have extra-EU imports, particularly of simple, standardised products, such as pallets imported from Eastern Europe. Increasing competition has spurred mergers and acquisitions, mainly among larger companies in the industry, and has triggered a shift to higher value added products. SMEs have responded through strategies of specialisation and customisation. Cost reductions through rationalisation and increasing automation have had the effect of raising the required skill levels of the workforce, which has resulted in a lack of qualified labour. This highlights the need for appropriate training programs directed to the wood processing industry. Intra-EU trade is still hindered by remaining internal barriers, specifically technical ones related to the harmonisation of product standards.

## ENVIRONMENT

Wood is a recyclable raw material. The processing of wood requires a minimum of energy and, depending on the subsector,

**Figure 7: Wood processing  
Origin of EU imports**



**Table 5: Wood processing**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.4	81.2	84.7	89.3	95.5	99.1	100.0	102.6	105.9	111.5
Unit labour costs index (3)	90.5	94.0	93.4	92.3	91.6	93.7	100.0	105.0	107.6	105.2
Total unit costs index (4)	84.8	87.8	87.8	88.5	90.7	95.9	100.0	103.1	103.8	102.6
Gross operating rate (%) (5)	8.0	8.2	9.4	10.2	10.7	10.0	9.6	9.4	9.2	10.1

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

results in minimal to no pollution of the air, water or soil. However, there have been discussions on the use of tropical wood, the recycling and disposal of packaging waste and the tax related to CO<sub>2</sub> emissions. This is certainly not unique to this sector, and has to be seen in a much broader context.

### The protection of tropical forests

The deforestation of the tropics is an alarming situation that gives rise to general concern. The most important reason for this deforestation is the circle of poverty, population pressure, over-indebtedness and economic underdevelopment that produces an increasing demand for land for farming, industrial purposes and infrastructure.

Unqualified and destructive timber exploitation only accounts for a minor portion of the deforestation (approximately 6 %). Nevertheless, it is environmentally irresponsible. The tropical forests must be protected, but adequate account has to be taken of their ecological, economic and social functions. This requires land planning that designates protected forests, forests for commercial use and areas for agricultural, industrial and infrastructure purposes.

Environmentally sound and sustainable forest management schemes can make important contributions to a large extent to the preservation of forests. The European wood processing industry fully supports the introduction of such schemes. Gen-

eralised bans and boycotts do not contribute to the preservation of tropical forests. On the contrary, they are likely to accelerate the deforestation of tropical areas due to the increase in poverty that is likely to arise as a result. The ITTO guidelines for sustainable forestry, which have been adopted by all producer and consumer countries, constitute the first internationally recognised criteria for sustainable forest management. It is essential to achieve the implementation of these guidelines before the target year 2000 that has been agreed upon within the ITTO.

These measures should be implemented in collaboration with competent environmental organisations. An important incentive for the realisation of sustainable forestry is the introduction of an attestation of origin. An attestation scheme can be established on a country by country basis or on a case to case one. The interests of the wood producing countries of the Third World have to be appropriately considered when coordinating international measures for the protection of tropical forests. Even in the problem zone of the tropical forests, ecology and economy are no irreconcilable contrasts.

In the same context, certain ecological political parties also contest the use of wood from temperate forests. Although the European wood processing industry is in favour of a generalised labelling scheme in which temperate forests have to be submitted to the same criteria of sustainability, there is no fear for deforestation in this area.

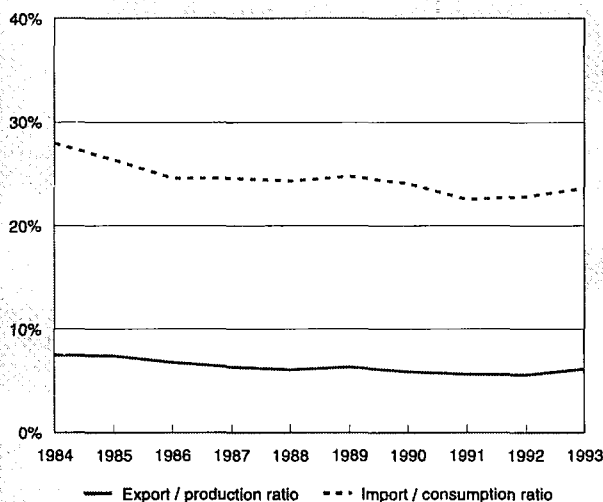
On the contrary, studies and EU figures show that there has been an enormous increase in potential wood resources in the EU and in the EFTA countries. Data indicate that there is a potential for increasing annual yields by 170 million m<sup>3</sup>. This potential is likely to increase even more when 16 million hectares of agricultural land within the EU will be put to other uses, mostly by way of reforestation. It should be clear that these enormous wood reserves are bringing prices down very rapidly. This should be taken into consideration by the wood processing industry as well as national and international authorities. EFTA, the EU and its Member States should strengthen the market for wood products through promotional activities.

### Recycling and disposal

In recent years, national authorities, as well as those on the European level, have begun to focus on packaging and packaging waste. This resulted in the adoption in December 1994 of a EU Directive concerning packaging and packaging waste.

Among packaging materials, wood takes a specific place. Wood is a recyclable raw material. Wood requires little energy for processing compared to other raw materials, and therefore helps to reduce the use of valuable energy resources. Wood waste cannot be considered to be waste in its proper sense, since it can be used to manufacture other materials such as

**Figure 8: Wood processing**  
**Trade intensities**



Source: DEBA

**Table 6: Wood processing  
Breakdown by size of enterprise, 1990 (1)**

(%)	Number of enterprises (units)	Share of number of enterprises	Share of employment	Share of turnover
Less than 20 employees	230 462	94.4	48.3	36.3
20-99 employees	12 225	5.0	27.5	31.6
100 or more employees	1 537	0.6	24.2	32.1

(1) Based on data for NACE 4600; estimates.  
Source: Eurostat "Enterprises in Europe"

particle board, fibre board and laminated wood. If this use of wood waste is not possible, it can also be used as a fuel. Many wood processing companies burn bark and wood waste from their operations for heating purposes. Modern furnaces have reached very high standards and, from an environmental point of view, have to be regarded as being highly efficient.

Based on the arguments above, wood is a highly suitable packaging material. It can be recycled to produce other materials, or can be used for energy production. Treated or coated wood packaging can be burned in suitable furnace installations together with household wastes. The wood processing industry supports the re-use of wooden packaging materials for energy production as one of the solutions in recycling, and suggests positive discrimination of the use of wood in packaging.

#### CO<sub>2</sub> reduction policy

After considerable effort, the wood processing industries have managed to achieve some quite good results in the reduction of energy use. This sector of the industry is well aware of the necessity to reduce the emissions of CO<sub>2</sub> to protect the atmosphere. Therefore, it will aim at further CO<sub>2</sub> reductions and will support political policies consistent with that purpose if they can be realised in an economic way and be combined with the necessary political measures. One should also bear in mind that around 30 % of CO<sub>2</sub> emissions are caused by households, mainly from heating. It is therefore necessary to reduce energy use for the heating of houses. Wooden constructions could very well contribute to this. Expanding the use of wood wastes for heating would bring down the use of other non-renewable energy sources that are less "CO<sub>2</sub> friendly".

#### Outlook for the near future

The entry of Austria, Finland and Sweden into the Union will most likely lead to increasing emphasis on environmental issues, taking into consideration the high environmental awareness in these countries. At the same time, however, these three countries are highly dependent on their forest resources, and will therefore have a positive attitude towards wood and wood processing products.

### REGULATIONS

The wood processing industries strongly support the Single European market and regulations such as the Construction Products Directive, which aim at harmonisation on the European level. Despite the fact that the Single Market should have been realised by the 1st of January 1993, the wood processing industries still are confronted with a number of barriers to trade.

The following items are of specific concern for the wood processing industries:

#### German "Gefahrstoffverordnung"

In 1986, the German government issued a "decree on dangerous substances", introducing, among other things, a requirement that wood based materials and furniture made thereof should not result in test chamber concentration values of more than 0.1 parts per million (ppm) of formaldehyde. This gave rise to detailed opinions and observations from various Member States. Between 1986 and 1991 the subject remained under discussion.

On 12 February 1991, the German government released its "Prüfverfahren für Holzwerkstoffe" (test methods for wood-based panels) and stated that these could be considered as the implementing orders of the formaldehyde section in the "Gefahrstoffverordnung". Again, six Member States and the EFTA Secretariat as well as the Commission itself introduced detailed opinions and observations. In spite of this, a final decision on the implementing orders was taken when, at the end of October 1991, the German government published the test methods for wood-based panels in the "Bundesgesundheitsblatt".

Compared to the initial proposals of the German authorities, some beneficial changes were introduced. The main request of industry, that the results of the "derived test methods" (such as perforator and gas analysis values) should be considered as equivalent to the tests in "large chambers" was not met, however. Industry, therefore, remains opposed to this publication and believes it requires much more clarification.

#### Regulations related to wood dust

In some countries, there are very strict regulations on the exposure to wood dust in workplaces, due to its presumed health risks. For the time being, wood dust does not appear on the EU-list of carcinogenic substances in work places, because no direct relationship between exposure to pure wood dust and certain types of cancers of the higher respiratory system have been proven. Research continues, however. The industry launched a research programme to be performed at the Cancer Research Centre in Heidelberg. The programme, which will be co-financed by the EU, will take approximately 3 years and should be finalised by the end of 1995. It is expected to provide vital scientific evidence in the wood dust discussion.

#### Packaging and packaging waste directive

In December 1994, the Council of the European Union finally reached an agreement on a Directive concerning packaging and packaging waste that will come into force in 1996. Indeed, work on the Directive only began after the German authorities had introduced a national regulation and France intended to do so as well. It aims at harmonising national measures concerning the management of packaging and packaging waste and sets five-year targets for achieving specified recycling rates for different materials. The Directive authorises energy

**Table 7: Wood processing  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.86	N/A
Danmark	1.55	1.69
BR Deutschland	1.14	1.10
Hellas	1.03	1.06
España	1.37	1.47
France	0.89	0.93
Ireland	0.58	0.79
Italia	0.85	0.84
Luxembourg	N/A	0.00
Nederlând	N/A	0.77
Portugal	2.63	2.37
United Kingdom	0.89	0.71

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

recovery which is deemed to be the best solution for certain wood wastes.

### Volatile organic compounds

The Commission of the European Union is in the process of modifying its proposal for a Directive concerning the limitation of the emissions of organic solvents from certain activities and industrial installations. The aim of this Directive is to reduce the emissions of VOCs from certain industrial installations and processes. It is part of a strategy for an overall reduction of the emission of VOCs in the EU.

The proposal covers two activities of the wood processing sector, namely coating of wooden surfaces and wood impregnation. The most recent version of the proposal contains some important modifications based on the results of a cost evaluation study performed by Karlsruhe University. This study, and other data provided by the wood processing industry, clearly showed that the thresholds for the application of strict emission limits were set too low. For the coating of wooden surfaces, the threshold for small installations has been raised to a consumption of 15 tonnes per year. For the impregnation of wooden surfaces, it has been raised to 45 tonnes per year.

Although these modifications can be considered an important improvement, the VOC Directive could still have important implications on many SMEs in subsectors of the wood processing industries, such as the manufacturers of furniture, parquet and joinery. Discussions on this subject will continue.

### Biocidal products Directive

The wood preservation industry regrets that work on the preparation of the biocidal products Directive has been blocked at the European parliament for the moment. This Directive should enable the creation of a single market for biocidal products, including wood preservatives. Meanwhile, discussions have started on the possible revision of the EU Directive on Pentachlorophenol (PCP), where certain Member States now press for a generalised ban. This is a further example of the effect of a national regulation on the European decision-making process, as the European PCP Directive was drafted only after Germany had introduced national measures.

### Generalised tariff preferences

At the end of 1994, the EU adopted a revision of the GSP. Within this scheme, developing countries receive preferential tariff duties for certain industrial products. Whereas in the former system, fixed duty-free amounts or quotas were given to certain countries, all industrial products are now grouped into four categories: very sensitive, sensitive, semi-sensitive

and non-sensitive. Most products from NACE 46 have been classified as non-sensitive, which means that all tariff duties are abolished. Certain products, however, continue to be classified as semi-sensitive (e.g. wood-based panels, joinery and brushware), which means that duties will only be reduced to 70 % of the rate agreed upon in the context of the General Agreement on Tariffs and Trade.

### Co-operation with Central and Eastern Europe

Developments in Central and Eastern Europe will have important consequences for the wood processing industries in the EU, as these countries have large wood reserves and a qualified low cost workforce. Furthermore, companies are not as restricted by environmental legislation as companies in the European Union.

The wood processing industry does not believe that these problems can be solved by confrontation. Therefore, it is looking for co-operation with these countries, supporting them to develop their own market for wood products.

### OUTLOOK

Average nominal annual growth in the period 1995-97 is estimated at 5.8 % for apparent consumption and 5.7 % for production. This growth should be supported by general economic recovery in the EU. It is possible, however, that recovery in the wood processing industry may initially be somewhat slower than the manufacturing industry average. The two main user industries, building and furniture, are typically lagging sectors.

Extra-EU exports are expected to increase by an average nominal rate of 5.6 %. Exports of wooden boards to the emerging markets in the Far East will probably play a major part in this development. The wooden building components industry is likely to benefit from certain structural changes in the construction industry, such as the trend towards more subcontracting and the increasing use of prefabricated elements. Increasing consumer preference for wood as a building material is an additional advantage. Demand for containers and pallets will be stimulated by the recovery of international trade.

The decline in employment that began in 1990 will level out in 1995. In 1996 and 1997, employment is expected to grow again by 0.4 % per year. The stricter requirements with respect to health and environment will increase costs in the industry. Furthermore, the industry is facing increasing competition, especially from countries in Central and Eastern Europe.

With the entry of Austria, Finland and Sweden into the EU in 1995, the relative importance of the wood processing industry for the EU economy should increase considerably.

Written by: Cel-Bois

The industry is represented at the EU level by: European Confederation of Woodworking Industries (Cel-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

# Sawing and first processing of wood

## NACE 461

Although half the EU consumption of sawn, planed and dried timber is met by imports, the restructuring of the industry that took place in the 1980s has had a favourable impact on EU production and has already led to a decrease in extra-EU imports in the early 1990s and an improvement of the trade balance. Structural changes have taken the form of vertical integration and/or the merging of small production units. Average annual growth rates in the period 1995-97 are estimated at 3.8 % for consumption and 5.1 % for production.

### INDUSTRY PROFILE

#### Description of the sector

The first stage in the processing of wood falls under NACE code 461. The companies in the subsector are engaged in the following activities:

- saw milling;
- planing of wood;
- drying and seasoning of wood.

The subsector is an important supplier to the other subsectors of the wood processing industry, as well as to the furniture and the construction industries. Production in 1994 is estimated at 5.6 billion ECU. Value added in 1993 amounted to 1.7 billion ECU, compared to 2.7 billion ECU for semi-finished wood products (NACE 462) and 4.7 billion ECU for the wooden building components subsector (NACE 463). Sawing and the first processing of wood represents 14 % of the value added by the European wood processing industry. In 1993, the most important producers in the EU were Germany (representing around 34 % of added value), Spain (21 %), France (16 %) and the UK (15 %).

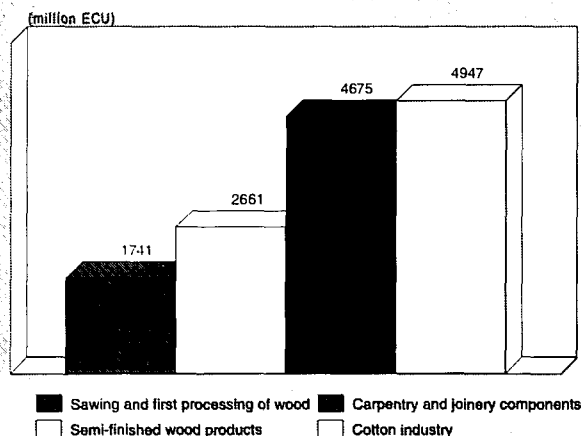
#### Recent trends

In recent years, sawing and first processing of wood has also been affected by the economic recession. In the period 1989-93, apparent consumption decreased at an average rate of 2.6 % per year, in real terms. Apparently, EU production (-1.5 % average real annual growth) was less affected by the decline in consumption than extra-EU imports (-3.7 %) were. After rising from 1986 to 1990, apparent consumption in current prices decreased in 1991 and 1992, as well as in 1993 (-3.4 %). Production in current prices also rose sharply until 1990 (3.6 % per year on average). In ensuing years, production growth was in the negative. The beginning of the 1990s saw stagnating economic activity. However, production is expected to do better in 1994, with an estimated increase of 3.9 %. In 1993, the real growth rate was negative for both consumption (-4.1 %) and production (-3.5 %).

Employment decreased by 10 % to 64 000 people in 1993, reaching its lowest level in ten years. Employment in the sector represents 16 % of total employment in the wood industry. The decrease in employment between 1990 and 1994 is more pronounced in the sawing and first processing of wood sector (-19.4 %) than in the total manufacturing industry (-13.3 %). According to the estimates for 1994, however, employment will remain relatively stable (-1.4 %) compared to the total manufacturing industry (-4 %).

In 1994, production in constant prices is expected to be 22.6 % higher than in 1984, slightly above the manufacturing industry average (+22.4 %). The sawing and first processing of wood

Figure 1: Sawing and first processing of wood  
Value added in comparison with related industries, 1993



Source: DEBA

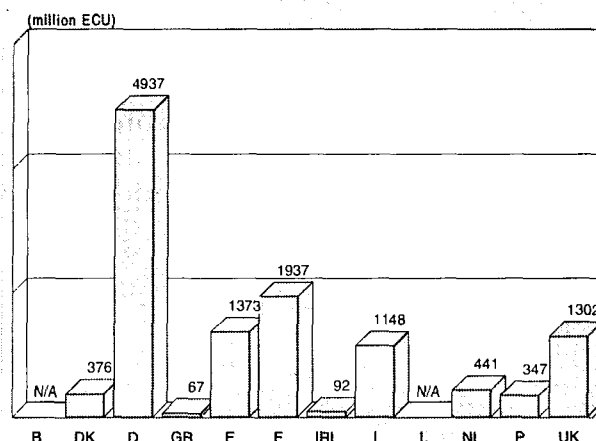
sector performed significantly better than total manufacturing industry in the late 1980s, but was hit harder by economic recession during the early 1990s. This shows that the subsector is more cyclical than the manufacturing industry average.

#### International comparison

In 1993, EU production (5.4 billion ECU in current prices) in the sawing and first processing of wood sector amounted to 29 % of US production and 39 % of Japanese production. Canada and the Scandinavian countries are also important players on the world market. With the entry of Sweden, Finland and Austria in 1995, the relative importance of the EU will increase significantly.

Over the last years, production in the three trading blocks has developed more or less in parallel. Nevertheless, the average annual real growth rate of EU production (2 %) over the period 1984-93 was higher than that of US and Japanese production (both 1.5 %). In recent years, growth differentials have been larger. Whilst production decreased in the EU in

Figure 2: Sawing and first processing of wood  
Value added by Member State, 1993



Source: DEBA

**Table 1: Sawing and first processing of wood**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	8 771	10 626	11 799	12 308	11 250	11 065	10 685	12 191	12 600	13 100	13 600
Production	3 878	5 253	5 597	6 026	5 746	5 599	5 399	5 690	6 000	6 300	6 600
Extra-EU exports	233.5	275.5	301.5	302.9	281.4	259.2	284.3	345.9	370.0	390.0	410.0
Trade balance	-4 893.0	-5 373.0	-6 202.0	-6 282.0	-5 504.0	-5 466.0	-5 287.0	-6 500.0	-6 600.0	-6 800.0	-7 000.0
Employment (thousands)	78.7	79.8	77.8	77.9	74.9	70.8	63.7	62.1	61.6	61.8	61.9

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Sawing and first processing of wood**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.21	-2.61	1.12	-4.07
Production	4.86	-1.46	2.00	-3.47
Extra-EU exports	1.81	-3.68	-0.67	9.71
Extra-EU imports	3.56	-3.69	0.27	-4.06

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Sawing and first processing of wood**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	234	246	261	271	276	302	303	281	259	284	346
Extra-EU imports	5 127	4 657	4 709	5 227	5 649	6 503	6 585	5 786	5 726	5 571	6 846
Trade balance	-4 893	-4 411	-4 448	-4 957	-5 373	-6 202	-6 282	-5 504	-5 466	-5 287	-6 500
Ratio exports / imports	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Terms of trade index	89.6	95.8	108.2	110.0	103.0	99.4	100.0	103.3	110.9	109.3	N/A

Source: DEBA

**Table 4: Sawing and first processing of wood**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	77.6	78.7	81.7	90.8	97.0	99.4	100.0	101.9	106.7	114.5
Unit labour costs index (3)	95.2	99.7	96.0	90.6	91.2	95.1	100.0	107.2	106.9	99.5
Total unit costs index (4)	85.2	86.4	86.0	85.1	88.0	95.6	100.0	101.5	98.5	97.0
Gross operating rate (%) (5)	7.86	8.70	9.17	9.89	10.94	9.68	9.04	8.90	8.86	10.63

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

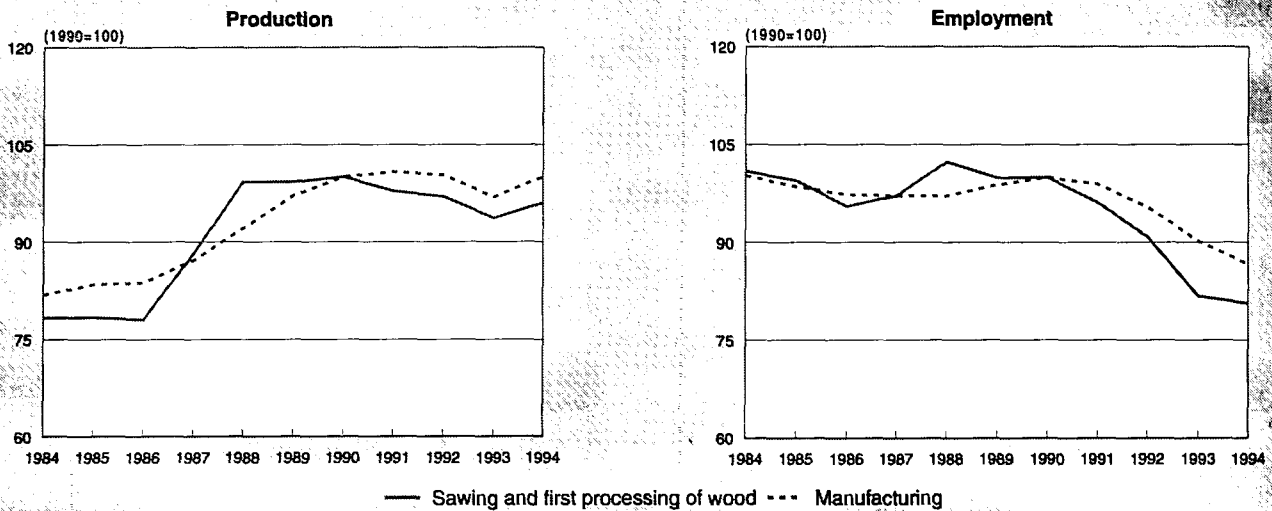
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3: Sawing and first processing of wood**  
**Production in constant prices and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

1993 (-3.5 % in constant prices), it also decreased in the USA (-2.9 %). After consecutive decreases in 1991 (-5 %) and 1992 (-2.5 %), Japanese production began to recover in 1993 (+4.4 %). However, production in these three trading blocks is still below their 1990 levels.

**Foreign trade**

The negative trade balance is reflected in a very low ratio of extra-EU exports over extra-EU imports, averaging 5 % in the last decade. However, extra-EU exports increased by almost 10 % in 1993, whilst imports decreased by almost 3 %. The import penetration rate declined by approximately 6 percentage points in the period 1984-93, reaching 52 % in 1993. Although import penetration remains very high, European producers have been successful in gradually substituting for extra-EU imports over the last decade.

During the economic recession of the early 1990s, EU production was less affected by the decline in consumption than extra-EU imports were, leading to an improvement in the

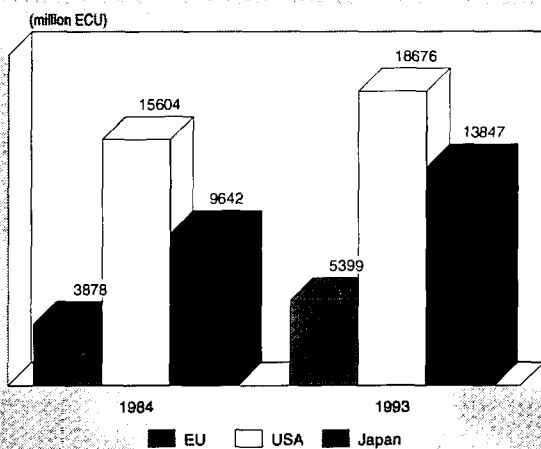
trade balance. In 1993, the real growth rate was negative for extra-EU imports (-4.1 %). Extra-EU exports, on the other hand, grew by 9.7 % in 1993. In 1993, extra-EU imports mainly came from the EFTA countries (50 %), the USA (11.1 %), Malaysia (8.3 %), Canada (7.1 %) and Russia (5.3 %). Extra-EU exports mainly went to the EFTA countries (58 %) and Japan (6.5 %).

**MARKET FORCES**

**Demand**

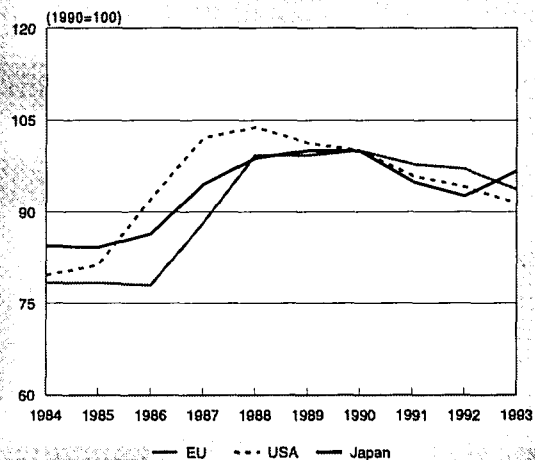
Only 5.3 % of production is exported to non-EU countries, and an estimated 8 % of EU production is directed to the final consumer. The larger part of EU production goes to industry, more specifically to the pallets, carpentry and furniture industry. This situation is not expected to change in the near future. New products are emerging based on new techniques, such as gluing, in order to increase added value.

**Figure 4: Sawing and first processing of wood**  
**International comparison of production in current prices**



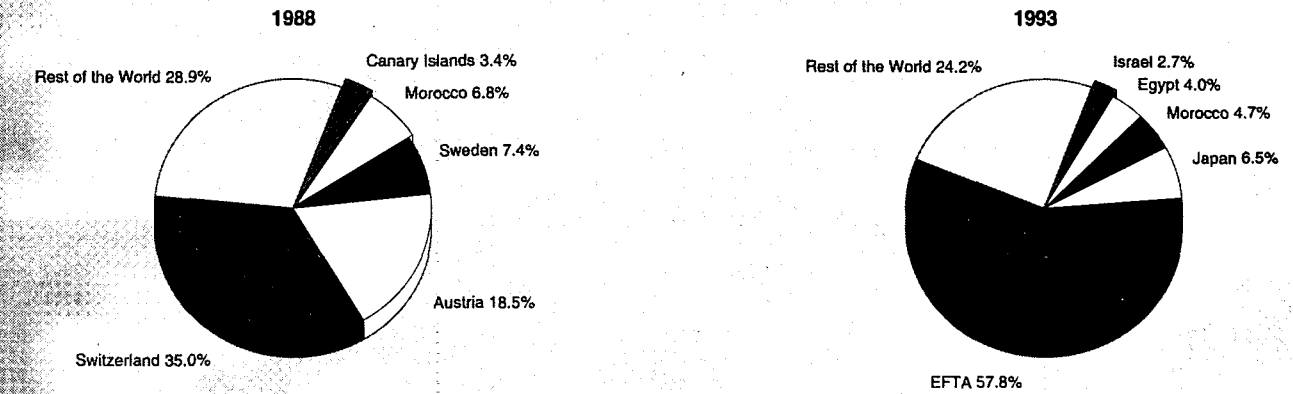
Source: DEBA

**Figure 5: Sawing and first processing of wood**  
**International comparison of production in constant prices**



Source: DEBA

**Figure 6: Sawing and first processing of wood  
Destination of EU exports**



Source: Eurostat

Automation is increasing in the large sawmills, more specifically in the softwood sector.

### Supply and competition

The EU sawmilling market has been overwhelmed by massive imports, mainly from Sweden and Finland. The devaluation of the currencies of these countries in 1992-93 led to a huge increase of exports to the EU and brought about significant tension on the European market. However, the situation has stabilised since then. The pallets industry is facing problems as inexpensive products are entering the EU market, mainly from Poland, but also from other Central and Eastern European countries.

Labour productivity has risen continuously over the past decade. In 1993, it increased by 7.3%. After a significant increase in the years 1989-91, unit labour costs in 1992 and 1993 fell below their 1990 level, due to the rapid growth in labour productivity. After having declined continuously since 1989, the gross operating rate in the sawing and first processing of wood sector showed significant improvement in 1993, and almost reached its peak level of 1988.

## INDUSTRY STRUCTURE

### Companies

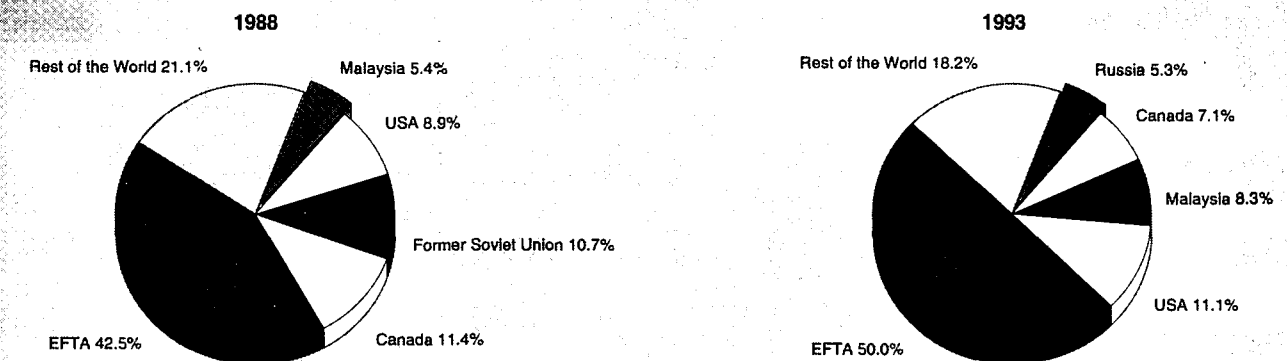
Around 1 350 enterprises employing more than 20 persons operate in the sector. In total, some 62 800 persons were employed by these enterprises in 1994. Since small and medium-sized enterprises predominate, total employment is likely to be considerably higher than official figures reveal.

The EU countries with the highest degree of relative specialisation in the sawing and first processing of wood are Portugal and Spain. Portugal has a production specialisation ratio of 4.92, which is more than twice as high that of Spain (2.14).

### Strategies

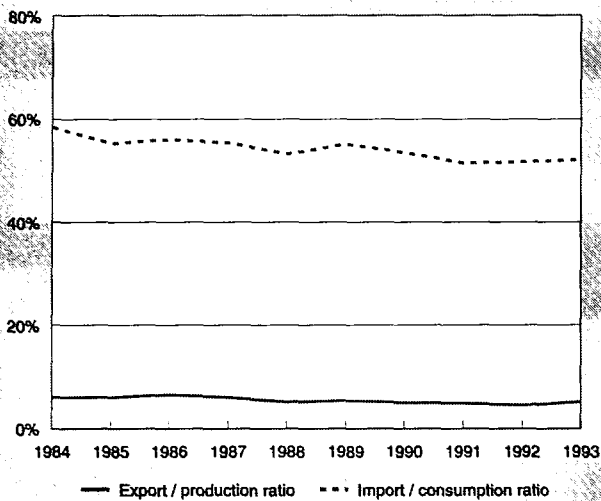
The investments that took place during the course of the 1980s contributed to the reorganisation of the industry, a necessity due to the stiff competition from non-EU producers. There were three main types of structural changes: the closure of non-profitable enterprises, the merging of small production units and an increased tendency towards vertical integration. Investments focus on plant modernisation and existing projects and are principally taking place inside the EU. There is a tendency for large companies to reduce or dispose of investments mainly because of liquidity problems. Furthermore,

**Figure 7: Sawing and first processing of wood  
Origin of EU imports**



Source: Eurostat

**Figure 8: Sawing and first processing of wood  
Trade Intensities**



Source: DEBA

there have been numerous mergers and acquisitions in the sector. Moreover, there is a growing need for highly qualified personnel.

The main strategy among the companies in the sector is to produce goods with higher added value. They therefore tend to subcontract for second stage processing, instead of remaining mere suppliers of raw material. By producing goods that are customised for further processing, EU companies can improve their competitiveness vis-à-vis extra-EU competitors.

Due to their geographical proximity, companies engaged in the first processing of wood may also respond in a more flexible way to the needs of companies involved in the second processing of wood (e.g. just-in-time delivery).

**Table 5: Sawing and first processing of wood  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.58	0.74
Danmark	1.06	0.33
BR Deutschland	1.02	0.96
Hellas	0.85	0.65
España	1.28	2.14
France	0.85	0.92
Ireland	N/A	N/A
Italia	0.59	0.45
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	4.06	4.92
United Kingdom	1.60	1.25

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

## OUTLOOK

Consumption, which decreased by 3.4 % in 1993, is expected to increase in the coming years. For the period 1995-97 an average growth rate of 3.8 % is expected. Production which is expected to grow by 3.9 % in 1994 (in current prices), is expected to increase further in the period 1995-97, at an average rate of 5.1 % per year. This means that EU production will continue to replace extra-EU imports. In short, the prospects in the short and medium terms are positive. After a continuous decline since 1990, employment is expected to grow slightly in 1996 and 1997.

Written by: Cel-Bois

The industry is represented at the EU level by: European Confederation of Woodworking Industries (Cel-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

# Semi-finished wood products

NACE 462

The manufacture of semi-finished wood products is the second largest wood processing subsector, representing 23 % of total sector production. Approximately 750 firms (each with 20 or more employees, with a total employment of 63 200 people, are involved in the production of semi-finished wood products. The main products are different kinds of wooden board material, such as particleboard, fibreboard and plywood. The real growth rates for 1993 were 1.7 % for production and -0.6 % for consumption, the difference in growth caused by a significant increase in extra-EU exports (+26.7 %). Since the second half of 1993, new extra-EU export opportunities have emerged in several Asian countries. The nominal average annual growth rates for the period 1995 to 1997 are estimated at 4.8 % for consumption and 4.9 % for production.

## INDUSTRY PROFILE

### Description of the sector

The subsector mainly produces wooden board material, such as particleboard, fibreboard and plywood. These in turn are used as intermediate products in the furniture or construction industries, or sold as end products. Apart from raw boards, there are also surface-improved panels (boards covered with veneer, laminates or resin impregnated paper). NACE 462 also includes companies that are engaged in the impregnation of wood with chemical preservatives.

Production of semi-finished wood products represents 23 % of the total production of the wood processing industry. Of the total volume of consumption of raw wooden board material, particleboard represents 73 %, fibreboard 11 % and plywood 16 %. Particleboard accounts for approximately 80 % of the total production volume of wood-based panels in the EU.

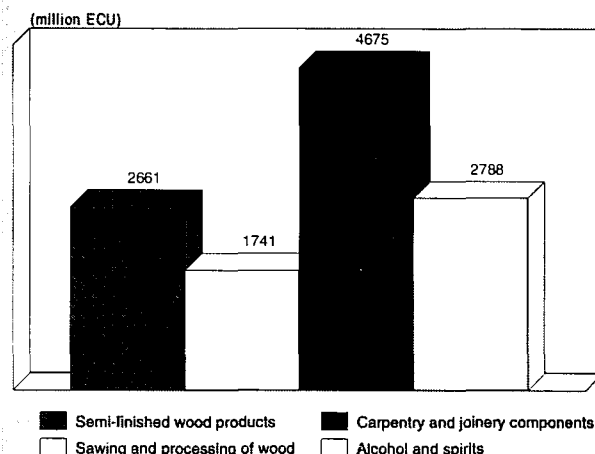
The value added in the subsector in 1993 amounted to nearly 2.7 billion ECU, compared to 1.7 billion ECU for sawing and first processing of wood (NACE 461) and 4.7 billion ECU for the production of wooden building components (NACE 463). 44 % of the value added was generated by Germany, the biggest producer in the EU, followed by France and Italy, accounting for 14 % and 12 % of value added, respectively.

### Recent trends

In the period 1984-93, apparent consumption of semi-finished wood products grew at an average real annual rate of 3 %. Decreasing consumption in 1986 and 1993, were the only exceptions to the trend. In the same period, production in constant prices increased by 33.7 %, performing well above the total manufacturing industry (+15.1 % on average), the poor 1993 figures of which further widened the gap. Average annual real growth rates in production were 3.3 % for semi-finished wood products and 1.9 % for the total EU manufacturing industry.

In 1993, production of semi-finished wood products increased by 1.7 % in constant prices, a slower pace than in the previous years. In the same year, production in current prices fell by 2.6 %, reflecting the downward pressure on prices due to weak demand from the industrial customers. Estimates for 1994, however, indicated a boost in the production of semi-finished wood products in current (+8.7 %) as well as in constant prices (+7.3 %). For the period 1995-97, production is estimated to reach an average annual growth rate of 4.9 %.

Figure 1: Semi-finished wood products  
Value added in comparison with related Industries, 1993

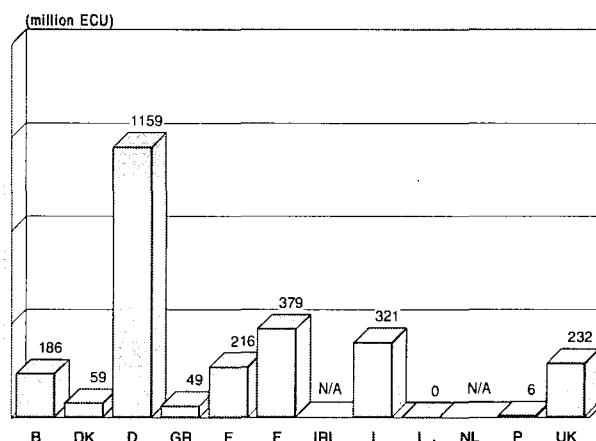


Source: DEBA

The real growth rates for 1993 were 1.7 % for production and -0.6 % for consumption, the difference in growth caused by a significant increase in extra-EU exports (+26.7 %). Since the second half of 1993, new extra-EU export opportunities have emerged in several Asian countries. Consumption suffered severely from the recession in 1993. That year, apparent consumption in current prices of semi-finished wood products amounted to 9.6 billion ECU, which was 3.2 % below the 1992 level. Between 1995 and 1997, apparent consumption is expected to increase at an average annual rate of 4.8 %.

The semi-finished wood products subsector employed around 63 200 people in 1994, which constituted 16 % of the total employment in the wood processing industry. Meanwhile, its share of total sector production amounted to 23 %. Hence, the subsector is relatively capital-intensive. Employment in the semi-finished wood products industry decreased by an estimated 11 % between 1990 and 1994. However, this negative trend in the employment level is slightly less marked than for the whole EU manufacturing industry (-13.3 %).

Figure 2: Semi-finished wood products  
Value added by Member State, 1993



Source: DEBA

**Table 1: Semi-finished wood products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	6 829	7 056	7 020	7 576	8 453	9 129	9 606	9 865	9 900	9 579	N/A
Production	5 636	5 901	5 813	6 305	6 970	7 621	7 972	8 302	8 311	8 096	8 804
Extra-EU exports	333.0	363.2	376.4	399.7	414.6	480.6	474.3	468.1	467.5	606.4	N/A
Trade balance	-1 193.0	-1 155.0	-1 207.0	-1 271.0	-1 482.0	-1 507.0	-1 635.0	-1 562.0	-1 589.0	-1 483.0	N/A
Employment (thousands)	75.7	71.9	65.9	66.8	66.7	68.0	71.0	70.7	69.0	64.4	63.2

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 2: Semi-finished wood products**  
**Breakdown by sector, 1993 (1)**

(thousand cubic metres)	Apparent consumption	Production	Extra-EU exports
Particle board	20 629	19 792	4 406
Fibre board - hardboard	807	660	33
Fibre board - MDF	2 211	2 683	494
Plywood	4 464	1 505	191

(1) Apparent consumption and production have been estimated.

Source: Cel-Bois

**Table 3: Semi-finished wood products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.86	1.88	2.98	-0.55
Production	3.84	2.58	3.28	1.70
Extra-EU exports	4.86	4.29	4.61	26.74
Extra-EU imports	4.23	-0.32	2.18	-3.53

(1) Some country data for apparent consumption and production have been estimated.

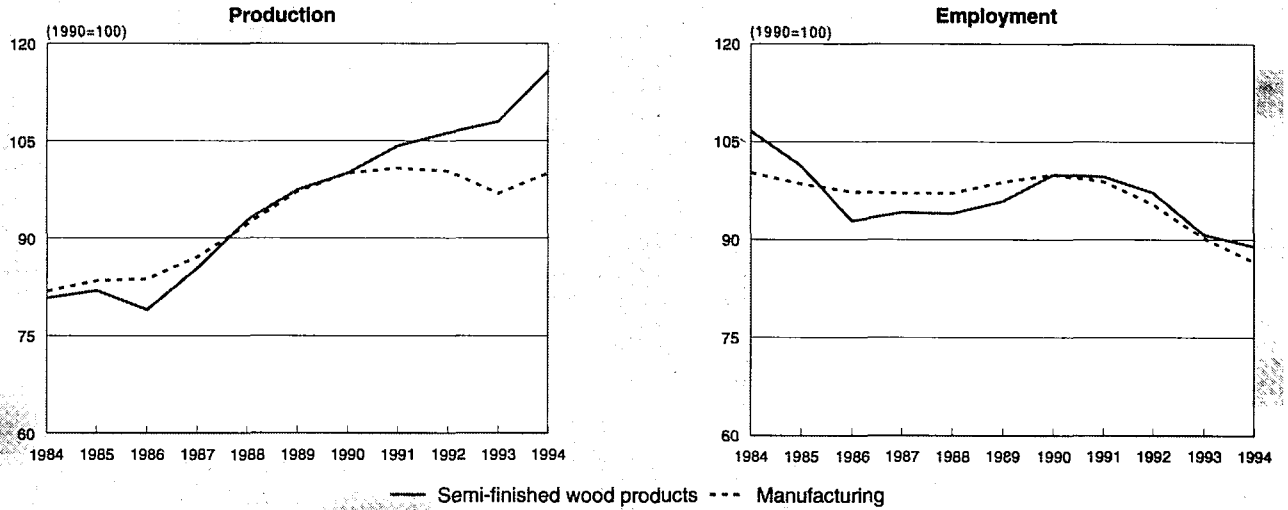
Source: DEBA

**Table 4: Semi-finished wood products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	333	363	376	400	415	481	474	468	468	606
Extra-EU imports	1 526	1 518	1 583	1 671	1 897	1 988	2 109	2 031	2 057	2 089
Trade balance	-1 193	-1 155	-1 207	-1 271	-1 482	-1 507	-1 635	-1 562	-1 589	-1 483
Ratio exports / imports	0.22	0.24	0.24	0.24	0.22	0.24	0.22	0.23	0.23	0.29
Terms of trade index	87.7	89.6	98.3	97.9	97.8	94.2	100.0	96.4	97.1	94.4

Source: DEBA

**Figure 3: Semi-finished wood products**  
**Production in constant prices and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

Moreover, the employment level is expected to stabilise in the period 1995-97.

**International comparison**

In 1993, EU production of semi-finished wood products equalled 65 % of US production and 72 % of Japanese production. However, in the period 1989-93, production in the EU of semi-finished wood products grew by an average real annual rate of 2.6 %, against 1.7 % in Japan and -0.5 % in the USA. EU production has grown continuously since 1986, whereas USA production has been more cyclical. The European wooden board industry is relatively young and is specialised in products such as particleboard and Medium-Density Fibreboard (MDF), the markets for which have displayed significant growth potential during the period. US industry is still largely engaged in the production of plywood. The plywood market is a more mature market, subject to cyclical fluctuations and also to substantial competition from low wage

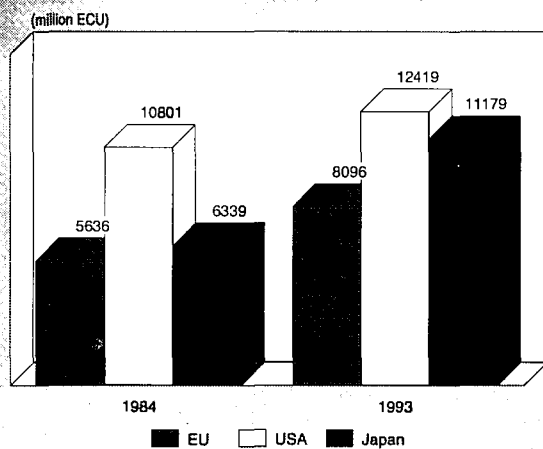
countries in South America and Asia (e.g. Brazil and Indonesia).

**Foreign trade**

Following consistent growth since 1984, at an average annual rate of 4.6 %, extra-EU exports rose steeply by 26.7 %, in 1993. This is explained mainly by new export opportunities in the emerging Asian markets. Extra-EU exports, mainly consisting of particleboard and MDF, are expected to grow further during the period 1995-97, at an average annual rate of 8.6 %. The trade balance, after deteriorating almost continuously since 1985, improved in 1993 thanks to the significant rise in extra-EU exports. Nevertheless, the trade balance remained in the negative due to massive extra-EU imports of plywood.

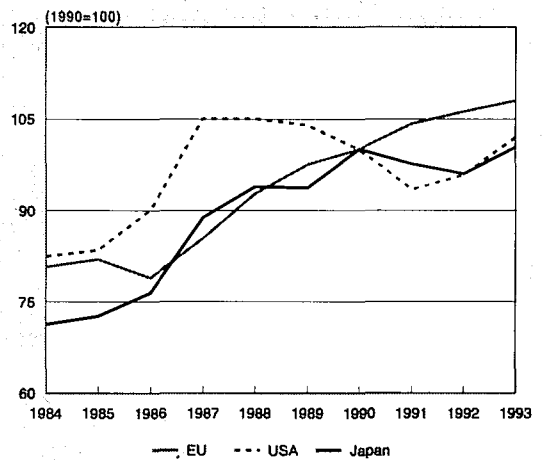
The extra-EU exports over extra-EU imports ratio remained stable during the period 1984-92, averaging around 23 %. In 1993, it reached 29 %, also due to rising extra-EU exports. The import penetration rate has remained stable over the last

**Figure 4: Semi-finished wood products**  
**International comparison of production in current prices**



Source: DEBA

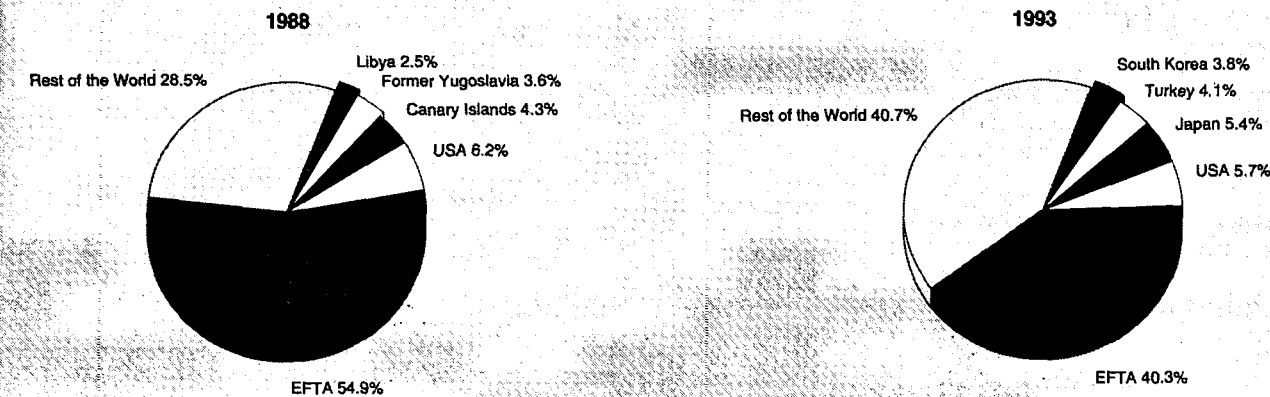
**Figure 5: Semi-finished wood products**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 6: Semi-finished wood products  
Destination of EU exports**



Source: Eurostat

years, averaging around 22 %. For the semi-finished wood products sector, the EFTA countries and the rest of the world are the major export markets, and each represented 40 % of EU exports in 1993. Indeed, EU producers have increased their share of the rest of the world markets (mainly the Far East) significantly over the past years, whilst the relative importance of exports to the EFTA countries has been reduced. In 1993, the most important Asian export markets were Japan (5.4 %) and South Korea (3.8 %). Meanwhile, 38 % of extra-EU imports originated in the EFTA countries. The USA (17.6 %), Indonesia (14.3 %) and Brazil (5.7 %) are important suppliers of plywood. In fact, extra-EU imports mainly comprise plywood and hardboard, whilst particleboard and MDF make up the bulk of extra-EU exports.

have joined other special products, such as very thin as well as very thick boards.

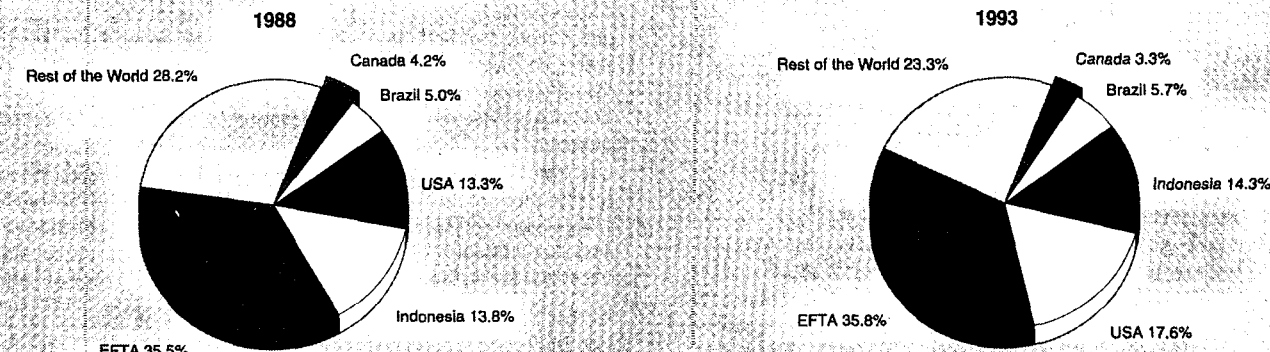
One trend in buyers' preferences is to replace solid wood, tropical wood, plastics and other wood based panels with MDF, especially for furniture manufacturing. MDF is a good substitute material for more expensive types of solid wood. Thin MDF is a strong competitor and substitution product for thin plywood and hardboard. As thin plywood and hardboard are mainly imported from outside the EU, intra-EU competition is not affected by this development. Apart from traditional applications for MDF (i.e. furniture manufacturing, the production of profiles and skirtings), MDF is becoming increasingly attractive for interior design, exhibition stands, window frames and door skins, etc. For plywood, one of the major developments in the world market is the reinforcement of export limitations for wood due to national and international environmental pressures (such as the reduction of trade in logs in Malaysia, the limiting of logging in the USA, etc.). Oriented Strand Board (OSB) is a relatively new type of wooden board material, at least in Europe. It is mainly used in the construction industry, due to its mechanical properties, and mainly serves as a substitution product for plywood.

**MARKET FORCES**

**Demand**

The development of new applications for particleboard will continue to gather momentum and, hence, influence demand. The range of special boards is expanding continuously. Special products, such as moisture-resistant boards, fire-resistant panels, bendable, lacquered, printed and melamine-faced boards

**Figure 7: Semi-finished wood products  
Origin of EU imports**



Source: Eurostat

**Table 5: Semi-finished wood products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	75.8	80.9	85.0	90.7	98.7	101.7	100.0	104.6	109.3	119.0
Unit labour costs index (3)	94.8	95.4	94.2	92.6	90.5	92.2	100.0	102.3	103.9	100.2
Total unit costs index (4)	90.3	93.8	92.6	92.8	94.0	97.8	100.0	99.9	99.3	94.9
Gross operating rate (%) (5)	7.6	6.8	9.5	10.2	10.4	10.4	10.1	10.1	9.0	11.3

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

## Supply and competition

Wooden board production is practically fully automated and the investment threshold is very high, especially for continuous production lines. Important modernisation and concentration has taken place in recent years and the industry has reached an advanced level of technology and very high efficiency. This enables the industry to meet high quality standards also in the near future.

The risk of overcapacity in the European particleboard sector was reduced in 1993 and 1994, years in which few new production lines were installed. During the recession of the early 1990s, rationalisation, rather than investments in new production capacity, has taken place. In some cases this has led to the closure of older or less efficient production units. In view of the rationalisation and the increase in demand that can be expected from economic recovery, prospects for the EU particleboard sector appear more favourable than they did in the first years of the 1990s, at least in terms of production volume.

Whereas the risk of overcapacity weakened in 1993-94, EU particleboard industry was simultaneously confronted with another threat. In 1994, especially, prices of basic chemicals (e.g. methanol) began to rise due to speculation. This led to spectacular rises in glue prices, by 30 % or more at a time. Methanol is an important input material for the glues used in the production of particleboard and MDF. These glues rep-

resent around 20 % of the total production cost of particleboards. Whilst commodity traders are already anticipating economic recovery, the industrial buyers of wooden boards (mainly furniture and construction industries) are typically lagging sectors. This makes it very difficult for the particleboard sector to adjust its prices in response to the higher raw material costs. Caught between an upward price pressure from suppliers of input materials and a downward one from the said customers, which are still suffering from weak end product demand in the EU, profit margins in the particleboard industry have been reduced to nearly zero.

The popularity of MDF, especially in the furniture industry, is still increasing. The rapid expansion of MDF production in Europe is therefore likely to continue for the rest of the millennium. However, its growth rate may vary with the business cycle.

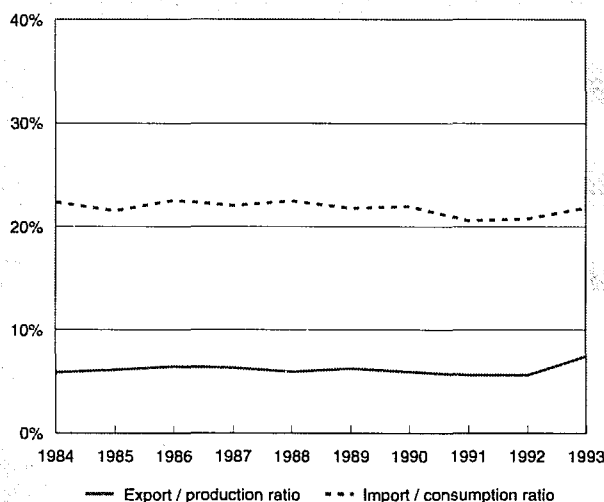
The impact of foreign competition may be distorted due to less environmentally friendly log harvesting or production methods, lower labour costs, greater availability of raw materials, trade practices and trade policies (such as dumping by countries in Central and Eastern Europe and the GSP countries). Technological advantages are not considered to be a factor affecting competition on the EU and extra-EU markets. It is therefore necessary for extra-EU competitors to respect the prevailing rules of international trade and competition. Large imports into the Community at very low prices from Eastern European countries and countries benefiting from the Generalised System of Preferences, constitute a real threat to the industry. The completion of the single European market will be very difficult for the industry if imports from Eastern European countries are not controlled in a fair manner, especially against the backdrop of the Europe agreements signed with these countries which will lead to the complete abolition of customs duties on imports.

The deficit in the EU trade balance for semi-finished wood products is the consequence of large, inexpensive wood reserves outside the EU (North America, Scandinavia and Eastern Europe) and the massive imports of plywood from North America and Southeast Asia and imports of hardboard from South America and Eastern Europe. In the plywood sector, the most important competitive advantage of the EU manufacturers over the large single-product manufacturers in the USA and Indonesia is that European industry is specialised in the manufacture of small series of special, custom-made goods from very different types of wood. The entry of Finland and Austria into the EU will have a significant impact on the EU trade balance figures for semi-finished wood products.

As for particleboards and MDF, competition is mainly intra-EU. In plywood and hardboard, there is significant competition from outside the EU.

In the hardboard sector, the number of companies switching from the so-called wet process to the dry process is expected to increase further due to strict regulations regarding envi-

**Figure 8: Semi-finished wood products**  
**Trade intensities**



Source: DEBA



ronmental protection. This development is accelerated by the pressure of imports from Central and Eastern Europe. Despite these problems, a new hardboard production plant is planned in the United Kingdom. If this project succeeds, it will be the first new hardboard production unit in the EU in many years.

OSB is mainly produced in the UK and France and the product has been well received in these and several other European countries. In the 1990s it should become a major product for the European panel industry. In the near future, OSB production is expected to grow substantially. Several new production units are being planned, e.g. in Ireland.

Labour productivity in the semi-finished wood products sector has increased significantly since 1990. In 1993 only, it increased by 8.9 %. Higher productivity led to a decrease in unit labour costs by 3.5 % in 1993, reducing them to their 1990 level. Following a continuous decrease since 1990, the sector achieved a substantial improvement of its gross operating rate in 1993, from 9.3 % to 11.3 %.

## INDUSTRY STRUCTURE

### Companies

According to estimates, some 750 firms (with 20 or more employees) are involved in the manufacture of semi-finished wood products. The particleboard industry counts around 120 companies, employing 20 000 people. Total employment in the industry is around 63 200, which equals an average number of 85 employees per firm. This figure is relatively high compared to other subsectors of the wood processing industry.

The EU countries that were the most specialised in the production of semi-finished wood products in 1993, are Greece (with a production specialisation ratio of 3.30) and Belgium (2.22). Belgium is the world's most prominent exporter of particleboard, with an export volume of approximately 1.8 million m<sup>3</sup>, representing 20 % of world trade. Germany, although the biggest EU producer, only just exceeds the European average (1.00) with a specialisation ratio of 1.10.

### Strategies

The chipboard industry is a capital-intensive sector. Production is practically fully automated, requiring massive research and development efforts, and the investment threshold is high, especially for the continuous production lines. These circumstances imply that an average chipboard firm exceeds the typical SME dimension of the wood processing sector, and that the added value of this activity is lower than in other parts of the wood processing industry, where a high percentage of labour costs raises the value added. In recent years, the sector has undergone major restructuring and an apparent concentration has taken place. Large competitors have begun to expand their market shares by investing in larger plants and by investing across Europe.

In the fibreboard sector, investments are focused on the development of new products, the modernisation of existing products, the increase of capacity and the shift to environmentally friendly production methods (such as converting from the wet process in the hardboard industry to the dry process in the MDF industry). In order to reduce overcapacity, diversification of products is taking place, e.g. aiming at the development of structural boards. With regard to company structures, there are several new joint investments by board manufacturers in MDF, but there are no major changes in hardboard yet.

Until recently, the plywood sector was quite labour-intensive. However, technological development and computer applications in production control and the operation of machinery have lowered production costs to a great extent. They have at the same time enabled a substantial reduction in wood

**Table 6: Semi-finished wood products  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	2.01	2.22
Danmark	0.99	1.16
BR Deutschland	1.14	1.10
Hellas	3.07	3.30
España	1.72	1.36
France	0.90	0.88
Ireland	N/A	N/A
Italia	1.11	1.08
Luxembourg	0.00	0.00
Nederland	N/A	N/A
Portugal	1.64	0.22
United Kingdom	0.38	0.60

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

waste. The sector is still highly suited for product diversification (with greater utilisation of European wood species), especially when production methods allow for the manufacture of small series of special, custom-made products. Investments by European companies, are characterised by modernisation and finding new product developments.

## REGULATIONS

The common external tariff on imports from outside the EU is the same for particleboard, fibreboard and plywood. Having been maintained at 10 % for some time, it is now being gradually reduced as a result of the Uruguay Round of the GATT. On January 1st, 1995, a progressive reduction of the tariff started in order to lower the bound level of duty to 7 % by January 1st, 1999. The first step of reduction brought the common external tariff to 9.4 % on January 1st, 1995.

The Europe agreements signed between the EU and Hungary, Poland, the former USSR and Romania changed the regulations formerly applicable to these countries. Customs duties on imports to the EU of particleboard, plywood and fibreboard from Bulgaria, Estonia, Latvia, Lithuania, Poland, Hungary, Romania, the Czech Republic and Slovak were abolished on the 1st of January 1995. As far as the republics of the former Soviet Union are concerned, since their inclusion in the 1993 GSP a fixed duty-free quota of 4.2 million ECU applies to imports of fibreboard into the EU from Russia and Ukraine. With regard to plywood, there is a fixed duty-free quota of 90 300 m<sup>3</sup> for plywood from Russia, Ukraine and Belarus. Annual quotas on imports of particleboard and plywood originating in the Republics of Croatia, Slovenia, Bosnia-Herzegovina and Macedonia have been fixed for 1995. The annual ceiling for particleboard is 45 779 tonnes, whilst for plywood the annual ceiling is set at 177 681 m<sup>3</sup>. As soon as these levels have been reached, a customs tariff of 9.4 % may be reintroduced by a Commission Regulation.

## OUTLOOK

Consumption, as well as production, of semi-finished wood products is expected to grow in the coming years. The average growth rate for the period 1995 to 1997 is estimated at 4.8 % for consumption and 4.9 % for production. Extra-EU exports are expected to maintain their growth trend from 1994 to 1997, notably because of new opportunities in emerging markets such as the Near and Far East.

In the particleboard industry, it seemed that the countries of northern Europe would see a recovery in 1994 after many

years of recession. Countries in Central Europe suffered badly from the downturn of the German economy. Their recovery will also depend on their ability to build up a domestic market. The industry in the countries of Southern Europe is heading for a period of restructuring which has already started in some countries. All these developments will take some time to materialise. However, the structural reforms initiated in the Eastern European countries and in the Baltic States have begun to produce some results leading to expectations of forthcoming growth. However, the economic situation in the CIS countries is highly unstable and the prospects are quite uncertain.

In the fibreboard sector, the MDF industry represents a European production capacity of more than 4 million m<sup>3</sup>. Compared to particleboard (30.7 million m<sup>3</sup>) and sawn timber (68 million m<sup>3</sup>), the share of MDF in the market of wood and wood products is still quite moderate. European MDF industry will, furthermore, increasingly open up export markets outside the EU and EFTA for its products, more specifically for special MDF boards. Nevertheless, the setting up of new production capacity in the Far East will expose the European exporters to increased competition from local producers.

The semi-finished wood products sector is facing a number of risks, including the additional costs associated with increasingly strict requirements with respect to health and environment, in the light of competition from extra-EU imports. However, political reforms in Central and Eastern Europe offer a potential for exports and possibly joint ventures.

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# Wooden building components

## NACE 463

The manufacture of wooden building components accounts for 37 % of the production value of the EU wood processing industry and thus constitutes its main subsector. The subsector is largely dependent on developments in the construction industry. It is highly involved in renovation work, which makes the sector less dependent on cyclical new building construction.

### INDUSTRY PROFILE

#### Description of the sector

This subsector produces a wide variety of wooden building components (doors, window frames, shutters, partitioning and other walls, staircases, constructions of glued laminated wood, prefabricated buildings of wood etc.). It is distinguishable from the carpentry subsector of the construction industry through its industrial scale and methods of production.

In 1993, production in current prices reached a value of 13.1 billion ECU, which represented 37 % of the total production of the wood processing industry (excluding wooden furniture). Hence, the manufacture of wooden building components is the most important subsector of the industry. Apparent consumption amounted to 14 billion ECU, thereby producing a slight trade balance deficit.

Subsector employment was approximately 146 600 people in 1993, representing 37.4 % of the total employment in the woodworking industries. In the same year, the wooden building components industry generated a value added of 4.7 billion ECU. Representing nearly 40 % of value added, Germany is the biggest producer.

#### Recent trends

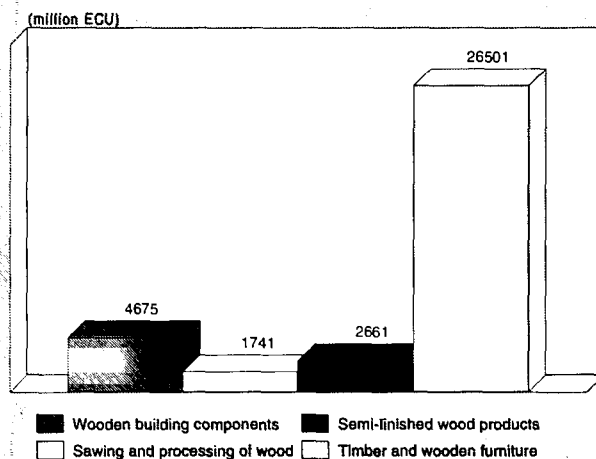
In the period 1984-93, apparent consumption of wooden building components increased steadily, at an average real growth rate of 3.4 %. Unfortunately, EU production was not able to keep pace with the rapidly growing demand, despite a decrease in extra-EU exports. This resulted in a steep rise in extra-EU imports, especially between 1989 and 1993 (+20.6 % average real annual growth), and a trade deficit that increased from 1987 to 1993, to reach 885 million ECU. Nevertheless, production in constant prices grew by an estimated 30 % between 1984 and 1994, which was 8 percentage points above the EU manufacturing industry average growth. This rapid growth mainly took place between 1986 and 1990, years in which economic growth and construction activity recovered after a period of recession, and in 1994 (growth estimated at 6.1 %).

Between 1984 and 1989, the average real annual growth rate of production was 3.5 %, similar to that of the EU manufacturing industry. For the period 1989-94, however, the wooden building components industry outperformed EU manufacturing industry (average real annual growth rates of 1.9 % and 0.6 %, respectively).

Employment declined in the first half of the 1980s. Thanks to increasing demand, employment started to grow again in 1987 to reach a peak of 161 100 employed in 1990. However, employment fell sharply, to an estimated 146 600 in 1994, following the general trend of the entire wood processing sector.

The wooden building components industry also suffered from the economic recession of the early 1990s. In 1993, production

Figure 1: Wooden building components Value added in comparison with related industries, 1993



Source: DEBA

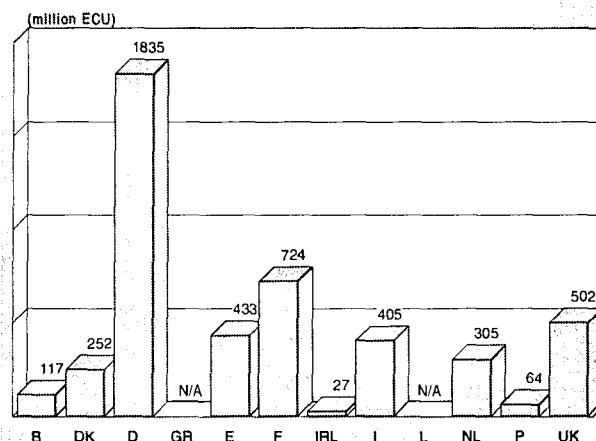
in constant prices decreased by 0.5 %. For 1994, production was projected to grow to 14.2 billion ECU (+6.1 %).

#### International comparison

Previously, the wooden building components industry was significantly larger in the USA than in the EU. In 1984, the production value of the EU industry represented only 60 % of that of its US counterpart. This is explained by the popularity of wood as a building material in the USA. However, the difference in production volume was reduced to 16.5 % by 1993. This was due not only to cyclical factors, but also to the fact that wood is becoming increasingly popular as a building material in the EU as well.

US production is subject to cyclical fluctuations to a higher degree than the EU and Japan are where production is growing more steadily. Japan has the smallest, but fastest growing, wooden building components industry of the three trading blocks. It amounted to nearly 64 % of EU production in 1993.

Figure 2: Wooden building components Value added by Member State, 1993



Source: DEBA

**Table 1: Wooden building components**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	7 734	7 620	8 095	9 004	10 162	11 175	12 039	12 587	13 453	13 997	N/A
Production	7 896	7 721	8 131	8 996	10 101	11 084	11 857	12 242	12 882	13 112	14 189
Extra-EU exports	451.2	377.3	344.7	351.4	375.4	436.0	441.4	422.4	403.2	382.0	N/A
Trade balance	162.0	100.3	36.2	-8.6	-61.1	-90.9	-182.4	-344.8	-570.5	-885.4	N/A
Employment (thousands)	161.1	153.3	148.2	155.4	160.5	160.7	161.1	157.9	156.7	149.1	146.6

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 2: Wooden building components**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.21	2.35	3.38	1.48
Production	3.48	0.89	2.32	-0.49
Extra-EU exports	-5.96	-6.43	-6.17	-5.71
Extra-EU imports	8.78	20.58	13.87	24.06

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Wooden building components**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	451.2	377.3	344.7	351.4	375.4	436.0	441.4	422.4	403.2	382.0
Extra-EU imports	289.2	277.0	308.5	360.0	436.5	526.9	623.8	767.2	973.8	1267.4
Trade balance	162.0	100.3	36.2	-8.6	-61.1	-90.9	-182.4	-344.8	-570.5	-885.4
Ratio exports / imports	1.56	1.36	1.12	0.98	0.86	0.83	0.71	0.55	0.41	0.30
Terms of trade index	89.1	89.9	101.3	102.4	99.2	97.9	100.0	99.3	102.7	98.3

Source: DEBA

**Table 4: Wooden building components**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	82.7	80.5	86.6	89.0	93.8	98.4	100.0	102.0	105.0	109.9
Unit labour costs index (3)	87.8	93.6	91.2	91.6	92.4	94.8	100.0	106.3	110.0	108.7
Total unit costs index (4)	81.0	86.4	86.4	87.7	90.6	95.0	100.0	104.0	107.8	108.9
Gross operating rate (%) (5)	9.15	8.58	9.69	11.06	10.89	10.26	9.65	9.05	9.18	9.78

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

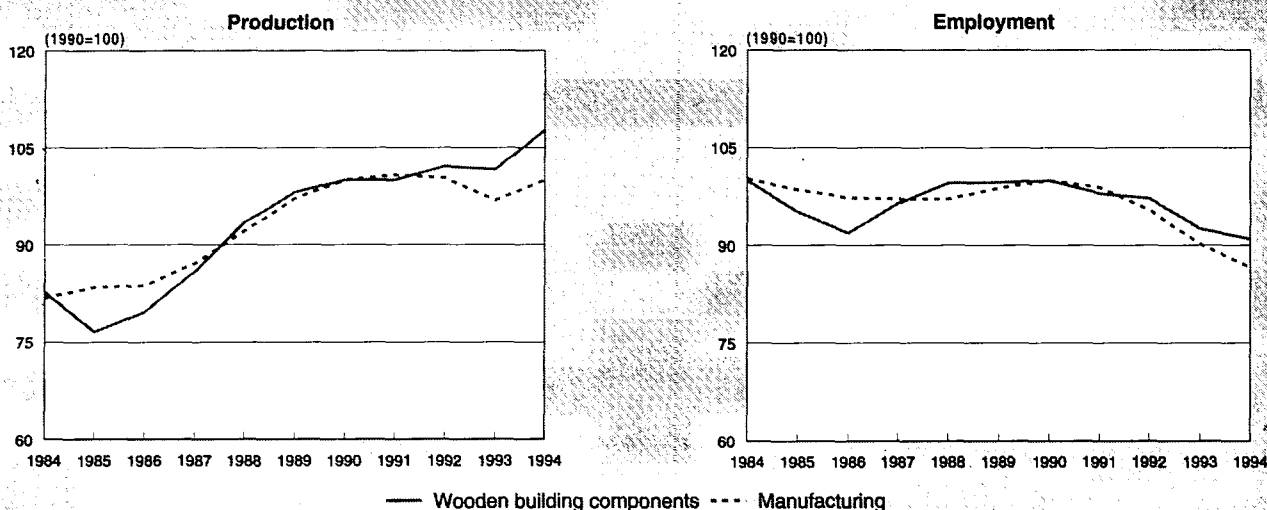
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Wooden building components  
Production in constant prices and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

and managed an average real annual growth rate of 9.7 % between 1984 and 1993.

**Foreign trade**

Between 1984 and 1993, extra-EU exports declined at an average real annual rate of 6.2 %. This means that EU producers have been focusing mainly on their home markets. On the other hand, extra-EU imports grew at an average rate of almost 14 % over the same period. In 1989-1993, extra-EU imports even grew at an average real rate that exceeded 20 %. The trade balance deteriorated continuously during the period and became negative in 1987.

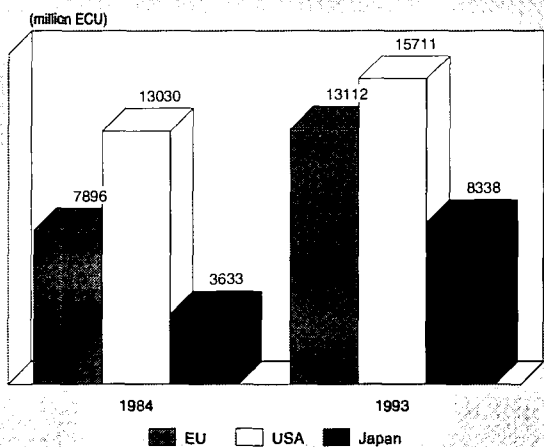
Extra-EU trade in wooden building components remains limited. Extra-EU exports amounted to only 2.7 % of production in 1993, whilst extra-EU imports equalled 9.1 % of consumption. In the long run, the consistently increasing trade deficit is a cause for concern. Between 1984 and 1993, the exports/production ratio dropped from 5.7 % to 2.9 %. Over

the same period, the imports/consumption ratio went from 3.7 % to 9.1 %.

Most companies in the wooden building components sector work closely together with the local building industry. Extra-EU trade remains limited to a few highly standardised products that can be transported at relatively low costs (e.g. plane doors).

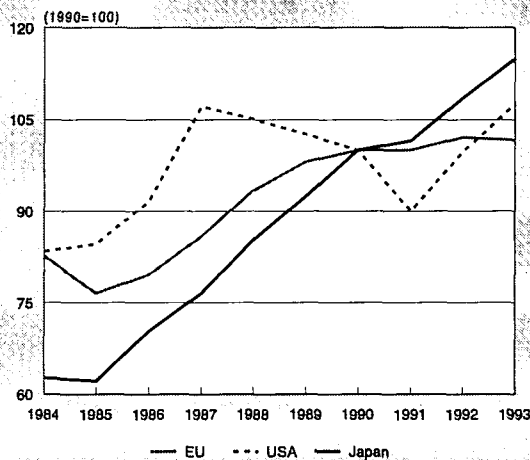
Nevertheless, intra-EU trade is increasing rapidly. This is undoubtedly due to European integration, that has started a process of harmonisation of technical standards and a broadening of the "local" market horizon. Extra-EU exports are still mainly oriented towards the EFTA countries (52.6 % in 1993), because of the geographical proximity and the partial similarity in building practices. However, the EFTA countries' share of extra-EU imports has decreased (46.6 % in 1993). Imports of inexpensive standardised products are increasingly being imported from low labour cost countries in Eastern Europe and South East Asia.

**Figure 4: Wooden building components  
International comparison of production in current prices**



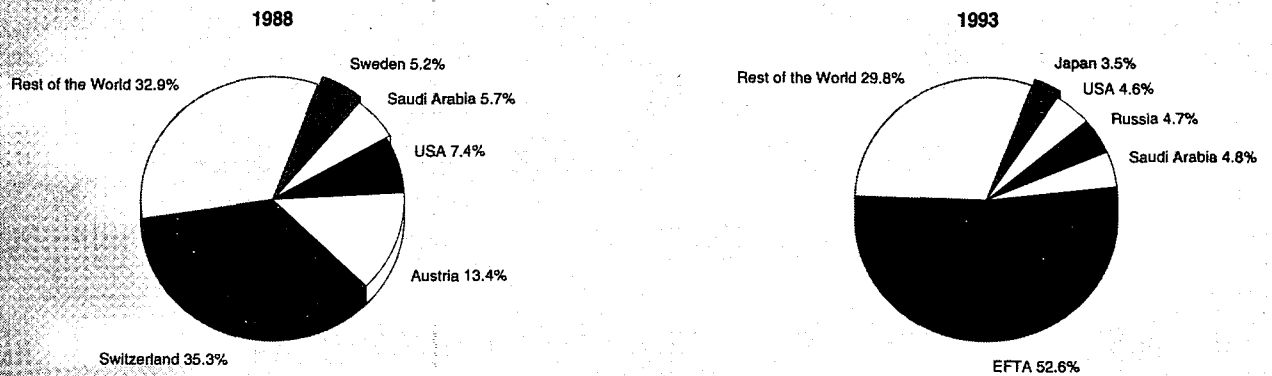
Source: DEBA

**Figure 5: Wooden building components  
International comparison of production in constant prices**



Source: DEBA

**Figure 6: Wooden building components  
Destination of EU exports**



Source: Eurostat

## MARKET FORCES

### Demand

Demand in the sector is heavily dependent on developments in the building industry. Renovation work is expanding faster than total building activity. This particularly enhances the demand for wooden building components, which are well suited, and sometimes even specifically designed, for renovation work. It has also made this subsector less dependent on cyclical new building construction. Renovation already represents around one third of total construction activity in the EU. Wooden parquet flooring for private housing has benefited from changing consumer preferences in recent years.

In private housing construction, the Single Market will not have a significant impact on the demand for building components, since well-defined regional markets will continue to exist within Europe. This is largely due to the specific climatic conditions and local building practices and styles.

The demand for wooden building components is more and more influenced by the ability of wood to provide thermal and acoustic insulation, rather than the more traditional properties associated with wood, particularly in the non-residential building sector.

### Supply and competition

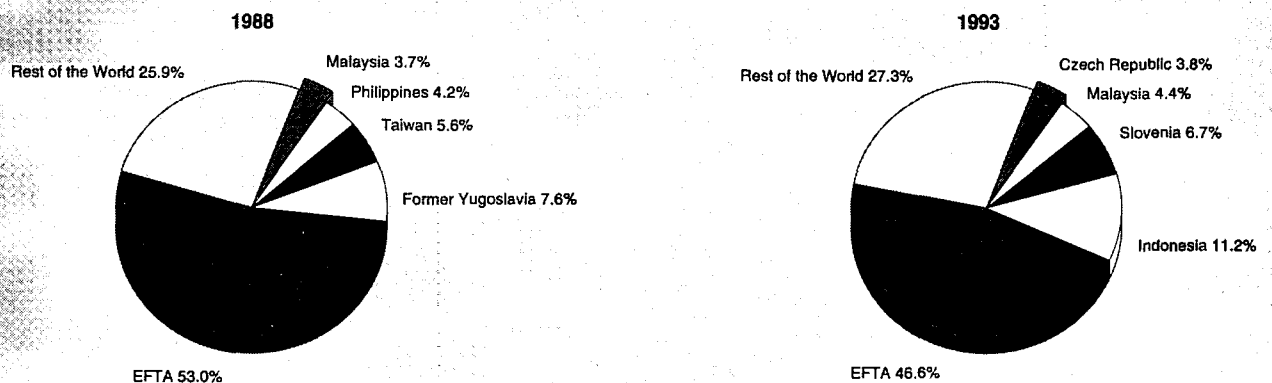
International competition remains rather limited due to differences in climatic conditions and building practices. Transport cost is also a limiting factor for international trade, since most products are heavy and voluminous. Nevertheless, foreign competition still makes its presence felt, mainly due to lower labour costs in non-EU countries. Factors such as exchange rate developments, improved availability of raw materials or technological advantages also play an important part.

Wood treatment enables the use of wood in applications where previously, its use had been excluded. This makes it possible for wood to take market shares from alternative building materials in non-traditional markets. Treated wood is now used in relatively new applications, e.g. in agriculture and horticulture, for enclosures, playgrounds, and in hydraulic engineering.

Products such as fire-resistant wooden doors may appear inconceivable. However, the high degree of dimensional stability of wood provides it with a competitive advantage over metal or synthetic materials, since the latter deform more rapidly at high temperatures.

Producers of wooden window frames experience competition from substitution products made from other materials, such

**Figure 7: Wooden building components  
Origin of EU imports**



Source: Eurostat

as aluminium and PVC (polyvinyl chloride). However, wooden frames still have the largest market share in the EU with 40 %, well ahead of aluminium and PVC. Debate on the environmental impact of use of the latter materials may seriously affect their market share.

Recently, traditional producers of wooden building components also experienced competition from other subsectors of the wood processing industry, such as sawmills, wooden board producers and even furniture manufacturers. The latter often produce building components, such as wooden flooring or doors, in order to increase the value added of their products (true for sawmills and wooden board manufacturers), or to be less dependent on cyclical demand (furniture manufacturers).

### Production process

The production process distinguishes the industrial manufacturer of wooden building components from the local carpenter. The machinery and production techniques used in a factory producing e.g. doors or window frames resemble those in the furniture industry rather than those of the individual carpenter. Computer aided design and computer aided manufacturing (CAD-CAM), state-of-the-art computerised numeric control (CNC) machinery and automated coating installations have already found their way into the wooden building components industry. The industry has thus become the supplier to individual construction firms or carpenters, which integrate the prefabricated components into the building at the local construction site.

## INDUSTRY STRUCTURE

### Companies

In order to cope with specific climatic conditions and local building practices and styles, small to medium-sized enterprises (SMEs) are ideal, with a size that fits established geographical limits and a technical specialisation. Indeed, it is the SMEs that make up the vast majority of the companies in the industry. There are more than 2 000 companies that employ 20 or more people in this sector, employing a total of 146 600 people. In view of the many SMEs in the sector, total employment is much higher. With a production specialisation ratio of 3.1, Denmark is the only EU country with a

specific specialisation in the production of wooden building components.

### Strategies

Recent investments have focused on plant modernisation and capacity increases, among other reasons, due to increased demand in Germany since the reunification. Investment is mainly undertaken by European producers themselves, and foreign investment is insignificant. Producers tend to specialise considerably and the sector is characterised by numerous acquisitions, particularly in Germany.

Most manufacturers of wooden building components are active on local or regional markets, because of the differences in climatic conditions and building practices. However, by conforming to the European construction products directive, many enterprises will be able to expand their potential markets to the EU level.

In brief, there are three generic strategies for companies in this sector. The first one is to specialise and to focus on the local market, by taking the specific preferences and requirements of local consumers and building companies into account. Aspects such as service and flexibility are very important parts of this strategy which is common among SMEs in the sector. The second strategy involves concentration and mass production of highly standardised building components. The market for these products is the entire EU. Economies of scale and price leadership are the keys to success. Large companies that employ this strategy have to reckon with competition from extra-EU imports. A third strategy is to focus on a product with specific technical properties. Unlike the first (specialisation) strategy, it allows firms, including SMEs to operate on the EU level. This strategy is likely to become more important as the harmonisation of standards for these products continues.

In the window frames sector, a growing number of manufacturers are combining the production of wooden as well as PVC frames. From the viewpoint of technology, this is perfectly feasible since the machinery for the production of wooden window frames may also be used for the processing of PVC. With this strategy of differentiation and complementarity, producers become less dependent on consumer preferences and the outcome of the debate on the environmental issues related to the use of these materials.

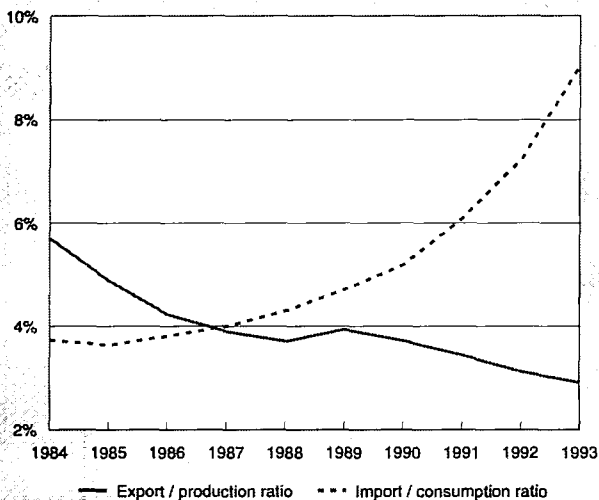
### Impact of the Single Market

Several measures in the Internal Market programme have had effects on the sector. Measures with regard to the free movement of persons, public procurement and consumer protection in the building industry indirectly affect the wooden building components sector as a supplier to the former industry. There has been no general trend towards mergers among the many SMEs in the sector as these are active on local markets, working closely with the local building industry. Nevertheless, increasing harmonisation has expanded the market and intra-EU trade is growing. In distribution, concentration has taken place as large DIY chains have set up units in other EU countries in response to harmonisation and a larger market.

## REGULATIONS

In March 1994, after five years of discussion within the Standing Committee on Construction, the interpretative documents relating to Council Directive 89/106 on the approximation of laws, regulations and administrative provisions of the Member States with regard to construction products, (known as the "Construction Products Directive", which defines the six essential requirements for a construction product) were finally published. This means that the Member States can now implement the Directive, and that construction products bearing the CE-mark of conformity can enter the market. The industry has prepared itself for the implementation of the Directive,

**Figure 8: Wooden building components  
Trade intensities**



Source: DEBA



**Table 5: Wooden building components  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.50	0.74
Danmark	2.64	3.10
BR Deutschland	1.18	1.15
Hellas	0.18	0.42
España	1.13	1.15
France	0.86	0.97
Irland	0.49	0.54
Italia	0.73	0.76
Luxembourg	N/A	N/A
Nederland	N/A	1.41
Portugal	1.09	1.02
United Kingdom	1.00	0.65

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

which it believes is necessary for the creation of a single internal market, by lending massive financial and technical support to the European standardisation process.

Recent events involving the Construction Products Directive, however, may weaken its impact on harmonisation. The European Commission has expressed the opinion that the harmonised standards should not impose limitations or prescriptions on products (such as minimum or maximum values), but should only contain definitions and test methods.

Meanwhile, the preparation of European standards concerning product specifications is progressing steadily. Five Technical Committees of CEN, the European Committee for Standardisation, are preparing standards for wooden construction products. Presently, no European technical approvals for wood processing products have been applied for in the context of EOTA, the European Organisation for Technical Approvals.

## OUTLOOK

Apparent consumption of wooden building components is expected to grow by an average annual rate of 6.8 % in 1995-97, thanks to the expected increase in construction activity. The average annual growth rate for production for the period 1995-97 is estimated at 5.4 %. Extra-EU imports are therefore projected to increase further. Extra-EU exports, on the other hand, will continue to decrease by approximately 6 % per year.

Apart from fluctuations that are purely cyclical, there are also three important structural changes taking place that may have a determining influence on the future of the wooden building components industry. First of all, there is the trend towards increasing renovation and maintenance, which highly benefits the use of wooden building components. Renovation and maintenance already represent around one third of total construction activity in the EU. This share will undoubtedly grow. Secondly, it is uncertain what effect the European integration of the construction market through increasing standardisation of building products will have on EU production of wooden building components (at least for some products). European standardisation not only stimulates intra-EU trade, but also facilitates extra-EU imports. Thirdly, there is a general trend in the building industry towards increasing subcontracting and growing use of prefabricated building components. This is visible as a decrease in the share of value added in building industry turnover. Such developments are also assisted by European integration and the standardisation of building products. They lower the labour intensity of the construction process and increase productivity (higher turnover per capita). They also increase the geographical mobility of (large) construction firms. This causes a shift in the value added chain from the building industry to the supplying sectors, such as the wooden building components industry, thereby creating considerable opportunities for the producers of wooden building components.

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# Other wood products

## NACE 464, 465, 466

With the exception of 1993, production and consumption in this industry have improved consistently since 1982, despite increasing competition from low labour cost countries in Eastern Europe and the Far East. The industry is characterised by a large number of SMEs with relatively stable employment. Significant investments have taken place in recent years to increase automation in production as much as possible, in order to compete more successfully with imports. Still, the trade balance has continued to deteriorate.

### INDUSTRY PROFILE

#### Description of the sector

Other wood products comprises several smaller and highly heterogeneous subsectors of the wood processing industry. The most important is wooden containers (NACE 464), which includes e.g. boxes, crates, pallets, barrels, and cable drums. NACE 465 brings together miscellaneous wood products. The most important products are wooden frames for paintings, photographs, mirrors and similar objects. NACE 466 includes the production of articles of cork, basketware, wickerwork and other articles of plaiting materials (except case and wicker furniture) and the manufacture of brushes and brooms.

In 1994, the production value of these subsectors totalled an estimated 9 673 million ECU, which represented 25 % of the total production of the wood processing industries (except wooden furniture). Employment amounted to 119 500, which equalled 30.5 %. Hence, the sector is very labour intensive. In 1993, wooden containers and pallets accounted for 3.1 billion ECU (34.1 %) of the total production of other wood products. Extra-EU exports of wooden containers remained limited. Production of brushes and brooms amounted to 1.2 billion ECU (13.4 %).

The value added in the sector in 1993 was 3.4 billion ECU, roughly 27 % more than the value added of the semi-finished wood products and almost twice as high as the value added of sawing and first processing of wood.

Germany is by far the most important producer of other wood products within the EU, not only in absolute terms. The per capita production is also much higher in Germany than in other EU countries of similar size, such as France, Italy or the UK.

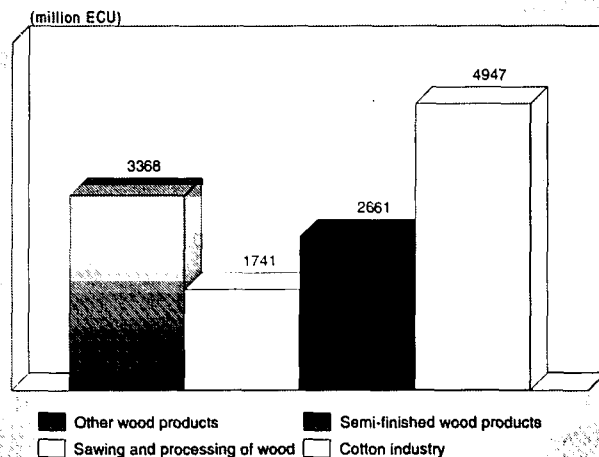
#### Recent trends

Apparent consumption grew continuously during the period 1984-91, at an average real annual growth rate of 3.4 %. Although growth was limited until 1986, from 1987 to 1991 it grew significantly, but then fell again in 1992-93 (-3.1 %).

EU producers were slow to respond to the upswing in consumption, however, and there was a strong rise in extra-EU imports in 1987-89. EU production reacted by strong growth in 1988-91. Over the period 1984-93, the average real annual growth rate of production was 2.7 %.

Employment declined steadily between 1984 and 1988, from 131 900 to 122 800, but rose again from 1989 onwards, reaching a peak of 133 900 employed in 1991. Since then, however, employment has fallen back sharply. For 1994, employment was estimated at 119 500. Nevertheless, in terms of employment, the other wood products sector continues to perform above the total EU manufacturing industry, mainly thanks to the expansion in 1989-91. Production of other wood

Figure 1: Other wood products  
Value added in comparison with related industries, 1993



Source: DEBA

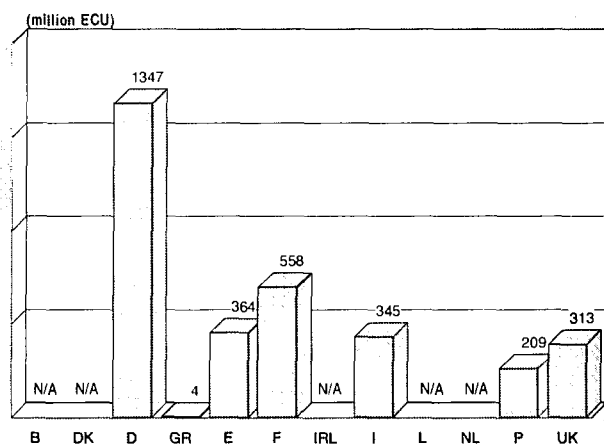
products grew by an annual rate of 2.7 % in the period 1984-93, compared to 1.9 % for total manufacturing industry.

Because of the slowdown in economic growth and international trade in 1992-93, poor demand for other wood products lowered production to 9 042 million ECU in 1993. Production was projected to grow by an estimated 7 % in 1994.

#### International comparison

In 1993, EU production of other wood products equalled 62 % of US production and 102 % of Japanese production. Over the period 1984-93, EU production of other wood products grew slightly slower (with an average real annual growth rate of 2.7 %) than US production (3.0 %) and Japanese production (3.1 %). This growth differential can be attributed to the decline in EU production in the recession years 1992-93. Over the period 1984-91, production in the EU grew faster than in the USA or Japan.

Figure 2: Other wood products  
Value added by Member State, 1993



Source: DEBA

**Table 1: Other wood products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	5 478	6 969	8 179	9 059	9 900	9 827	9 507	10 230	10 900	11 800	12 700
Production	5 456	6 862	8 043	8 866	9 537	9 418	9 042	9 916	10 600	11 400	12 200
Extra-EU exports	598.7	710.6	837.3	814.7	847.4	883.6	917.6	1 570.9	1 710.0	1 860.0	2 010.0
Trade balance	-22.2	-107.5	-135.5	-193.3	-363.2	-409.4	-465.6	-314.8	N/A	N/A	N/A
Employment (thousands)	131.9	122.8	130.1	130.5	133.9	128.7	122.1	118.6	119.0	120.0	121.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Other wood products**  
**Breakdown by sector, 1993 (1)**

(million ECU)	Apparent consumption	Production	Extra-EU exports
Wooden containers	3 065	3 086	71
Brushes and brooms	1 204	1 211	238
Articles of cork and plaiting materials	891	868	263
Others	4 347	3 877	345

(1) Apparent consumption and production have been estimated.

Source: Cei-Bois, DEBA

**Table 3: Other wood products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	5.04	1.29	3.36	-3.11
Production	4.44	0.58	2.70	-2.90
Extra-EU exports	1.63	0.30	1.04	3.02
Extra-EU imports	7.39	6.32	6.91	-0.46

(1) Some country data for apparent consumption and production have been estimated.

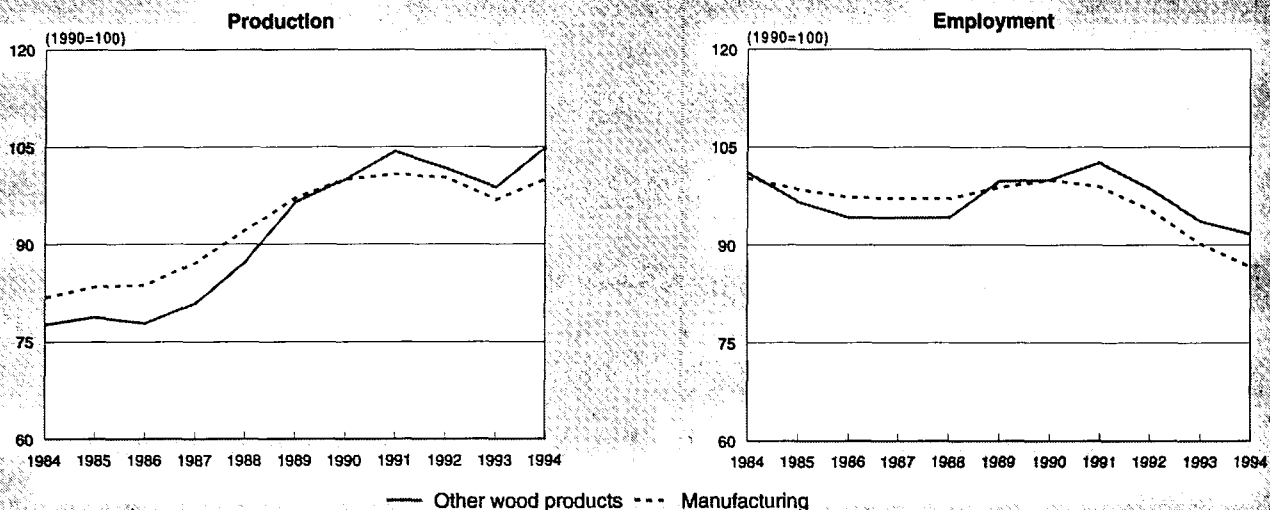
Source: DEBA

**Table 4: Other wood products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	599	640	629	629	711	837	815	847	884	918	1 571
Extra-EU imports	621	628	606	681	818	973	1 008	1 211	1 293	1 383	1 886
Trade balance	-22	11	23	-51	-108	-136	-193	-363	-409	-466	-315
Ratio exports / imports	0.96	1.02	1.04	0.92	0.87	0.86	0.81	0.70	0.68	0.66	0.83
Terms of trade index	80.6	79.0	89.5	92.9	92.9	96.2	100.0	98.9	99.9	93.7	N/A

Source: DEBA

**Figure 3: Other wood products**  
**Production in constant prices and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
 Source: DEBA

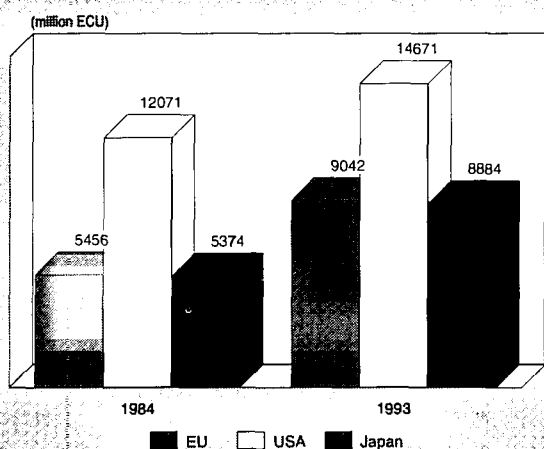
**Foreign trade**

Extra-EU exports and imports amounted to 918 million and 1 383 million ECU, respectively, in 1993, producing a trade deficit of around 465 million ECU. Extra-EU imports have grown rapidly since 1987, increasing their share of EU consumption (from 10.4 % in 1986 to 14.5 % in 1993). Import penetration remains relatively low, despite the fact that most of the subsectors of the other wood products sector are exposed to competition from extra-EU, low labour cost countries. The export/import ratio deteriorated from 1.04 in 1986 to 0.66 in 1993. Extra-EU exports grew by an average real annual rate of only 1.0 % between 1984 and 1993. The exports/production ratio remains fairly stable around 10 %.

External trade in wooden containers and pallets is of limited importance but has nevertheless increased since 1989. Extra-EU imports now represent around 2 % of the consumption of wooden containers and pallets. These imports mainly consist of inexpensive pallets produced in East European countries

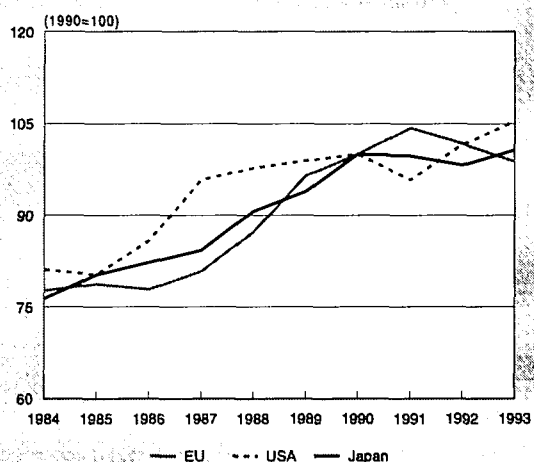
such as Poland, Hungary and the former Czechoslovakia. The trade balance for wooden containers and pallets, which remained strong at the beginning of the period 1984-93, has gradually become weaker and showed only a very small surplus in 1993. Most of the trade takes place within the EU. Trade figures may be underestimated, however, as some international movements of wooden containers and pallets are not visible in these due to the fact that consignments of empty containers and pallets are included in customs statistics, whereas loaded containers and pallets are not. Although the EU brushes and brooms industry is experiencing stiff competition from China and Eastern Europe, the trade balance retains a slight surplus. Distinguishing between product lines, there is a surplus for industrial brushes, paint brushes and rollers and domestic brushes. However, for toilet brushes, fine hair brushes and (since 1982) for brooms there is a trade deficit. Articles of plaiting materials are mainly imported from countries in the Far East, such as South Korea, Taiwan and the Philippines.

**Figure 4: Other wood products**  
**International comparison of production in current prices**



Source: DEBA

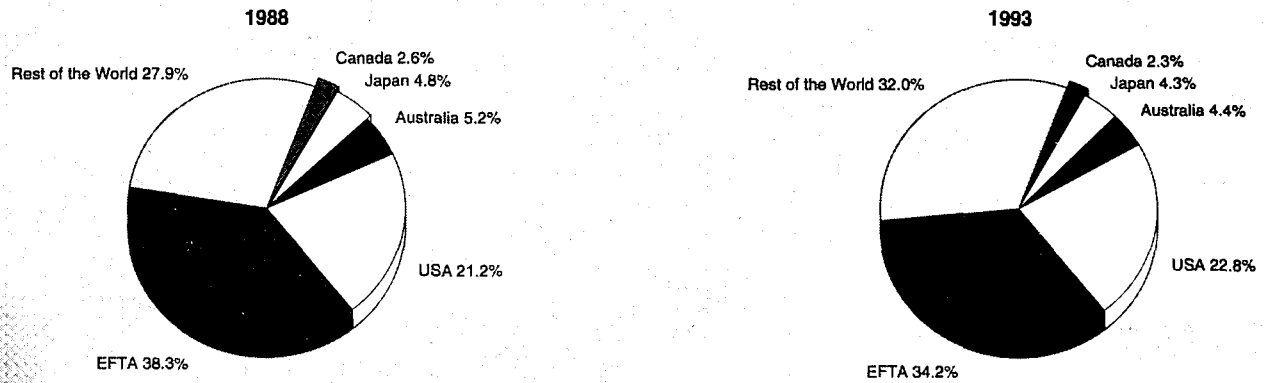
**Figure 5: Other wood products**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 6: Other wood products  
Destination of EU exports**



Source: Eurostat

The most important extra-EU export markets for other wood products are the EFTA countries (34.2 % in 1993) and the USA (22.8 %). Extra-EU imports originate mainly in China (20.2 %, mainly fine hair brushes), Poland (12 %, mainly pallets) and Indonesia (7.8 %, mainly articles of plaiting materials).

## MARKET FORCES

### Demand

Since the sector is highly heterogeneous, its products typically have different types of buyers, i.e. industry or final consumers. Wooden containers are mainly sold to various industries. Demand for these products has an indirect character: since a large part of industrially produced goods are transported either in wooden containers or on pallets, demand for these packaging materials largely follows the general macroeconomic situation.

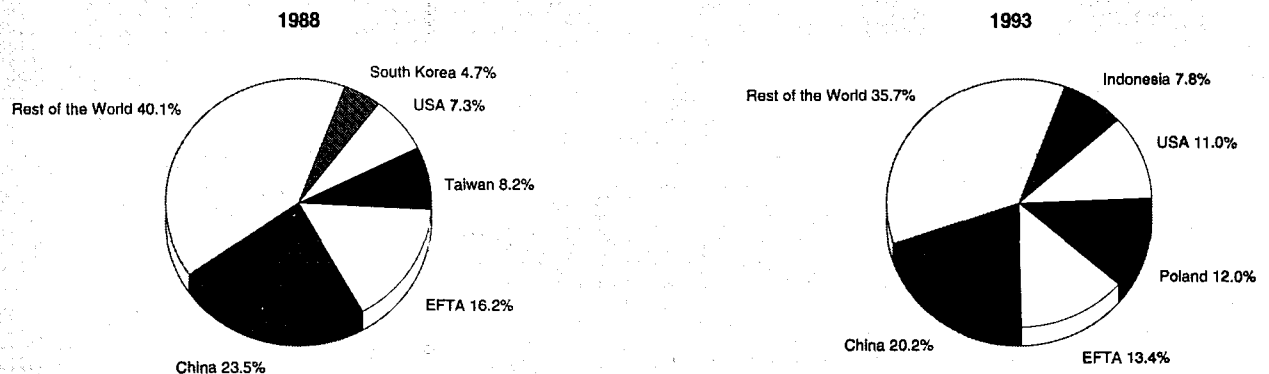
As intra-EU, as well as extra-EU, trade is increasing, there is a potential stimulus for sustained growth in the sector of transport-related packaging, such as wooden containers and pallets. During the early 1990s, however, demand for wooden containers was rather weak due to the slowdown in economic growth and international trade. Economic recovery had a sig-

nificant positive impact on production in 1994 (estimated growth was 7.0 % in current prices).

Wooden containers serve to facilitate the transportation or storage of various goods. This requires lightweight structures that are able to withstand rough handling. Standardised dimensions makes pallets highly suitable for repeated and different uses.

With the exception of industrial brushes, most brushes and brooms are sold to final consumers. Industrial brushes are sold by direct sales to industry customers. Personal hygiene products (toothbrushes and brushes for hair and make-up) are distributed by specialised retail chains, pharmacies and supermarkets. Paint brushes and rollers are mainly sold in DIY-stores. It is worth noting that large distributors may also import products directly from outside the EU. Wooden frames for photographs, paintings and mirrors are also mainly sold to consumers. These products are distributed by large outlets, such as department stores, as well as by small specialised businesses, e.g. photographers, art galleries and gift shops. Demand for bottle corks comes from producers of wine, champagne and beer. Cork is also used for insulation and, increasingly, for flooring.

**Figure 7: Other wood products  
Origin of EU imports**



Source: Eurostat

**Table 5: Other wood products**  
**External trade in brushes and brooms, 1993**

(million ECU)	Brooms	Toilet brushes	Fine hair brushes	Paint brushes/ rollers	Industrial brushes	Domestic brushes	Others
Extra-EU exports	8.7	78.1	24.0	26.5	30.0	36.9	36.2
Extra-EU imports	9.6	90.8	26.6	23.3	9.8	25.2	24.3
Trade balance	-0.9	-12.7	-2.6	3.2	20.2	11.7	12.0
Ratio exports / imports	0.9	0.9	0.9	1.1	3.0	1.5	1.5

Source: Eurostat

### Supply and competition

Since 1990, demand for wooden containers has weakened due to the general slowdown in economic growth and international trade, putting pressure on the supply side to lower profit margins. The economic recovery that began in 1994 is expected to improve this situation. In the subsectors included, internal EU competition remains limited. Foreign competition from extra-EU countries, however, is fierce in all product lines. The major extra-EU competitors are the low labour cost countries in the Far East and Eastern Europe. It is clear that lower labour costs are the main competitive advantage of these extra-EU competitors. They are also less burdened by costs for social benefits or environmental protection.

Because of the relatively low degree of complexity of the production process, it is difficult for EU producers to realise technological advantages. Even at the highest possible level of automation it is often difficult to compete with lower labour costs and distorted trade practices, such as dumping. The EU brushes and brooms sector has already been involved in anti-dumping procedures with respect to Chinese brushes several times.

Since 1990, there has been a steep rise in the imports of pallets from Eastern Europe (especially Poland, Hungary and the former Czechoslovakia) at low prices, that barely cover transportation costs. These imports are a serious threat to the survival of the EU pallets producers. In this case it is clear that European standardisation of pallet dimensions has stimulated extra-EU imports.

Most of the extra-EU imports of brushes and brooms come from China and Eastern Europe. China has what may be characterised as a "quasi-monopoly" in paint brushes. Imports of brushes from China and Eastern Europe have disrupted EU production on more than one occasion, e.g. when products have been offered at dumping prices (which has often occurred). EU industry is hoping that trade agreements with these countries, as well as certain structural changes in their home markets, will improve the situation.

Availability of raw materials often plays an important part as well. China has nearly a monopoly in pig hairs, which are used for fine paint brushes. Articles of straw, cork and other plaiting materials are mainly imported from South East Asia. Eastern Europe has large reserves of wood, suitable for the production of pallets.

Because of the relatively labour intensive production process, productivity growth is rather slow. Between 1990 and 1993, unit labour costs increased faster than labour productivity. Understandably, this had a negative effect on profitability, reflected in gross operating rates going down from 10.5 % to 9.4 % between 1988 and 1993.

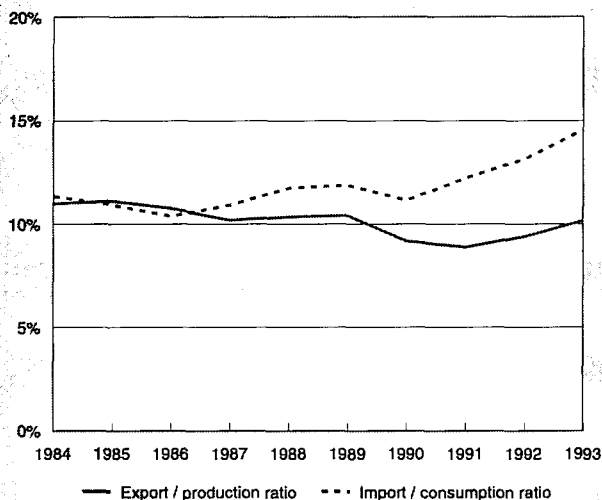
### Production process

Common raw materials used for the production of wooden containers and pallets are poplar and pine. The handles of brushes and brooms are mostly made of wood or plastic. Hairs for brushes can be made from synthetic fibres, animal hair (mainly pig hair) or plants (coconut fibre).

Although the production process is relatively non-complex, automation is possible. During the second half of the 1980s, the wooden containers sector made important investments in automation and rationalisation. Because of external competition, EU producers of brushes and brooms need to automate the production process to the greatest extent possible. Automation of production means acquiring high-performance machines that introduce the fibres, attach them to the frame and adjust the packaging material, all in one cycle. It enables toothbrushes, nail brushes, etc. to be produced in very large quantities. For these types of brushes, packaging and labelling are also performed by automated operations. The manufacture of paint brushes, particularly fine brushes, is less automated, although significant progress has been made.

Manual steps are still important part for certain operations (e.g. in the manufacture of paint brushes). In addition, automation has generated an increasing need for people with technical knowledge of machines and tools.

**Figure 8: Other wood products**  
**Trade intensities**



Source: DEBA

## INDUSTRY STRUCTURE

### Companies

Most companies in the other wood products sector are SMEs. The number of enterprises that employ more than 20 people is estimated at about 2 100, of which more than 800 are in the wooden containers sector. Among the subsectors, wooden

**Table 6: Other wood products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	76.9	81.5	82.7	85.8	92.7	96.8	100.0	101.6	103.1	105.5
Unit labour costs index (3)	90.3	92.8	96.0	96.4	94.5	94.1	100.0	104.4	107.9	107.6
Total unit costs index (4)	84.0	85.2	86.8	88.1	89.9	95.7	100.0	105.9	106.0	105.1
Gross operating rate (%) (5)	7.00	8.91	9.27	9.70	10.48	9.76	9.83	9.61	9.90	9.44

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Table 7: Other wood products**  
**Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.42	N/A
Danmark	0.90	N/A
BR Deutschland	1.15	1.09
Hellas	0.29	0.22
España	1.41	1.62
France	0.93	0.91
Ireland	N/A	N/A
Italia	0.95	0.94
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	N/A	5.86
United Kingdom	0.76	0.56

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

containers is the most capital-intensive. The average size of the manufacturer is also larger.

For most EU countries, production specialisation ratios are insignificant. The exception is Portugal, which has a production specialisation ratio of 5.86. Portugal is an important producer of cork and articles of cork.

### Strategies

The predominant strategy among the companies in the sector is to rationalise and automate the production process as much as possible in order to be able to meet the competition from non-EU countries with low labour costs. For the producers of wooden containers, specialisation in custom-made packaging products helps keep competition from low wage countries to a minimum as the latter mainly produce standardised products. Thanks to geographical proximity, EU producers are able to respond in a more flexible manner to the needs of their customers (e.g. special dimensions, just-in-time delivery). Producers of wooden containers, and pallets especially, are developing systems for recycling. This should provide them with a competitive advantage over producers of plastic and metal pallets.

### Impact of the Single Market

Among the effects of the Single Market of specific relevance to this sector, most concern the wooden containers and pallets sector (NACE 464). Among the measures to guarantee the free movement of goods, the elimination of internal border controls has been especially important in that it has stimulated intra-EU transport. The liberalisation of transport services has

been important for much the same reason and measures with regard to environmental protection are very important. The Directive on packaging and packaging waste will have positive effects for the industry as it allows incineration with energy recovery as an alternative to material recovery. Competition from outside the EU has increased significantly, as non-EU companies have found the increasingly uniform market of simple, standardised products, such as pallets, easier and more interesting to compete in. Since 1989-90 there has been a massive increase in imports of pallets from Eastern Europe, which has triggered EU producers to shift to higher value added products in response, such as customised packaging materials. Meanwhile, growing intra-EU trade has increased the demand for packaging materials which has helped to compensate the losses due to rising imports.

### REGULATIONS

In December 1994, the Council of the European Union finally reached an agreement on a Directive concerning packaging and packaging waste that will come into force in 1996. Indeed, work on the Directive only began after the German authorities had introduced a national regulation and France intended to do so as well. It aims at harmonising national measures concerning the management of packaging and packaging waste and sets five-year targets for achieving specified recycling rates for different materials. The Directive authorises energy recovery which is deemed to be the best solution for certain wood wastes.

### OUTLOOK

After a slowdown in 1992-93, production and consumption will grow again at a steady pace. It is expected that consumption will grow slightly faster (at an average annual growth rate of 7.6 % in 1995-97) than production (7.2 %). This means that the extra-EU imports share of consumption will continue to rise.

Therefore, increasing imports from low labour cost countries in the Far East and Eastern Europe constitute the main risk for the sector. European standardisation has certain advantages, but also poses the risk of facilitating increasing extra-EU imports (e.g. pallets). Opportunities for EU producers will come from specialisation in custom-made packaging and from developing systems for recycling (energy recovery, production of particle board, repeated use, etc.).

Written by: Cel-Bois

The industry is represented at the EU level by: European Confederation of Woodworking Industries (Cel-Bois). Address: rue Royale 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.







**Pulp, paper and board  
NACE 471**

Production volume in the pulp, paper and board sector reached 49.5 million tonnes in 1993. However, over-capacity and falling prices resulted in a 6.9 % decline in output value; paper production increased while pulp output fell. On a more optimistic note the EU's trade deficit fell for the fourth year running with strong exports; in particular, graphic paper grades. There was a sharp improvement in labour productivity for the third successive year, reflecting ongoing restructuring. Restructuring has also resulted in an improved environmental record, particularly increased recycling. In 1994, demand continued to recover and both prices and profits increased. Merger and acquisition activity also stepped up as restructuring continued. Prospects are good for the foreseeable future in the EU and export markets. Threats to growth include: currency instability; uncertainties about the timing of recovery in eastern Europe and the former Soviet Union; the ongoing costs of environmental measures; and uncertainty about the course of the business cycle beyond 1996.

**INDUSTRY PROFILE**

**Description of the sector**

The sector has three main product categories: pulp, paper and board. In Europe, paper and board is made mainly from waste paper and wood pulp, with a small proportion of fillers. The latter vary depending on the paper grade. "Market" pulp is wood pulp for papermaking sold in competition by producers on the open market. It excludes "integrated" pulp, used by the producing mill or by other mills owned or controlled by the same group in the same country. Market pulp does, however, include pulp shipped to affiliated firms in other countries. Paper and board includes products such as printing and writing paper, sanitary and household paper, wrapping and packaging paper and board, and various specialist grades.

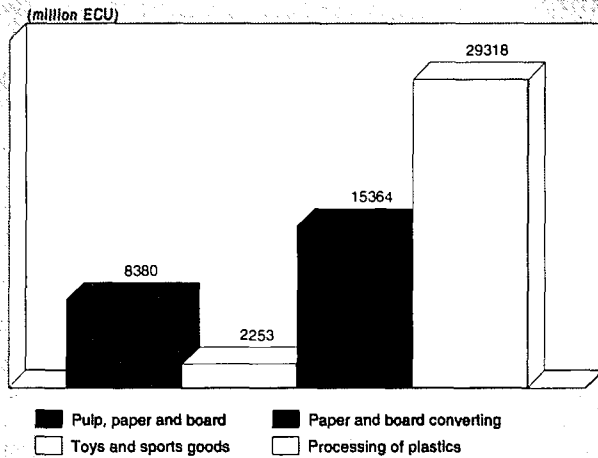
There are three main final uses for the sector's products: communications for printing, writing and drawing; packaging for transport, storage and presentation of goods; and various specialist applications, including hygienic and disposable paper (toilet, towels, nappies etc.), fiduciary paper (money, cheques), and technical uses (filter, photographic, insulation, wallpaper). In the EU-12, market pulp production is concentrated in Portugal, Spain, France and Germany, in that order. The extension of the EU in 1995 adds Sweden and Finland, both of whom have larger outputs than any other Member State.

Newsprint production is concentrated in Germany, France, the United Kingdom and the Netherlands. With EU accession, Sweden and Finland will head the list with Austria entering lower down. Printing and writing grades are produced mainly in Germany, France, Italy and the UK. Germany and France dominate the packaging grades market with Italy, Spain and the UK being strong contenders. Germany, France, the UK and Italy lead in household and sanitary papers output, with Italy being a net exporter. Sweden and Finland are also net exporters of these grades.

**Recent trends**

Industry output decreased by 1.1 % in 1993 to 49.5 million tonnes. However, a continuing fall in prices due to over-capacity resulted in a 6.9 % fall in the current value of pro-

**Figure 1: Pulp, paper and board  
Value added in comparison with related industries, 1993**

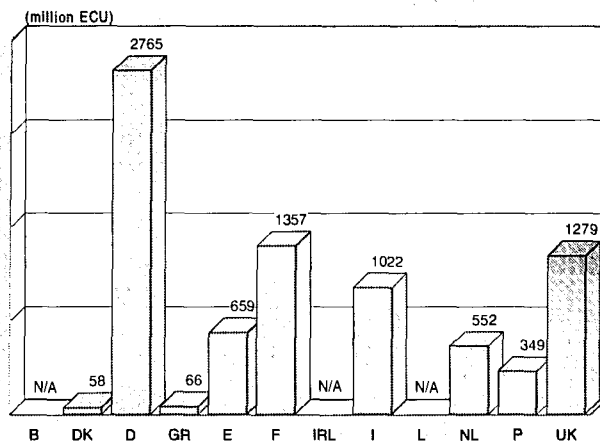


Source: DEBA

duction. Pulp output fell by 7.4 %, with both chemical and mechanical pulp contributing to the decline. Paper and board output, in contrast, increased by 0.5 %, with graphic paper output up by 2.1 %, and household and sanitary papers up by 1.6 %; however, output of other grades decreased by 1.1 %.

Relative to other industry sectors pulp, paper and board is modest in size. Value added in 1993 was 28 % of that of plastics processing but over three times that of toys and sports goods. Value added of the closely associated paper and board converting sector was 83 % higher. Germany is the main EU producer, followed by France, the United Kingdom and Italy. However, the enlargement of the EU will alter these rankings significantly and the relative importance of the sector. Based on 1993 tonnage, the inclusion of Sweden, Finland and Austria, would have increased the output of this EU sector by around 85 %.

**Figure 2: Pulp, paper and board  
Value added by Member State, 1993**



Source: DEBA



**Table 1: Pulp, paper and board  
Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	31 430	38 926	44 838	44 126	42 379	40 830	36 950	41 793	44 100	46 400	49 000
Production	22 645	27 853	30 856	30 596	29 569	28 955	26 965	29 653	31 300	32 800	34 600
Extra-EU exports	1 887	2 287	2 526	2 417	2 518	2 655	2 875	3 348	3 800	4 100	4 500
Trade balance	-8 785	-11 073	-13 982	-13 530	-12 810	-11 875	-9 985	-12 140	-12 800	-13 600	-14 400
Employment (thousands)	193.7	186.7	188.0	187.0	182.0	174.7	163.2	157.2	160.0	150.0	150.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Pulp, paper and board  
Main indicators in volume**

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Apparent consumption	54 903	54 283	57 461	60 478	64 625	67 104	68 976	70 351	73 502	71 726
Production	37 930	37 665	39 227	41 287	44 384	46 093	47 252	47 652	50 001	49 467
Extra-EU exports	9 710	10 193	10 983	12 219	13 854	14 646	15 670	16 352	17 523	17 509
Extra-EU imports	26 683	26 811	29 217	31 410	34 095	35 657	37 394	39 051	41 024	39 768

Source: CEPI

Recycling is important and increasing. Waste paper utilisation represented 56 % of total fibre furnished in 1993. Waste paper consumption increased by 619 000 tonnes while apparent pulp consumption fell by 1 817 000 tonnes. Waste paper recovery represented 41 % of total apparent domestic paper consumption in 1993 compared with 39 % in 1992.

The real value of production has shown little growth in recent years, averaging 0.6 % in 1989-93 compared to 3.9 % in 1984-1989 and 2.4 % per annum over the entire period. Preliminary data indicates a recovery in 1994 with production growth of 6.6 %. Output growth over the 1984-94 period, however, was more rapid than for the EU manufacturing industry as a whole. Nevertheless reflecting ongoing restructuring, the shake-out of jobs in the sector was more extreme than in most other industrial sectors. Employment has fallen by 19.7 % over 1984-1994, with accelerated job rationalisation during 1990-1994.

#### International comparison

In 1993, total EU pulp production (market plus integrated) was around 8.8 million tonnes and paper and board production was 41.0 million tonnes. In global terms, the combined figure of 49.8 million tonnes ranks behind that of the world leader, the USA, with 137.9 million tonnes. Canada and Japan follow with 40.4 and 38.4 million tonnes, respectively. The EU was the world's sixth largest pulp producer, but the second largest

paper producer after the USA. The addition of the three new EU Member States, at their 1993 levels of production, would have pushed up total EU production to 92.5 million tonnes, of which 34.0 million tonnes was pulp and 59.5 million tonnes paper, moving it in both cases to second ranking in the world after the USA.

In terms of rates of growth at constant prices, Japan's industry grew rapidly during 1984-1989, but suffered a severe cyclical setback in 1991, and was only just recovering in late 1994.

#### Foreign trade

The EU-12 has a substantial trade deficit in the pulp, paper and board sector. This deficit has, however, improved in recent years. Having climbed steadily in the late 1980s, the deficit fell from 14 billion ECU in 1989 to 10 billion ECU in 1993. Extra-EU exports increased by 8 % to 2.88 billion ECU in 1993, while imports decreased by 11 % to 12.9 billion ECU. The export/import ratio, which had fallen in the second half of the 1980s, increased in the early 1990s reaching a record .22 by 1993. Similarly, the extra-EU export/production ratio also reached a record 10.7 % in 1993, while import penetration fell.

Traditionally, EFTA countries have been the EU's main trading partners. In 1993 they received 25 % of EU export tonnage and provided 71 % of EU imports. The USA is the EU's second largest trading partner, receiving 14 % of export ton-

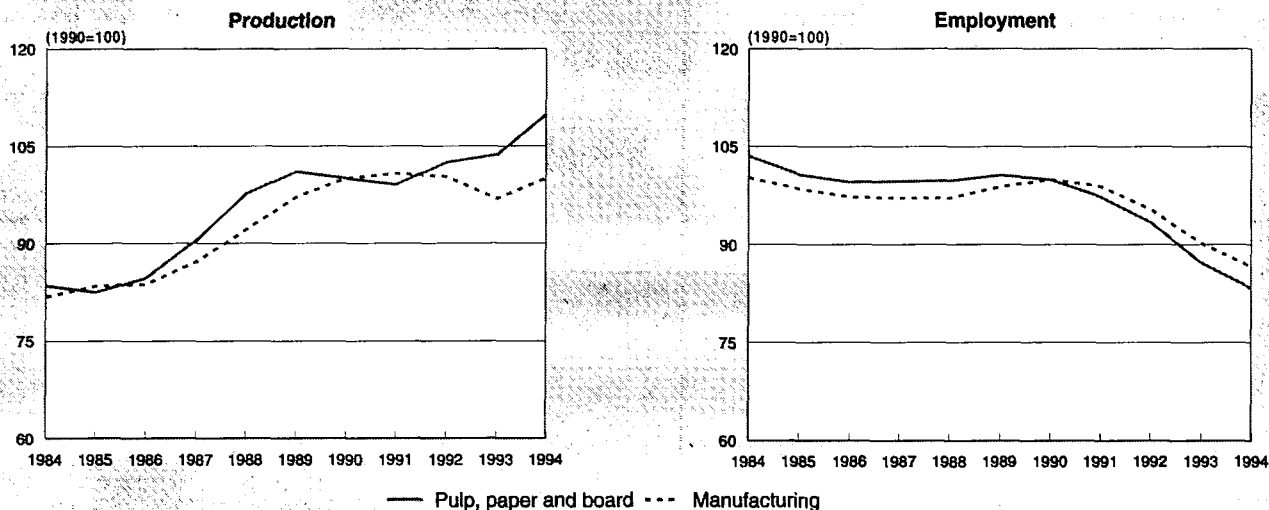
**Table 3: Pulp, paper and board  
Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.66	1.07	3.05	0.11
Production	3.89	0.64	2.43	1.11
Extra-EU exports	3.86	8.15	5.74	10.97
Extra-EU imports	6.18	3.08	4.79	0.15

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Figure 3: Pulp, paper and board**  
**Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
 Source: DEBA

nage and providing 9 % of imports. Canada provided a further 9 % of EU imports.

**MARKET FORCES**

**Demand**

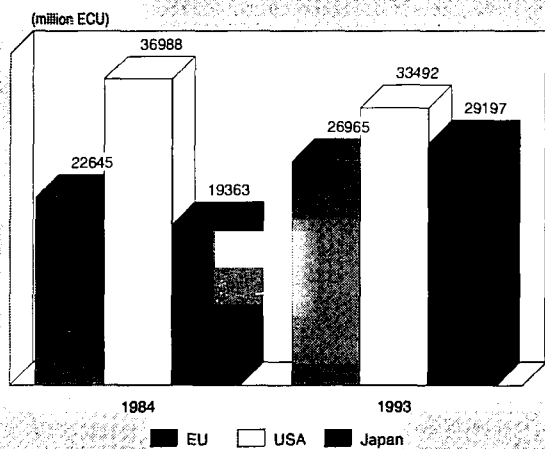
The market for pulp, paper and board products varies from intermediate industries to the final consumer. Pulp is largely an intermediate product, often sold within integrated companies but also to other firms. Customers for paper and board products vary from manufacturing industries (e.g. packaging) to retailers (e.g. toilet tissue). The diversity of markets also affects the susceptibility of the sector to the business cycle and other demand factors. For example, demand for packaging (which is also increasingly affected by environmental considerations) is relatively sensitive to economic developments, while demand for hygiene and sanitary products such as babies nappies is relatively immune.

Oversupply in 1993 and early 1994 supported the bargaining power of the main groups of customers, the paper and board converters, the printing and publishing sector and final consumers. The sector was under pressure from two directions: reduced revenues due to a continuing fall in prices in conjunction with a 1 % overall fall in domestic consumption of paper and board, and additional costs due to increasingly stringent voluntary and official environmental standards. In the second half of 1994, demand was growing and prices were rising, but environmental pressures remained severe.

**Newsprint**

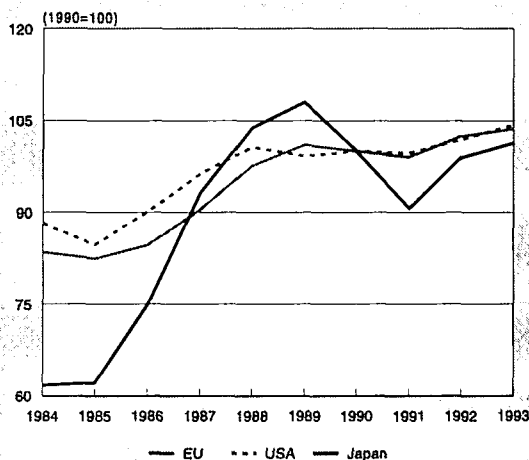
Newsprint is an uncoated graphic paper which can be lightly calendered and is largely made from waste paper and mechanical pulp. It is used in letterpress, flexographic, and offset printing. Consumption is directly related to printed advertising revenue. Low advertising expenditures in 1992 lowered demand for newsprint. However, in 1993, although prices remained depressed, there was a 3.5 % increase in consumption

**Figure 4: Pulp, paper and board**  
**International comparison of production in current prices**



Source: DEBA

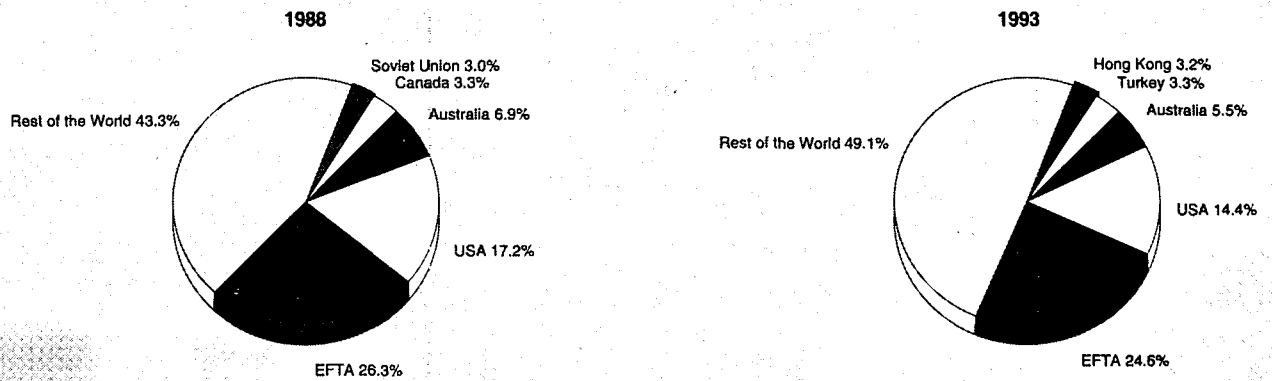
**Figure 5: Pulp, paper and board**  
**International comparison of production in constant prices**



Source: DEBA



**Figure 7: Pulp, paper and board  
Origin of EU imports**



Source: Eurostat

tonnage. As in the previous two years, additional domestic capacity in 1993 caused another significant reduction in net imports. Consequently, production grew by 10 % and was 25 % higher than 1989 levels.

#### Uncoated graphic paper

These grades include directory, heavily filled and super-calendered papers used in rotogravure and offset printing and in books and stationery of all kinds. Production of these grades declined by 0.5 % in 1993, but this was confined to the mechanical grades (i.e. in part containing mechanical pulp which has been produced by grinding, milling or related processes). Output of wood free grades (i.e. made from at least 90 % chemical pulp) continued growing. Production of the mechanical grades in 1993 was 13 % lower than in 1989, but 14 % higher for the wood free grades. Though production fell in 1993, apparent consumption for these grades as a whole increased by 2.3 % due to an increase in net imports following Nordic currency devaluation.

#### Coated graphic paper

Coated mechanical grades are used to print catalogues, magazines and advertising material, while coated chemical grades are used for high quality "glossy" printed products. Both con-

sumption and output of these grades increased by just over 2 % in 1993. Growth in domestic capacity kept growth of net imports in check. For 1993, production of these grades was 14 % higher than in 1989.

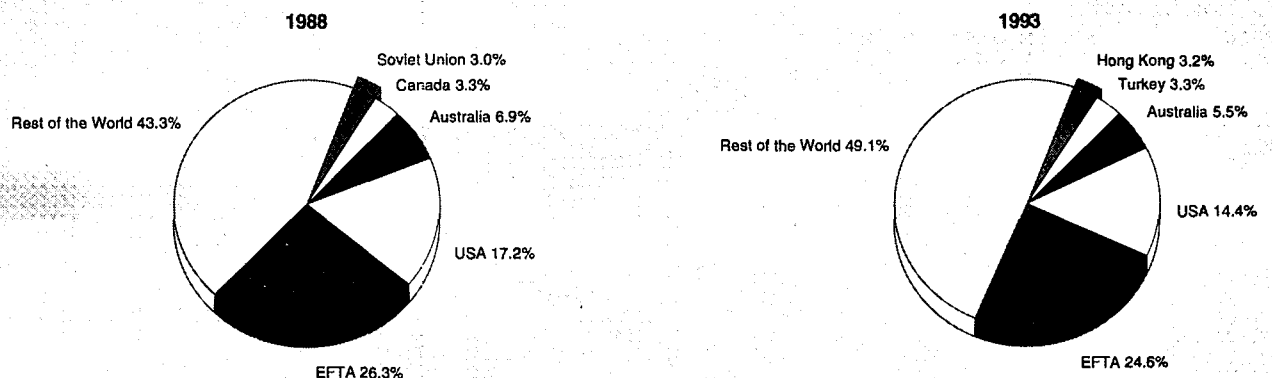
#### Hygienic and sanitary products

The main final products of these grades are hygienic paper and napkins and industrial wipes. In 1993, growth in tonnage of these grades slowed for the third year running to 4.0 % in production and 1.4 % in consumption due to a small fall in net imports. Nevertheless, output was still 19 % higher than in 1989.

#### Non-graphic grades

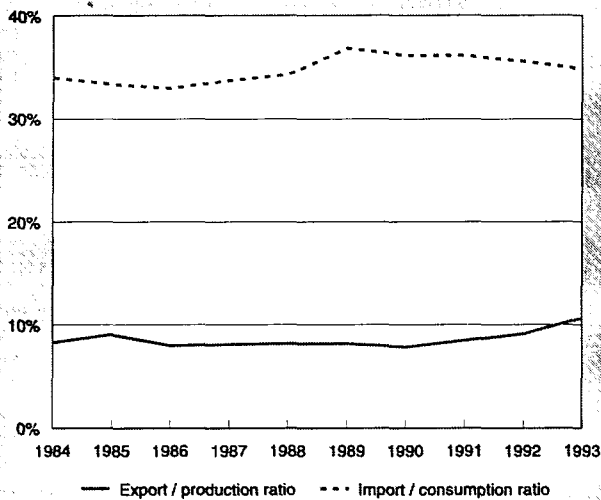
These include kraftliner and corrugated case materials, packaging paper, folding boxboard and greyboard. Kraftliner, used for the outer and inner lining of corrugated board, is produced mainly in France, Spain and Portugal with large imports from the Nordic countries and the USA. Apparent consumption of these grades in 1993 fell by 4.3 % while production decreased by only 1.1 %, cushioned by a fall in net imports. Production increased by 11.2 % for these grades between 1989 and 1993, but overall growth masks developments in different niches; output of specialist paper grades nearly doubled, case materials

**Figure 6: Pulp, paper and board  
Destination of EU exports**



Source: Eurostat

**Figure 8: Pulp, paper and board Trade intensities**



Source: DEBA

increased by 17.5 % and folding boxboard by 8.2 %, while output of wrappings and other boards fell by 19.3 % and 44.2 %, respectively.

## Supply and competition

### Paper and board

In 1993 over-capacity in the magazine paper grades and depressed prices in all grades were the industry's biggest problems. Capacity utilisation rates in the magazine grades were in the region of 85 % to 88 %. CEPI reports, for example, that the German paper industry was operating at a net loss in 1993. This squeeze on margins created considerable pressure to improve labour productivity. Between 1990 and 1993 labour productivity in the sector as a whole (including pulp) increased by nearly 18.8 % and unit costs fell by 11.3 %.

In 1994 demand improved and relatively little new capacity came on stream. CEPI estimates 1994 utilisation rates in the EU/EFTA regions of 88 % and 94 %, respectively, for SC (super calendered) magazine paper and coated mechanical reels, rising to 94 % for the former by 1995. The 1994 newsprint operating capacity rate is estimated at 95 %. Following an increase in pulp prices, paper prices in all grades increased sharply in the second half of 1994 and into 1995. While pulp prices in early 1995 were still marginally below their 1989 peak, the speed of the increase in price rises was dramatic, more than doubling since 1993. Production accelerated in response, increasing by 8.2 % in the first nine months of 1994. However, there is a risk of excessive stockpiling; although this could eventually stem paper and board price increases. Further pulp price increases will considerably penalise the non-integrated buyers of market pulp.

Over-capacity problems in 1992 and 1993 stemmed from a downturn in the North American and European business cycles when considerable capacity, both from large new machines and from upgraded machines, was coming on stream. This capacity had been planned and its foundations laid in the growth years of the late 1980s. In 1994 the situation has reversed. Only modest growth in capacity was planned but a continued rise in demand is likely in the short to medium term. Germany, the key EU market, plans no growth in overall capacity in magazine grades up to 1998. Finland, Sweden and Austria, however, are planning substantial increases, while other EU Member States plan only modest growth. In the case of newsprint, the United Kingdom and Germany plan

major expansions of their waste-based newsprint capacity and the Nordic countries and Austria plan smaller, but still significant, reductions in newsprint capacity.

Nordic companies benefited from profit recovery in 1993, via improved exports, following currency devaluation. EU-12 companies, however, did not begin to feel benefits from restructuring policies until the first half of 1994. But, more significant gains are expected in the second half when prices and revenues improve.

### Pulp

The European market is a net importer of pulp and, as such, is closely linked to the North American market, where the average mill is much larger. In 1993, EU/EFTA combined net imports of pulp were 4.6 million tonnes, contributing 12.6 % to apparent consumption. Of the region's gross imports of 6.1 million tonnes, two-thirds came from North America and most of the rest from growing sources in South America and East Europe. The weakness of the USD assisted North American exports.

As an internationally traded, standardised commodity produced in large scale production units (latest investments sometimes reaching 500 000 tonnes annual capacity), the inventory, investment and price cycles for market pulp are more pronounced than that for paper. Between mid-1989 and the end of 1993, the price of Canadian BSK pulp, the industry's prime grade, halved, with similar movements for its Nordic equivalents. However, the situation has virtually reversed with prices nearing 1989 levels in early 1995. This unstable situation is particularly damaging for non-integrated pulp buyers, of which there are many in Europe's relatively fragmented industry.

Recent price instability may, however, be about to end. Harvesting of lumber will rise in response to current price trends, which fell in recent years as a result of uneconomic prices. Furthermore, the FAO's 1994 capacity survey reported plans for only a 1.1 % per year increase in world pulp capacity from 1993 to 1998, with only 0.4 % per year in North America, and nil growth in the EU compared with 1.9 % for its Nordic suppliers. If this moderation persists, prices could possibly stabilise at profitable levels. This is essential if Europe is to improve the scale, efficiency and environmental cleanliness of its mills and reduce its dependence on outside sources. Since the FAO survey, however, new capacity plans have been upgraded. But again, as is the case for capacity plans in the newsprint, graphic and packaging grades, an increasingly coordinated pan-European industry strategy is emerging.

### International competition

International competitiveness of the EU paper industry is relatively good. It scores well on labour productivity vis-à-vis its competitors. EU companies have invested less in super-capacity and more in strategically flexible production techniques. This gives many EU companies an edge in dealing with the rapidly changing market conditions for various paper grades. The current rapid response of output to improving market conditions is an example of this. However, the concept of an industry delineated by the current geographical boundaries of the EU has been overtaken by events. Nearly two-thirds of the industry's capacity is owned by non-EU firms, primarily Swedish and Finnish companies. The accession of the new Member States in 1995 will remove yet another legal obstacle to pan-European strategies. EFTA's accession to the EEA in 1993 broadly meant that these groups had to conform to EU monopoly and merger rules, company law, and environmental, R&D and social policies. Full EU membership will extend this conformity to other areas such as agriculture, forestry, fisheries, energy, and transport; all of which are vital to the future of the pulp and paper sector.

Development of Europe wide economies of scale by the larger European paper groups is evident in ongoing restructuring.

**Table 4: Pulp, paper and board  
International comparison of production in volume**

(thousand tonnes)	1992	1993
<b>Production: Paper and board</b>		
EU	40 823	41 018
USA	82 958	84 957
Japan	28 310	27 762
Canada	16 598	17 534
Finland	9 130	9 966
Sweden	8 378	8 781
<b>Production: Pulp (market plus integrated)</b>		
EU	9 546	8 838
USA	63 960	52 908
Canada	22 653	22 896
Japan	11 200	10 593
Sweden	9 590	9 953
Finland	8 526	9 338

Source: CEPI, AF & PA, CPPA, JPA

A central objective is to specialise in core product grades for sale across national frontiers, rather than owning groups of small, nationally oriented production facilities with a high degree of product diversification. Merger, acquisition and divestment activities have been aimed at economies of scale to match those of world competitors. Some are concentrating on graphic grades, some on packaging grades, some on household and sanitary grades and yet others on niche markets for high value-added products. Some are acquiring and expanding trade networks for pan-European marketing of specialist grades and converted products. Yet others, particularly in the packaging and newsprint segments, are managing increasing proportions of their own waste paper supplies.

The USA paper industry began pulling out of recession in 1993, earlier than the Europeans. According to USA Bureau of the Census data, the net pre-tax profit margin of the industry fell to 1.5 % in 1992 from 11.4 % in 1988. In 1993, it had crept back to 3.4 % and in the first half of 1994 to 3.9 % on sales up by 4.7 %. Pulp & Paper Week's survey of 33 major companies reported a 22 % increase in turnover in the third quarter of 1994 over 1993 and more than doubling of post tax-earnings. The already cheap USD depreciated further contributing to a surge in USA exports.

CPPA (Canadian Paper and Pulp Association) data shows that the heavily indebted Canadian forestry industry recorded losses in 1991, 1992 and 1993. However, these were progressively improving due to improvements in the 'lumber and panels' sub-sector, which by 1993 made net earnings of 1.3 billion ECU, not quite offsetting the 1.4 billion ECU losses of the pulp and paper segment and other minor items. In the first half of 1994 there was a dramatic return to overall profits as the industry benefited from buoyant export markets in the

USA and overseas; particularly Europe, with the benefit of a cheap currency.

Japan is an inward-focused paper and board market because of its shortage of raw materials. It exports little and has high recycling levels. Its main influence on world markets is via imports of wood chips, pulp and waste paper. These have been depressed by deep recession and only by mid-1994 were there signs of a slow improvement. Japan's paper industry has a number of world class companies but profits have been low in recent years. Two major mergers in 1993 resulted in companies with a 10 % share (each) of Japanese paper and board output. This may signify the commencement of a major restructuring process.

The ASEAN and Chinese paper markets are the fastest growing in the world, with consumption outstripping rapid growth in production capacity. With the low value of the USD and European currency turmoil, North America has benefited most from growing Asian imports of pulp, waste paper, and paper and board. Lack of currency stability is a major problem for European exporters. Additional competition in the region also arises from Indonesia, which is actively developing a graphics paper capacity based on developing local pulpwood supplies. In Asian markets, the graphics and niche paper grades, in which Europe excels, offer the most promising export opportunities.

### Production process

Pulp, paper and board manufacturing has been traditionally linked to the forestry and wood processing sectors. With increasing use of waste paper, fillers and other materials, however, vertical integration above the pulping stage has been abandoned. Many of the major players are focusing on horizontal integration and drawing on a range of raw materials to produce a range of higher quality, specialised products within their chosen segment of the European and world markets, as well as forward integration into the converting sector.

Innovation, modernisation and increasing scale economies are an integral part of the development of new pan-European groups. Major investment is ongoing in two areas: environmental technologies aimed at reducing, and/or improving the environmental friendliness of emissions and effluents; and recycling technology, particularly in stock preparation. Considerable restructuring to obtain economies of scale has also occurred among the sector's machinery suppliers. Investment, labour and training costs associated with increasing demand for higher technical skills are high, resulting in many large companies increasing their financial gearing.

## INDUSTRY STRUCTURE

### Companies

Although concentration is increasing, by world standards the European pulp, paper and board industry is still relatively fragmented. Even when the new Member States are included, concentration remains low. Pulp & Paper International's list of the world's top 150 companies, based on 1993 financial data, included 41 North American companies with an average

**Table 5: Pulp, paper and board  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	1 887	2 120	1 871	2 032	2 287	2 526	2 417	2 518	2 655	2 875	3 348
Extra-EU imports	10 672	10 681	10 605	11 658	13 360	16 508	15 947	15 328	14 530	12 860	15 488
Trade balance	-8 785	-8 561	-8 734	-9 626	-11 073	-13 982	-13 530	-12 810	-11 875	-9 985	-12 140
Ratio exports / imports	0.18	0.20	0.18	0.17	0.17	0.15	0.15	0.16	0.18	0.22	0.22
Terms of trade index	102.5	109.7	109.8	104.1	102.5	99.1	100.0	106.4	108.2	119.4	N/A

Source: DEBA

**Table 6: Pulp, paper and board  
Production by subsector**

(thousand tonnes)	1983	1989	1993
Newsprint	1 530	2 771	3 476
Uncoated mechanical	2 028	2 174	1 899
Uncoated woodfree	4 174	4 930	5 622
Coated paper	3 939	6 500	7 417
Sanitary and household	1 793	2 369	2 827
Case materials	6 509	9 054	10 640
Folding boxboard	2 050	2 663	2 882
Wrappings	1 930	1 892	1 526
Other papers	764	1 055	1 740
Other boards	2 636	3 118	2 989
Total	27 353	36 526	41 018
Use of recovered paper	12 369	17 327	22 285

Source: CEPI

turnover for their pulp, paper and converting operations of 1.58 billion ECU, 64 European companies averaging turnover of 0.71 billion ECU and 31 Asian companies averaging 0.91 billion ECU. It also included four Australasian, two South African and eight Latin American companies. Of the 64 European companies listed by PPI, 39 are based in the EU-12 and 18 in the new Member States, averaging company turnover of 0.67 billion ECU and 0.97 billion ECU, respectively.

In 1993, the largest ten EU pulp and paper companies, measured by value of sales, were: KNP BT (NL); Arjo Wiggins Appleton (UK); PWA (D, acquired by Sweden's SCA at the beginning of 1995); Jefferson Smurfit Group (IRL); Jamont (B); Haindl (D); David S Smith (UK); Cellulose du Pin (F, acquired by Jefferson Smurfit in late 1994); Cartiere Burgo (I); and, Torraspapel (E). However, the picture is very different when companies in the new Member States are included: Stora (S); United Paper Mills (SF); Svenska Cellulosa (S); MoDo (S); and, Enso-Gutzeit (SF) join the current first five (including SCA-PWA) on the EU list. In addition, two Swedish, two Finnish and three Austrian companies join the rest of the above list. Most of these companies produce between one and six million tonnes of paper and board and are integrated forward into converting (some also into paper distribution). The largest have operations in two to 13 countries world-wide.

Only two European companies, KNP BT and Stora, were among the world's top ten paper and board companies in 1993. However, the 1994 purchase of Cellulose du Pin, Saint-Gobain's paper and packaging operations, by Jefferson Smurfit and of PWA by SCA in early 1995 now bring these into this league. Of the remaining world top ten in 1993 six were USA companies and two were Japanese. Typical of European companies are the fifty or so which produce between 100 000

and one million tonnes per year. However, the Finnish company Enso-Gutzeit would be included in the top ten (and JS and KNP BT excluded) if company size were measured by production capacity rather than value of sales.

Between 1983 and 1989 the number of paper and pulp mills in the EU increased, but between 1989 and 1993 there was a fall in numbers as the industry became more concentrated and average output and productivity of mills increased. Spain, Portugal and Italy, with their more fragmented industries, experienced the largest numerical falls. The United Kingdom, Belgium and Denmark also saw small falls in numbers. In contrast, the number of paper mills in Germany increased following unification, while France also saw a small increase in both the number of pulp and paper mills.

During 1984-1993, the effect of industrial concentration increased significantly the production specialisation index of the sector in France, the Netherlands and the United Kingdom and reduced that in Germany. More recently, European paper manufacturers have been involved in internal restructuring, with the recession in the early 1990s providing the catalyst. The emphasis was on disposing of peripheral operations and concentrating on "core" activities.

Acquisition activity in Europe has varied with the availability of finance and swings in the business cycle. Many companies are highly geared and finance has been difficult to obtain. Over the last three years, however, and particularly in 1994, acquisitions picked up. Important deals have included:

- the creation of KNP BT (NL) in 1993 followed in 1994 by the creation of KNP Leycam (A) a major coated paper producer;

**Table 7: Pulp, paper and board  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.6	81.9	85.1	90.8	97.8	100.5	100.0	101.8	109.7	118.8
Unit labour costs index (3)	88.3	93.4	94.9	93.8	92.1	93.8	100.0	106.6	103.9	95.7
Total unit costs index (4)	93.1	95.5	90.3	90.1	93.3	100.3	100.0	99.4	96.5	88.7
Gross operating rate (%) (5)	10.5	11.2	14.5	14.0	14.6	13.8	13.1	12.0	9.4	11.3

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Table 8: Pulp, paper and board  
Number of mills by Member State**

(units)	1983		1989		1993	
	Pulp	Paper	Pulp	Paper	Pulp	Paper
Belgique/België	3	15	3	14	2	12
Danmark	1	6	1	6	1	4
BR Deutschland	37	206	34	174	31	209
España	N/A	N/A	20	167	16	140
France	24	165	20	146	21	151
Italia	23	253	19	227	16	213
Nederland	2	35	2	32	2	32
Portugal	N/A	N/A	8	90	8	75
United Kingdom	3	94	8	91	4	88

Source: CEPI

- the acquisition by Jefferson Smurfit (IRL) of Saint-Gobain interests and later of a 27.5 % stake in Nettingsdorfer (A); and
- SCA's purchase of a 60 % controlling stake in PWA (D) at the beginning of 1995 to create Europe's largest paper company.

More modest acquisitions include: AssiDöman (S) of NcB (S) and later of MoDo Packaging (S); Sappi (South Africa) of Hannover Papier (D); and, Enso-Gutzeit (SF) of Tampella's (SF) pulp and papermaking operations and later of 35 % of Veitsiluoto Oy (SF). Modest investment in Europe continues to be made by North American companies, while Sappi and Amcor (Australia) have also appeared on the European scene in their general world-wide expansion.

According to PPI data, average capacity of the 1 039 EU paper mills in 1993 was 46 000 t/y, compared with 205 000 t/y for the 112 Nordic mills and 155 000 t/y for the 659 North American mills. Many of the European mills are non-integrated and, clearly, further restructuring could involve shutdowns of uneconomic units. However, further restructuring would not necessarily entail scale expansion of remaining mills. In many market niches the industry needs small, flexible production units which are close to their markets. In addition, the financial risk associated with large production units producing a limited range of products is often daunting.

### Impact of the Single Market

The Single European Market (SEM) Programme has had a highly positive effect in this sector, dramatically accelerating the restructuring process, increasing sales, productivity and competition especially in price. The free movement of goods and the EU's competition policy have been important in this respect, leading to a substantial increase in intra-EU trade, as have the measures related to the free movement of capital and to the energy sector. The SEM has boosted merger and acquisition activity, resulting in increased concentration on the one hand and more specialisation in niche products on the other. Distortions based on different national environmental policies is seen as an issue to be addressed in the future. Other remaining barriers which need to be addressed relate to technical harmonisation issues and prevention of intermittent bouts of currency instability.

### REGIONAL DISTRIBUTION

Increased recycling is having profound effects on regional location within the industry. New plants and expansions of existing enterprises are increasingly located near waste paper supplies in major conurbations. However, this trend varies according to grade. It is particularly true for the new large scale, waste-based newsprint plants in Germany, France and

Benelux, while the traditional Nordic suppliers are importing increasing quantities of waste paper to satisfy end-user demand for increased recycled content. Packaging grades have always been intensively recycled so relocation is less apparent; although recycling demand is putting pressure on Nordic supplies of the virgin pulp-based grades. Hygienic papers are affected in a similar way to the packaging grades with Nordic and Italian exporters feeling the pinch. Recycling in the remaining graphic grades is less developed but is increasing and eventually similar trends towards relocation may emerge.

Regional relocation trends are being assisted by the progressive integration of the industry across national boundaries and are a further counter-development to large scale mills serving Europe as a whole.

### ENVIRONMENT

Although the industry was among the first to acknowledge the importance of monitoring the environmental side-effects of its production processes and has always recycled high proportions of its output, it has become the target of several hard hitting protest campaigns. These campaigns have focused on four main issues: the quantity of forest wood used in paper production; the high and growing consumption of paper; the proportion of paper which is recycled; and the use of chlorine and its compounds for bleaching pulp and paper to high levels of brightness.

In response to these pressures and growing consumer awareness, the industry has a strong case to present. First, unlike other resource-based industries, it is one of the few which regenerates its own raw materials, employing sustainable forests and actually increasing afforested areas in Europe. Second, in 1994 the EU and EFTA already recycled 42 % of their paper consumption, a proportion they have been stepping up annually. Third, EU countries are increasingly accepting incineration with energy recovery as an effective means of disposal of poorer quality wastes which are costly to recycle, including various contaminated and mixed waste paper grades. Finally, the industry has phased out elemental chlorine in favour of chlorine dioxide, producing "elemental chlorine-free" (ECF) products. However, "totally chlorine-free" (TCF) bleaching is now being phased in, albeit with controversy about the best method to use. A major Swedish supplier is predicting that by 1996 the market share of TCF for printing papers will reach 60-70 % in the Germanic-speaking countries (in 1993 it was 37 %) and their Nordic suppliers (in 1993 it was 37 %), but only 6-10 % in all other European countries.

### REGULATIONS

There is a growing amount of legislation at national and EU levels aimed at the sector, mainly prompted by environmental



**Table 9: Pulp, paper and board  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	1.24	N/A
Danmark	0.68	0.38
BR Deutschland	1.04	0.92
Hellas	1.02	1.06
España	1.30	1.25
France	0.88	1.01
Irland	N/A	N/A
Italia	1.07	0.92
Luxembourg	0.00	0.00
Nederland	0.88	1.19
Portugal	3.28	3.26
United Kingdom	0.81	0.95

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

considerations. It is largely aimed at cleaner production processes and at reducing the volume of packaging and paper consumption, while placing responsibility for recovering and recycling waste on industrial producers and on users of packaging. National legislation includes Germany's strict Packaging Ordinance, together with similar legislation in France, Belgium and the Netherlands. Other EU countries, notably the United Kingdom, are about to introduce similar measures. Variations in the timing of introduction and the relative strength of this legislation from country to country distorts trade flows. The initial effect of the German Ordinance, for example, was to flood the European market with waste paper, pushing prices down to negative levels for the lower grades in 1993; although demand recovery in 1994 has corrected this.

Harmonisation of this type of legislation at the EU level to reduce such distortions is supported by the paper industry. After several disputed drafts, the EU Packaging and Packaging Waste Directive was approved by the European Parliament and adopted by the Council of Ministers at the end of 1994, following rewording to allow for Belgium's concern that its postponed Eco-tax on packaging was endangered. The Directive sets a five-year target obliging members to recover between 50 % and 65 % of waste packaging, and between 25 % and 45 % must be recycled leaving room for other disposal methods such as composting and incineration. These ranges allow for national variations in the progress of waste legislation. Some countries, however, feel the measure is not stringent enough to achieve an acceptable level of harmonisation; while others feel it does not go far enough to reduce the distortions caused by the stringent legislation of their neighbours. International competition, however, is forcing industry in countries with less advanced environmental legislation to adopt the standards of stricter countries.

The paper industry also supports the objectives of the regulation for a Community Ecolabel Award Scheme (i.e. to promote products with a reduced environmental impact during their life cycle and to provide consumers with information on their environmental impact), but is profoundly concerned with the initial operation of the regulation in the case of toilet tissue and kitchen towels. It considers that the criteria recently established for labelling these products may mislead consumers and will exclude many environmentally sound products.

As an industry with a small number of major players, the EU competition authorities keep a watchful eye on proceedings. Major mergers are scrutinised and participants asked to divest subsidiary interests where deemed appropriate. Price fixing is also an issue. Cartonboard producers were fined for alleged price fixing. This is a constant issue in that prices are liable to rise across the industry at roughly the same time as each company faces similar supply conditions and takes principal raw material prices as given on world markets.

## OUTLOOK

The accession of Sweden and Finland, and to a lesser extent Austria, has substantially altered the profile of the EU paper industry. However, companies in these countries have been expanding into the EU in readiness for membership and from a strategic perspective company objectives and policies remain largely unaffected.

Domestic demand and prices for the industry's products are rapidly increasing and there are prospects for more stable employment and improved profits until at least 1996. Economic recovery in North America and the Pacific areas is also providing opportunities for the industry's exports. It is anticipated that net exports will increase rapidly to 1997, averaging around 10 % per annum from 1995 to 1997. Consumption is expected to increase at around 5 % per annum over 1995-97, slightly ahead of production.

Continued restructuring and an acceleration in industrial concentration seems likely. Investment caution, however, should continue to underpin the recovery and, now that prices are reaching viable levels, any further price increases will be more moderate.

The industry, however, faces four long term problems: currency instability, which is restricting its ability to compete in growing markets in developing countries, as well as in its own domestic markets; uncertainty about the timing and recovery potential of the former Soviet Union states and Eastern Europe and, to a lesser degree, Central Europe; the ongoing cost of environmental measures; and uncertainty about the future course of the business cycle beyond 1996.

Written by: Fitzpatrick Associates

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# Paper and board converting

## NACE 472

The paper and board converting sector is strongly influenced by the general health of the economy. It is highly dependent on domestic demand and the sector's external trade balance is small. Packaging products make up about 60 % of its total output, whilst hygienic products, stationery and office supplies constitute the rest. The sector is also highly influenced by supply and capacity conditions in the pulp, paper and board industry, its main source of input materials. In response to general economic trends, the growth in both production value and volume in the converting sector slowed down in 1992, fell in 1993 and began to recover in 1994. In response to the sector's increasing demand for the main input materials, paper and board prices rose rapidly in 1994. The industry is fragmented in terms of ownership and regional distribution of its operating units, although there has been a considerable acceleration of mergers and acquisitions, and forward integration into converting, by the major paper and board manufacturers. Prospects are for increasing production, profits and employment in the sector. The sector's main concerns are the costs of participation in the various national waste management initiatives, how to benefit from increasingly pan-European product marketing, to reduce costs, profitably tap the potential of Eastern European markets, and the uncertainty about the future course of the business cycle in 1997 and beyond.

### INDUSTRY PROFILE

#### Description of the sector

The paper and board converting sector covers all processing of paper and board for their final applications in packaging, communications and other special uses. The sector manufactures a wide variety of products including packaging (often in combination with plastics and metal foils), stationery and office supplies, hygienic products, wallpaper, labels and many more such products.

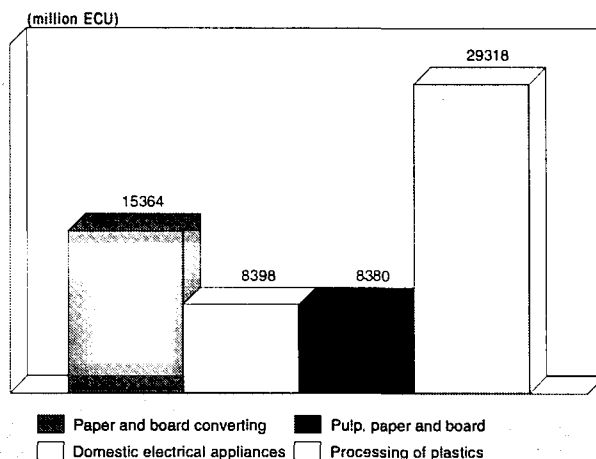
There is considerable overlap between this sector and paper and board manufacturing. Increasingly, the major European paper producers are integrating forward along the production and distribution chain and becoming active in both the paper production and converting markets.

#### Recent trends

The volume and production value in the sector increased steadily in the EU during the 1986-91 period but slowed down in 1992, fell in 1993 but recovered in 1994. Input prices fell sharply in response to falling demand in 1992 and 1993. A reversal of this was evident in 1994 and there was a sharp increase in paper and board prices, increases which are being passed on in converted products, particularly in the packaging segment.

The EU external trade balance of the sector, although mainly positive, has always been small compared to other large industries. In 1992 and 1993, there was a significant improvement in the trade balance, in contrast to reductions in previous years due to increasing imports. Between 1990 and 1993, extra-EU exports rose by between 5.4 % and 6.2 % per year, whilst imports fell by 0.5 % in 1992 and 0.6 % in 1993. Around 75 % of total EU trade flows are within the EU. With the accession of Austria, Finland and Sweden to the EU, this proportion will rise substantially in 1995.

Figure 1: Paper and board converting  
Value added in comparison with related industries, 1993

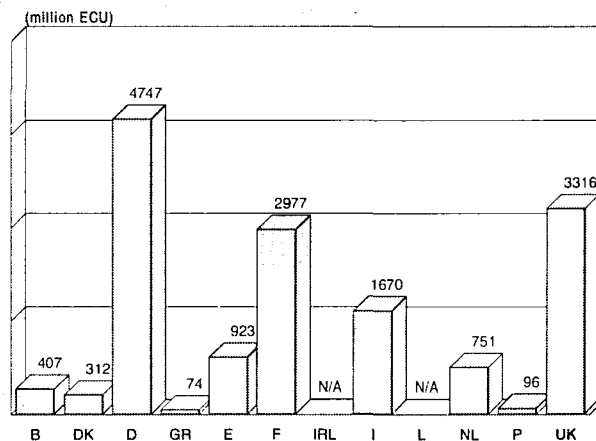


Source: DEBA

Paper and board converting is a major contributor to overall industrial activity. In 1993, its value added was 83 % higher than that of the pulp, paper and board industry, the main source of its input materials. The largest producer in the EU is Germany, with 4.7 billion ECU in value added in 1993, followed closely by the UK (3.3 billion ECU), France (3.0 billion ECU), and Italy (1.7 billion ECU). For the nine EU countries for which data are available for 1993, the converting sector's total added value was 1.7 times that of the supplying sector. For the four largest countries the corresponding figures were: the UK 2.6 times, France 2.2, Germany 1.7 and Italy 1.6. For the smaller countries the figures were: Denmark 5.4, Spain and the Netherlands 1.4, Greece 1.8 and Portugal 0.3.

From 1984 to 1993, production in the sector measured in constant (1990) prices, grew more rapidly than in EU manufacturing industry as a whole, by 3.5 % and 1.9 %, respectively, but showed a similar cyclical pattern. The upturn in 1994 was slightly delayed, however, at 2.8 % for the sector compared to 3.3 % for EU manufacturing industry. The cy-

Figure 2: Paper and board converting  
Value added by Member State, 1993



Source: DEBA

**Table 1: Paper and board converting**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	27 553	36 097	39 847	44 078	46 950	47 314	45 565	47 172	50 600	54 000	57 900
Production	28 190	36 529	40 348	44 477	47 223	47 797	46 332	48 141	51 700	55 200	59 100
Extra-EU exports	2 008	2 519	2 873	3 011	3 172	3 368	3 634	4 217	4 700	5 100	5 600
Trade balance	636.2	431.7	501.2	399.0	272.7	483.1	766.3	968.7	1 100.0	1 200.0	1 200.0
Employment (thousands)	386.0	389.2	399.6	406.1	411.5	402.9	382.7	376.0	380.0	380.0	390.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Paper and board converting**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.33	2.62	3.57	-1.03
Production	4.19	2.67	3.51	-0.53
Extra-EU exports	4.27	5.89	4.99	7.45
Extra-EU imports	7.05	5.71	6.45	0.72

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Paper and board converting**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	2 008	2 247	2 205	2 231	2 519	2 873	3 011	3 172	3 368	3 634	4 217
Extra-EU imports	1 372	1 490	1 568	1 762	2 088	2 372	2 612	2 899	2 885	2 867	3 248
Trade balance	636	756	637	469	432	501	399	273	483	766	969
Ratio exports / imports	1.46	1.51	1.41	1.27	1.21	1.21	1.15	1.09	1.17	1.27	1.30
Terms of trade index	106.4	105.7	107.1	106.2	103.6	100.4	100.0	101.7	102.6	104.3	N/A

Source: DEBA

**Table 4: Paper and board converting**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	80.0	83.1	86.2	88.8	93.5	94.9	100.0	102.0	105.2	110.1
Unit labour costs index (3)	89.2	92.1	92.1	93.1	94.5	97.8	100.0	105.3	107.0	103.0
Total unit costs index (4)	84.8	88.4	86.3	87.8	91.9	97.7	100.0	103.2	102.1	98.7
Gross operating rate (%) (5)	9.44	9.82	11.48	10.78	10.16	9.35	9.88	9.61	10.62	9.92

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

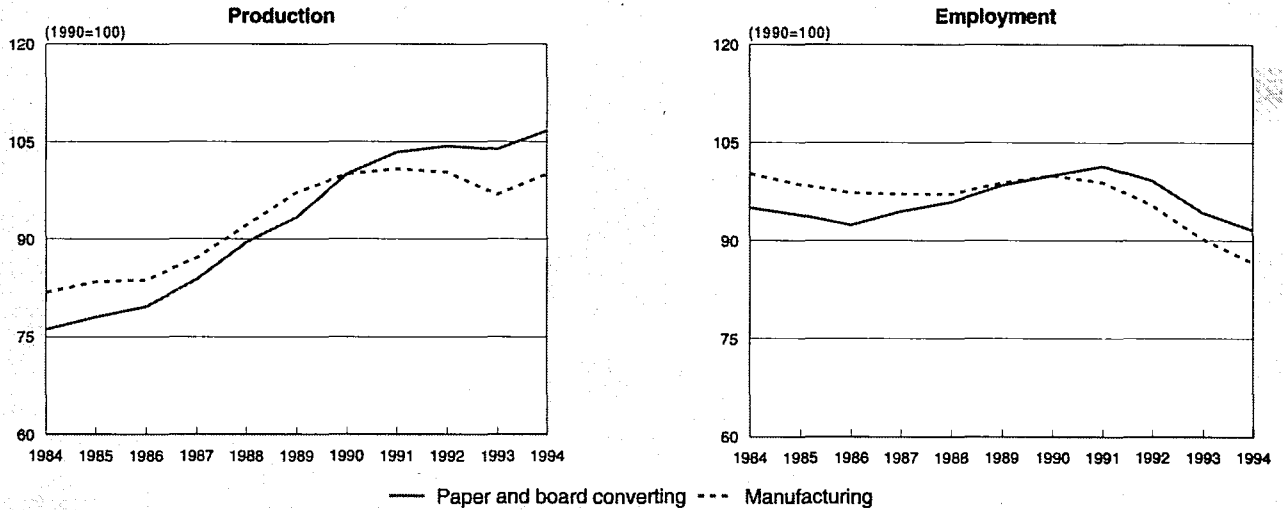
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3: Paper and board converting  
Production and employment compared to EU total manufacturing industry**



1994 are Eurostat estimates.  
Source: DEBA

clical pattern of employment was much more pronounced for the sector than for all EU industry.

Whilst employment in the sector in 1994 was lower than at any time in the previous ten years, this reflected sharp falls since 1991 rather than a gradual decline over the last decade. Employment rose continuously, by 36 000, over the 1986-91 period, but fell by 39 000 over the following three years. Rising labour costs throughout the late 1980s and into the early 1990s is likely to have contributed to the recent decline in employment.

Average growth rates in consumption and production during the 1984-93 period were 3.6 % and 3.5 %, respectively. Both grew much faster during the first five years of the period, by 4.3 % and 4.2 %, respectively, compared to 2.6 % and 2.7 % in the last four years.

Extra-EU exports grew at an average annual rate of 5.0 % in the nine years from 1984 to 1993, but at a higher rate in

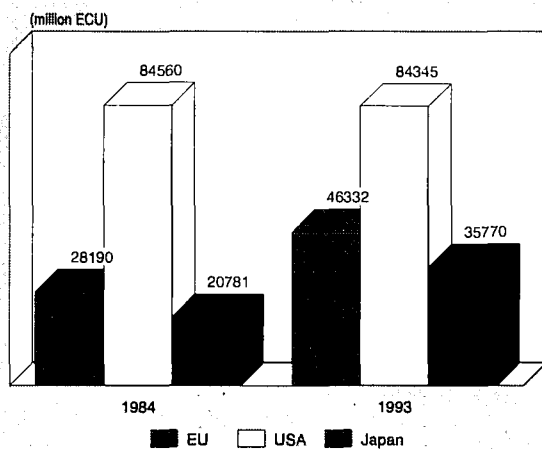
the latter four years of this period (+5.9 %). Extra-EU imports grew at an annual average of 6.5 %, but in this case at a higher rate in the first half of the period (+7.1 %).

**International comparison**

Because of the wide range of activities and product groups which the sector includes, it is difficult to make simple comparisons between the EU's paper and board converting sector and those in the Nordic countries, North America and Asia. In current prices, however, the value of EU output in the paper and board converting sector in 1993 was 55 % of that of the USA and 30 % higher than that of Japan.

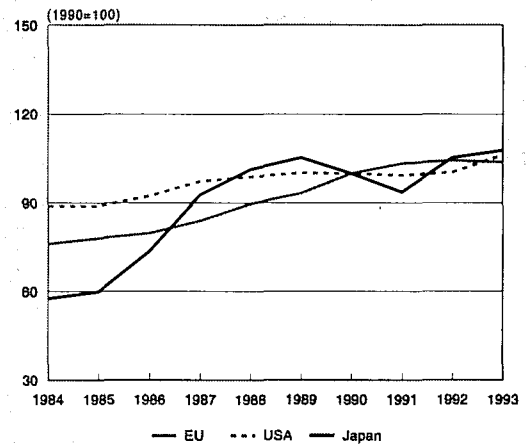
The prosperity of the sector in all three regions is closely related to the economy as a whole and in the 1984-93 period the real rate of output growth in the sector in the EU was 3.5 % per year, compared with 7.2 % in Japan and only 2.0 % in the USA.

**Figure 4: Paper and board converting  
International comparison of production in current prices**



Source: DEBA

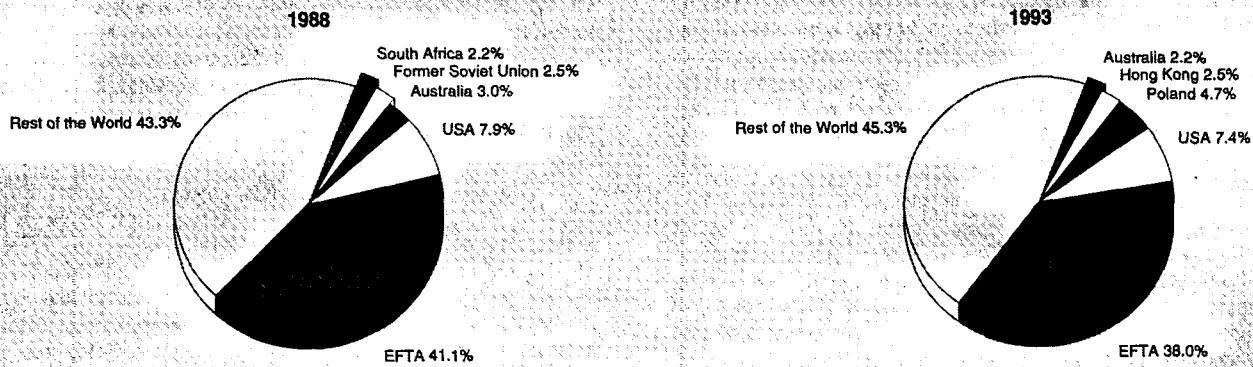
**Figure 5: Paper and board converting  
International comparison of production in constant prices**



Source: DEBA



**Figure 6: Paper and board converting  
Destination of EU exports**



Source: Eurostat

The recession, however, hit Japan's growth rate far more severely than the other two regions. Recession also affected the EU a year later than in Japan and the USA: in the latter country output rose rapidly (+5.9 %) in 1993, whereas it fell slightly in the EU (-0.5 %) and rose modestly in Japan (+2.5 %).

### Foreign trade

Extra-EU trade in converted paper and board products is limited but has grown rapidly from a small base, particularly in the 1984-91 period. For many packaging materials, in particular corrugated cases, the volume/weight and value/weight ratios make transport over long distances uneconomic. For hygienic products, labels, stationery and office supplies, the higher value/weight ratio makes long distance trade more profitable and larger volumes of these are products exported, e.g. to markets in Asia and South America.

In general, however, production in the sector is located as close as possible to the market in order to minimise costs. In 1993, the exports to production ratio, and imports to consumption ratio, were 7.8 % and 6.3 %, respectively. Whilst the former fluctuated around 7 % in the 1984-92 period, the latter increased slowly from just below 5 % in 1984 to over

6 % in 1992. In 1993, the exports to production ratio rose faster than imports to consumption.

The main trading partners are the EFTA countries, which reflects the importance of geographical proximity. They accounted for 38 % of EU exports and 67 % of imports in 1993. The USA was the destination of only 7 % of EU exports and the origin of 14 % of imports. A significant 55 % of exports went outside EFTA and the USA, particularly to developing countries. Paper and board companies are also increasingly looking to Eastern Europe as a potential market.

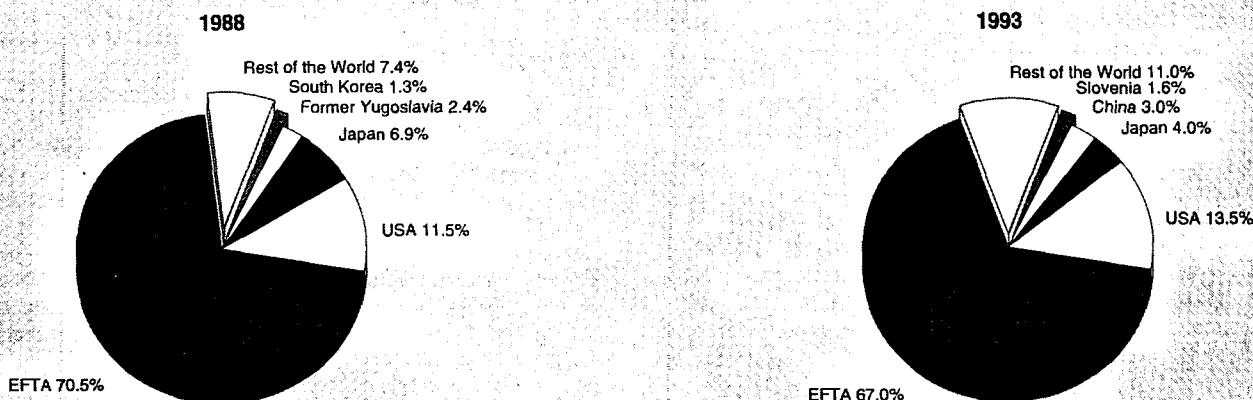
Exports to Poland, Hungary and the countries which constituted the former Soviet Union are growing. In particular, the Kaliningrad free trade zone provides an important trade link facility for EU-based paper and board converters expanding their markets eastwards.

### MARKET FORCES

#### Demand

Packaging products, including corrugated and solid fibre board, folding and rigid board boxes and containers, paper packaging and carrier bags and other wrappings for consumer products, accounted for about 60 % of the value of the in-

**Figure 7: Paper and board converting  
Origin of EU imports**



Source: Eurostat

dustry's output in 1993. The downturn in overall demand for these products in 1992 and 1993 coincided with a sharp increase in packaging waste management throughout Europe, augmented by legislation in many countries. At the same time, the resolute growth of container transport continued to take its toll on demand for secondary packaging, whilst competition from rigid and flexible plastics packaging continued to increase. Both prices and volumes fell for most packaging products. In general, demand for bags, sacks and packaging papers suffered more than that for board products. Within the latter, folding box board did less well than case materials.

Following the Packaging Ordinance, German production of paper and board packaging fell by around 8 % in value and 3 % in weight between 1991 and 1993, affecting all types of converted packaging products. In 1993, French production fell by around 1 % in value, but waste management legislation in France only began to be implemented in 1993. 1994, and particularly the second half of the year, saw a considerable recovery in demand and in prices of paper and board packaging, particularly in the northern Member States.

Household and hygienic paper goods is the second largest segment of production in the sector. Demand for high-quality products used in nursing, baby care and feminine hygiene has grown rapidly in the past two decades, as has that for lower value added products, such as toilet paper, kitchen towels and handkerchiefs. The market was already reaching saturation levels by 1992, particularly in northern Europe, so the recession struck a blow to overall demand which fell by 3.7 % in 1993. 1994 saw a modest improvement in demand although strong competition held down prices of disposable sanitary goods. However, per capita consumption of most of these products in the EU is on average lower than that in the USA and growth in demand is expected to be concentrated more to Southern Europe.

Stationery and office supplies is the third largest segment of production. It includes envelopes, labels, printing and copying paper and products for special applications such as facsimile and photographic papers, note books, binders and file covers. The developing information technology (I.T.) has shifted the emphasis in demand from education and mail-related stationery such as envelopes, note books, ruled papers and ledgers, towards I.T.-related stationery such as facsimile, computer, label and photocopying papers. The growth in overall demand for office supplies, is slowly but steadily increasing as I.T. spreads

to smaller businesses and to private consumers. Whilst 1993 saw a limited slowdown in sales of these products, sales growth and rising prices were resumed in 1994.

### Supply and competition

During the recession in 1992 and 1993, lower prices for input materials were more than offset by increased costs of labour, transport, energy and investment financing. These effects were combined with final prices that were brought down by the bargaining power of the sector's customers, including the food and consumer products processors and above all the increasingly integrated major retail chains. The spread of pan-European product marketing by these integrated distributors, together with signs of increasing co-operation between the major players, has stimulated lower prices, especially for medium-sized and smaller, non-integrated paper and board converters. Similarly, part of the benefits of the recovery in demand in 1994 were eroded by rising input material prices which were extremely difficult to pass on to the powerful customers.

One reaction to such price pressure is the integration of the industry's customers backwards into paper and board converting. The most common trend has been forward integration of paper and board manufacturers into converting and sometimes into distribution. These merged companies have been building their own pan-European chains with operations in the proximity of as many of Europe's major urban markets as possible. In the packaging converting segment, many of these developing groups are headquartered in the Nordic countries and have had a significant positive impact on the productivity of EU-based industry. The accession of Finland and Sweden to the EU will give a further boost to the development of these groups. The hygienic products segment is dominated by several North American groups including Scott Paper Corporation, Kimberly-Clark, and Proctor & Gamble, which have brought a vigorous consumer-oriented marketing approach to this segment. The recent merger of Sweden's SCA with PWA (D) is an important competitive move in the segment. In the office supplies sector, the two major companies are KNP BT (NL) and Arjo Wiggins Appleton (UK), both of which have distribution networks that are developing, as well as converting operations.

### Production process

In many areas, and particularly in the conversion of packaging materials, the sector is integrated backwards into paper and board production, but as a whole it still remains an industry of small and medium-sized firms with a variety of different production processes. However, the increasing concentration of groups of production units under the ownership of prominent paper and board manufacturing groups is boosting productivity in the sector generally. Concentration is providing firms with benefits which include access to large investment funds, interchange of technology and know-how, guaranteed input material supplies and joint product marketing.

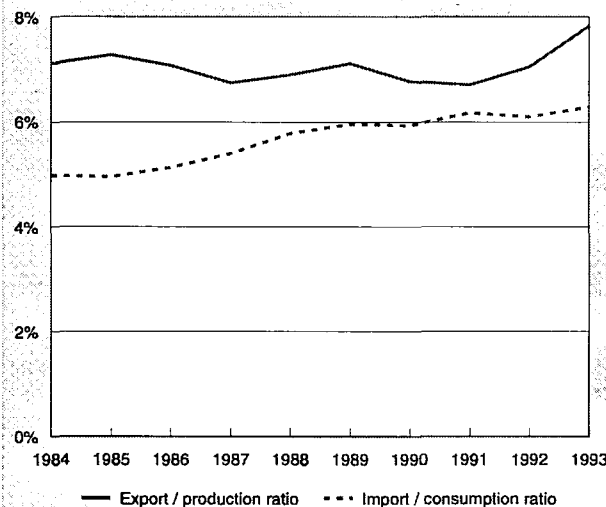
## INDUSTRY STRUCTURE

### Companies

There are a number of large European paper and board companies which are integrated forward into conversion of various types. In 1993, the largest ten EU companies in the sector were KNP BT (NL), Arjo Wiggins Appleton (UK), PWA (D, acquired by Sweden's SCA at the beginning of 1995), the Jefferson Smurfit Group (IRL), Jamont (B), Haindl (D), David S. Smith (UK), Saint-Gobain Paper-Wood (F, acquired by Jefferson Smurfit in late 1994), Cartiere Burgo (I) and Torraspapel (E).

The inclusion of companies from the three new Member States of the EU will considerably strengthen this list both in terms of input materials supplies, converted products in all three main categories and export orientation beyond Europe. Stora

**Figure 8: Paper and board converting  
Trade intensities**



Source: DEBA

(S), United Paper Mills (SF, part of Repola), SCA, MoDo (S) and Enso-Gutzeit (SF) join the current first five on the EU list to make the leading ten (nine), whilst two Swedish, two Finnish and three Austrian companies join the rest of the above list in terms of size. Most of these companies produce between 1 and 6 million tonnes of paper and board, are integrated forwards into converting and some also into paper distribution, whilst the largest have operations in as many as 13 countries world-wide.

Only two of the European companies, KNP BT and Stora, were among the world's top ten paper and board companies in 1993, although the 1994 merger of Saint-Gobain and Jefferson Smurfit and of SCA with PWA now brings them into this league as well. Six of the other eight of the world top ten in 1993 were US companies and two were Japanese.

In the 1984-1993 period, the effect of industrial concentration has been to increase significantly the product specialisation index of the sector in France and to less extent in Germany compared with a sharp fall in the UK. Elsewhere, the tendency has been mainly for a stable or slightly lower degree of specialisation.

### Strategies

All of the major manufacturers in the sector have been involved in internal restructuring, particularly during the recent recession with the main emphasis being on the disposal of peripheral operations and concentration on selected core activities. North American companies continue to invest modestly in Europe, whilst Sappi (South Africa) and Amcor (Australia) have also entered Europe as part of a general world-wide expansion. Despite these developments, there is still a large number of small non-integrated converters throughout the EU.

Acquisition activity in Europe has varied with the availability of finance and swings in the business cycle. Many companies are highly geared and finance has been difficult to obtain. The recovery in 1994 and early 1995 spurred a boost in acquisitions. The largest recent mergers were the creation of KNP BT (NL) in 1993 followed in 1994 by the creation of KNP Leycam (A) a major coated paper producer in 1994, and the acquisition by Jefferson Smurfit (IRL) of the Saint-Gobain Paper-Wood interests and later of a 27.5 % stake in Nettingsdorfer (A).

More modest acquisitions include: AssiDomän (S) of NcB and MoDo Packaging (both S); Sappi of Hannover Papier (D); Enso-Gutzeit of Tampella's (SF) pulp and paper-making operations, and 35 % of Veitsiluoto Oy (SF); and David S. Smith of Kaysersberg (F) in 1991, and of Spicers (UK) in 1993.

### Impact of the Single Market

The effect of the Single European Market (SEM) process on the paper and board converting sector has been largely positive. The free movement of goods and services within the sector is helped by EU geography and short lines of communication by comparison with North America, the former Soviet Union and the Pacific region countries. The marked stimulation of intra-EU trade has also encouraged restructuring in the industry. This has resulted in increased M&A activity, particularly by large companies integrating forward into converting, although this has led to problems for smaller firms. While Single Market measures also have a major impact on the distribution channels of the larger companies in the sector, industry location, which is dependent on the sector's raw material sources, has not been as significantly affected. Major remaining internal barriers are currency instability, access to finance for small firms and a range of environmental and technical barriers which may hamper trade with countries outside the EU. The industry regards a level environmental playing field for products and countries within the EU and with countries outside it as the major priority to be addressed.

## REGIONAL DISTRIBUTION

Since the industry produces products with higher value/weight ratios than the commodity grades of pulp, paper and board and its production runs are short, the regional location of this industry has generally been more widely dispersed with production units located near markets rather than materials. Increasing acquisition activity by the suppliers of input materials is by no means always reflected in physical integration. The tendency for input materials suppliers to locate near their waste paper supplies also coincides with the market location requirements of the converting operations. This tendency towards widely dispersed regional distribution of production units is assisted rather than hindered by the increasing transnational ownership in the industry.

## ENVIRONMENT

This sector's environmental concerns are twofold: they reflect the concerns of the pulp, paper and board sector through the demands of its own customers to use environmentally friendly paper and board input materials; and, more directly, by the sector's own need to use environmentally acceptable production processes and to participate in Europe's developing national waste management initiatives.

The paper and board converting sector already manufactures products that meet modern environmental standards. With regard to its most important input material, waste paper accounted for 56.4 % of the total fibre use for the EU's paper and board production in 1993, whilst waste paper recovery represented 41.0 % of total new supplies of paper and board. The two rates have increased steadily over recent years. In the tissue and board packaging segments the percentage of recycled fibres used ranges between 60 % and 100 %.

In the office products and stationary segments, recycling rates are lower but are also increasing. For non-recycled fibres, "elemental chlorine-free" (ECF) bleached pulp has been phased in across Europe, and "totally chlorine-free" pulp is now being phased in, particularly in the northern Member States.

## REGULATIONS

There is a growing amount of legislation at national and EU level stemming from environmental awareness. This is largely aimed at holding down the volume of packaging and paper used, and places the responsibility for recovering and recycling waste upon the industrial producers and users of packaging. National legislation includes Germany's strict Packaging Ordinance, together with similar legislation in France, Belgium and the Netherlands. The UK is about to introduce similar measures and other Member States are at various stages in their waste management strategies. Variations in the timing of introduction and in the relative strength of this legislation from country to country tends to distort trade flows. The initial effect of the German Ordinance, for example, was to flood the European market with waste paper, pushing prices down to negative levels for the lower grades in 1993, although this was corrected by demand recovery in 1994.

Harmonisation of this type of legislation at the EU level in order to reduce such distortions is supported by the paper industry. After several disputed drafts, the EU Packaging and Packaging Waste Directive was approved by the European Parliament and adopted by the Council of Ministers at the end of 1994, following rewording to allow for Belgium's concern that its postponed Eco-tax on packaging was endangered. The Directive sets a five-year target obliging Member States to recover 50-65 % of waste packaging, and to recycle 25-45 %, leaving room for composting and incineration.

These ranges allow for national variations in the progress of waste legislation. Some countries, however, feel that these

**Table 5: Paper and board converting  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.86	0.82
Danmark	1.24	1.13
BR Deutschland	0.90	0.97
Hellas	0.82	0.83
España	0.89	0.86
France	0.95	1.06
Ireland	N/A	N/A
Italia	0.86	0.88
Luxembourg	N/A	N/A
Nederland	1.02	1.03
Portugal	0.65	0.53
United Kingdom	1.45	1.28

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

Source: DEBA

measures are not stringent enough to achieve an acceptable level of harmonisation, whereas others feel that it does not go far enough in reducing the distortion effects caused by stringent legislation in their neighbouring countries. International competition, however, is forcing industry in countries with less advanced environmental legislation to adopt the standards of stricter countries.

## OUTLOOK

Demand is rising and prices are going up for the sector's products and there are prospects for a steady increase in the sector's profitability until 1997, and for a stabilisation in 1995 of the, until recently, falling employment levels. Indeed, steady output growth suggests the possibility of a slight increase in employment in 1996 and 1997.

The positive trade balance generated by the industry is small, representing only about 1.6 % of the value of the sector's total output, and is unlikely to change significantly. It could possibly deteriorate a little with growing domestic demand, although the impact of the accession of the three new Member States means that the consolidated statistics for the EU 15 will show a sharp increase in the external trade balance. There is likely to be a continued growth in investment by the sector in Central Europe, and to some extent in Eastern Europe and the former Soviet Union although the benefits of such investment may take some time to develop.

Restructuring and concentration in the industry seem likely to accelerate during the next two years and will concentrate ownership in the industry, supporting a continued improvement in the industry's productivity, but having less effect on the relatively fragmented regional distribution and small average size of its operating units.

The main concerns in the sector in the longer term are: the increasing costs of environmental measures and the labour costs and additional expenses. Particularly the participation in various national waste management initiatives across the EU causes an increase of costs and the paper and board converters have to find new ways to respond to the increasing cost and the pan-European nature of the sector's major customers. This will force the paper and board converters to look into new market possibilities in Eastern Europe, the Baltic Rim and Russia. Especially the Baltic Rim with its Russian exclave Kaliningrad has a central and unique geographical position on the crossroad between North, East and West trade routes. This area is a valuable gate to new international co-operation in Europe. These views will help to reduce uncertainty about the future course of costs and will give better access to the business cycle beyond 1996.

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# Printing and publishing

## NACE 473, 474

Printing and publishing, with all its historical and cultural importance, is a mature sector of moderate and steady growth. The industry is currently undergoing a technological revolution which threatens the future of paper-based production, but the changes implicit in this process can only occur over a long timeframe. In the medium term the economic upturn and increasing demands for information in all its guises will underpin steady growth in output, particularly in the short term as Europe emerges from recession.

### INDUSTRY PROFILE

#### Description of the sector

The printing and publishing sector comprises all the stages necessary to transform a piece of creative work into a manufactured product available for distribution to the public. The finished products of the printing and publishing sector are diverse and include books, encyclopaedias, daily and periodical press, maps, and musical scores. The publishing sector overlaps into computer and other consultancy services which produce written reports and secretarial support services. Because of the diversity of the publishing sector and its close links with the printing industry, EU statistics cover both sub-sectors together.

#### Recent trends

In most EU countries, consumption and production in current prices nearly doubled between 1984 and 1993. Overall consumption growth slowed down in 1992 and was negative in 1993, reflecting the recession in the EU, but picked up again in 1994. The slowdown was particularly apparent in the UK, the largest printing and publishing producer in the EU. Growth in consumption in Southern European countries such as Italy, Spain and Portugal, on the other hand, held steady.

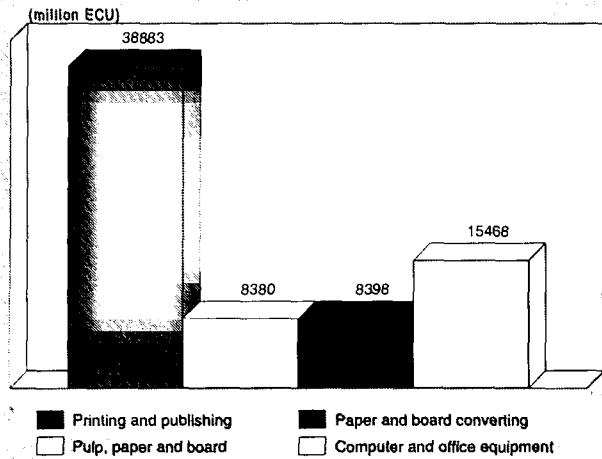
The EU trade balance with the rest of the world remains in surplus both in value and volume terms. Extra-EU exports have grown less rapidly than extra-EU imports, but from a much larger base. As a result, the extra-EU trade balance surplus has increased steadily over the last decade. In 1993, the value of EU exports in the printing and publishing sector was well over twice the value of imports.

Employment in the sector grew steadily from 1986 until the onset of recession in 1991 when employment peaked at 884 400. By 1994, it had fallen to an estimated 820 100. The USA remains the world leader in printing and publishing. In 1991, USA production was worth 36 % more than that of the EU and nearly twice that of Japan, which had the fastest growth during the 1982-91 period. However, the gap between USA and EU production is narrowing. Over the ten years between 1984 and 1993, production growth in constant prices in the EU was nearly 40 %, whilst the corresponding figure for the USA was 16 %.

#### Foreign trade

The EFTA countries (37.7 % share in 1993) have traditionally been the EU's main export markets in the printing and publishing sector, surpassing trade with the USA, whereas the latter is the most important source of EU imports (36.4 % in 1993). Intra-EU trade is growing compared to trade with the rest of the world. The accession of Austria, Finland and Sweden to the EU in 1995 will further increase the relative importance of intra-EU trade. Trade intensities are very low in the printing and publishing industry: the export/production ratio is about 4-5 %, and the import/consumption ratio is

Figure 1: Printing and publishing  
Value added in comparison with related industries, 1993



Source: DEBA

around 2 %. This reflects a number of factors. On the one hand, much of the output of the industry is based on locally or regionally articulated and specified demand preferences, whilst on the other hand major national markets are often dominated by large domestic business groups.

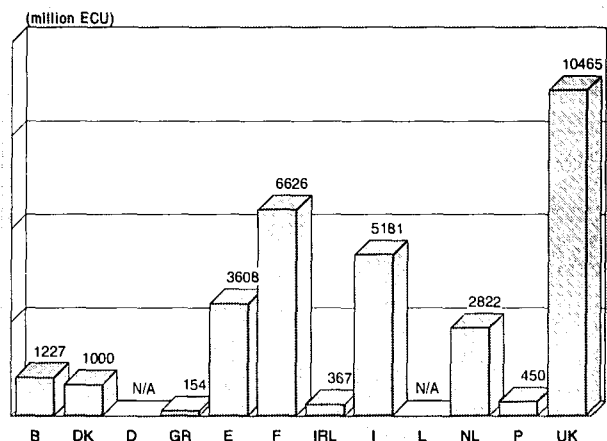
Although language considerations do predominate in matters of trade, new markets are developing as economic frontiers expand. Within the EU, wide use of the English language has allowed the UK to benefit the most from the Single European Market, closely followed by the Netherlands. The UK is becoming a crucial centre for European publishers, as well as an important entry point for North American printers and publishers wishing to establish themselves in the European market.

### MARKET FORCES

#### Demand

The potential market for the output of the printing and publishing sector in the EU is all persons above a very young age, reflecting the very low levels of illiteracy which prevail.

Figure 2: Printing and publishing  
Value added by Member State, 1993



Source: DEBA



**Table 1: Printing and publishing**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	47 796	69 017	77 671	83 001	86 826	89 240	88 348	89 887	94 900	100 600	106 800
Production	49 462	70 903	79 666	85 137	88 929	91 493	90 773	92 582	97 900	103 800	110 300
Extra-EU exports	2 785	3 248	3 555	3 775	3 969	4 161	4 430	4 814	5 300	5 700	6 200
Trade balance	1 665	1 886	1 995	2 136	2 103	2 253	2 424	2 695	3 000	3 200	3 500
Employment (thousands)	809.5	832.4	869.1	882.4	884.4	864.3	839.0	817.0	820.0	830.0	840.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 2: Printing and publishing**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.18	1.07	3.88	0.29
Production	5.94	1.14	3.78	0.50
Extra-EU exports	0.72	2.46	1.49	4.72
Extra-EU imports	4.09	0.43	2.45	-0.54

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Printing and publishing**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	2 785	3 147	3 060	3 108	3 248	3 555	3 775	3 969	4 161	4 430
Extra-EU imports	1 120	1 188	1 243	1 223	1 361	1 560	1 639	1 866	1 908	2 006
Trade balance	1 665	1 959	1 816	1 885	1 886	1 995	2 136	2 103	2 253	2 424
Ratio exports/imports	2.49	2.65	2.46	2.54	2.39	2.28	2.32	2.13	2.18	2.21
Terms of trade index	89.0	87.1	92.7	98.2	98.9	96.2	100.0	88.3	89.5	86.1

Source: DEBA

**Table 4: Printing and publishing**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	78.7	81.2	85.9	90.1	95.1	97.8	100.0	99.1	102.4	106.0
Unit labour costs index (3)	92.5	96.5	95.0	94.3	94.2	97.2	100.0	107.9	108.9	104.4
Total unit costs index (4)	82.9	86.8	86.6	89.3	92.6	97.0	100.0	105.6	107.0	104.7
Gross operating rate (%) (5)	11.8	12.1	13.5	13.2	14.2	14.0	13.6	13.2	13.5	14.1

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

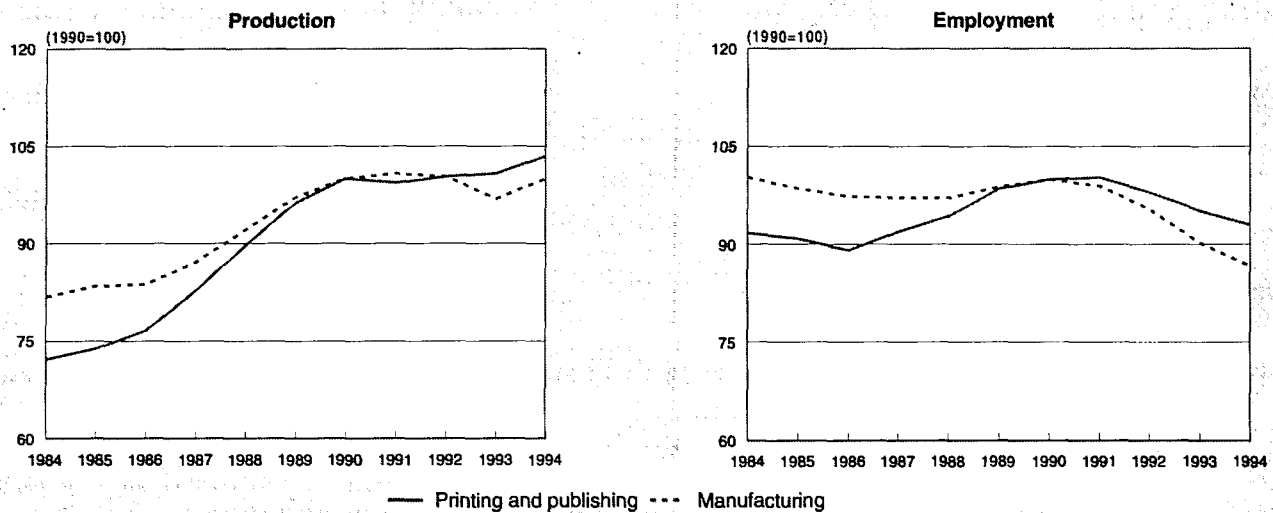
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Printing and publishing  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

However, developments in the book, magazine and newspaper trade depend on a complex variety of factors. For private consumers these include economic and social aspects such as demographics, education, leisure trends, number of public libraries, buying power and financing possibilities ranging from sponsoring to advertising. Demand from the commercial sector is related both to the overall level of development of particular economies and current economic conditions. Print, in particular, is a sensitive indicator of economic activity and was an early harbinger of the recent onset of recession in the UK. While the publishing sector is the key market for printing output - newspapers alone account for 20 % of printing output - and is slightly less susceptible to the vagaries of economic cycles than other media, commercial printing for individuals, businesses, government and community organisations is also important. These markets are, on the other hand, strongly influenced by business cycles.

There is a positive correlation between the level of education attained, income levels, age and propensity to read. However, this varies across countries with the importance of these factors more evident in Southern European Member States where the market is less mature. For example, on average, 93 % of graduate Italians read regularly compared to a figure of 26 % for those less qualified. On the other hand, analysis in the Netherlands indicated that the aggregate explanatory power of sex, age, education, profession, income and wealth on book reading was low. Rather, it was concluded that there were people in all strata of society in the Netherlands who are intensive readers with others who hardly read at all. In general, it was found that females read more than males and people under thirty read more than their older counterparts. While growing female labour force participation has the beneficial impact of increasing household incomes, it will, however, create time pressures which reduces leisure time available for reading.

Analysis of consumption trends for books reveals a marked difference between the South and the North, with Southern Europe characterised by relatively weak reading habits. The same considerations apply to newspaper reading and, to a much lesser extent, magazine reading. Books represent 27.5 % of leisure spending in Italy in 1991, compared with 18.7 % in 1981, but only 46 % of the population can be described as "readers", among whom 70 % read less than five books a year. In Spain 63 % of the population does not read for

leisure. However, with improved education and changing cultural habits the importance of reading in Southern Europe is increasing with the most committed readership among the young.

However, whilst changing cultural habits suggest continued growth in Southern Europe, slow population growth, the impact of the economic cycle and technological factors will be key variables influencing demand in Northern Europe. The ageing of the Northern Europe population will boost demand to the extent that the newly retired will have increased leisure time to devote to reading, but the decline in the younger age groups will impact negatively on demand. Stagnancy in new school entries intensifies this trend, as a reduction in the number of children has not been offset by a wider provision of education. The situation appears most favourable in the UK and France, where a slight rise in population is forecast. Meanwhile, the average birth rate in Europe has stabilised at around 11 per 1 000 population; the corresponding figure for the rest of the world is 26.

For a long time, children have been considered prime consumers: seen as the readers of tomorrow, they have spearheaded the youth sector as a major arena for socio-cultural activity. Educational success is a key factor for professional development and one of the main sources of parental concern. Encyclopaedias and dictionaries, as part of the educational publishing sector, also represent a rapidly expanding market. With the future health of the publishing sector, and by extension much of the printing sector, sector linked to overall levels of education, there is considerable potential for demand expansion in non-EU markets as levels of education and literacy improve world-wide. The impact of improvements in primary and secondary education in southern EU Member States on demand for publications is already indicative of this potential. Furthermore, third level education, which is increasing most rapidly in the less developed EU Member States is the most "intensive" in terms of publication requirements.

While reading ranks behind television and radio, nearly 50 % of Britons read one book per month. Despite such a high consumption rate, the level of buying is very low: of the 56 % of regular readers, only 60 % actually purchase their books. This situation is due to the importance of public libraries which are seven times more numerous in the UK than, for example, in France.

The impact of new technologies on demand for the output of the publishing and printing industry is multi-faceted. New technologies have opened up new markets both in terms of manuals and educational materials and in the way in which information is transmitted. As the benefits of advances of information technology become increasingly diffused across a wider population the market for "electronic" as opposed to "printed" information will expand. CD-based publishing is already relatively well established in educational and business subsectors and presents an increasing threat to the printing industry.

A CD-ROM (Compact Disc - Read Only Memory) is capable of storing up to 550 million characters - the equivalent of around 25 000 printed pages - and has become a vital storage medium for activities such as archiving, data banks, encyclopaedias and directories. Meanwhile, the CD-I (Compact Disk Interactive) has a storage capacity capable of storing and reproducing sound and images as well as text. The CD-I also permits interactive audio-visual applications via a simple remote control device. CD-I not only expands the possibilities for information transmittal for publishers, other applications of this technology also represent a competitive threat to the traditional leisure and business demand bases for printed materials.

Technological progress has also increased the capabilities of mainstream businesses (and to less extent individuals) to carry out printing jobs in their own offices (homes) which might otherwise have been contracted to specialist printing firms. These developments have however contributed to expanding the overall level of demand. Some of the "in house" printing being undertaken would not have occurred had the firms not acquired printing capabilities, whilst they often require extra inputs such as stationery, labels, compliment slips to facilitate their additional printing activities. The impact of technology on the quality and price of printed output has also stimulated demand. Far from leading to the "paperless" office, technology has to date led to increased consumption of printing materials. It has also led to a growth market in specialist magazines, manuals, etc. However, as discussed above, increasing diffusion of digital information and telecommunications technologies, and particularly the increasing use which businesses are finding for electronic communication methods, will place an upper bound on expansion of demand.

## Supply and competition

The European printing and publishing sector remains more a collection of national industries than an integrated European industry. This is evident from the small proportion of industry turnover accounted for by exports. Similarly, however, as is evident from rapid export growth, the industry is steadily becoming more internationalised.

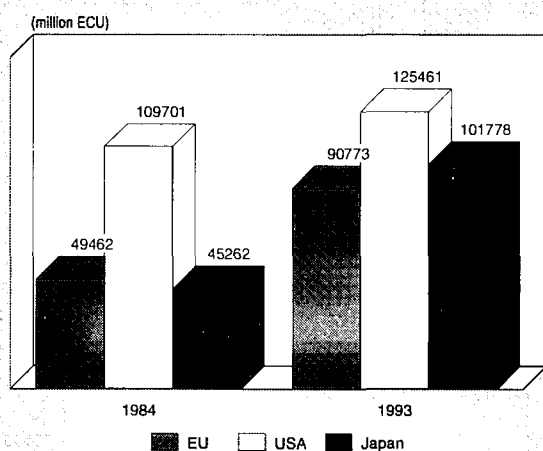
The absence of an "international" industry is particularly evident in the printing sector where many contracts are small and often awarded informally to local suppliers whose track record is known. The need for frequent contact between purchaser and supplier also favours local producers as does the time-critical nature of much of the work. Technological advances, particularly in DTP (desk-top publishing) are also making it increasingly easy to enter the publications market with little capital outlay. Reflecting this, many printing and publishing companies in the EU are small firms employing less than 10 workers and few employ more than 500. Intergraf data indicates that in the printing sector in 1993, less than 1 % of the firms employed more than 500 workers, whilst 85 % of companies had less than 20 staff.

The multiplicity of languages in use across the EU provides a further barrier to Europeanisation of the industry. However, international publishing is growing particularly in English which as well as being an important first language is also one of the most important second languages in the world. This presents a market advantage to publishers in the UK (and the USA), reflected in its dominant position in the publishing industry, whilst the importance of Spanish, French and German (particularly in Eastern Europe) provides opportunities for operators in those countries. In contrast, whilst Italy has a well-developed publishing industry it is more or less confined to its national market.

In the European book market, stagnant sales in recent years have held down growth in the number of titles published and contributed to what some see as a crisis of over-production, resulting in a fall in the size of average print runs and contributing to price rises through increased unit costs of production. A recent study jointly undertaken by Intergraf and consultants PIRA (UK) indicates that in major European countries the average book run length decreased from 12 000 in 1985 to 9 000 in 1991, whilst the number of titles rose and overall production volume fell. Increasingly shorter print runs is a universal trend amongst other print media, as well as books. The share of new titles published is another indicator of book market vitality. Around two-thirds of titles published annually in the UK, the Netherlands and Spain are new titles compared with about a half in France and Italy and a third in Germany. Commercially, new titles are a high-risk area for publishers, whereas reprints reduce uncertainty and hold down fixed costs on a larger number of units over a longer period. The strategy of differentiation practised by the major publishing groups can be seen, to some extent, as "competition by attrition", with each publishing house attempting to secure maximum shelf space in retail bookseller outlets and, literally, crowding out its competitors.

Book publishing has been affected by developments in audio-visual media, but the press has been affected even more. While overall advertising expenditure, the principal source of finance for the press, has risen sharply over the last ten years, advertising spending in the newspapers has dropped continuously. In particular, press market share has been lost to TV advertising. Liberalisation of the broadcasting sector is an ongoing threat as governments loosen restrictions on advertising on TV and the importance of satellite broadcasting grows. On the positive side, for the publishing industry, as the number of available TV stations grow and audiences become increasingly fragmented, TV may become progressively less cost-effective as an advertising medium. Despite forecasts that dailies, weeklies and periodicals would disappear as a

**Figure 4: Printing and publishing**  
International comparison of production in current prices



Source: DEBA

result of the rise of audio-visual media, the principal newspapers have maintained profit levels. However, the role of newspapers is changing and whilst they continue to carry news increasingly their emphasis is on comment and analysis.

The growth of TV advertising also affects the printing industry directly. Intergraf estimate that almost two-thirds of turnover in the graphic industry depends either directly or indirectly on advertising with the result that the industry's development is susceptible to media advertising shares. Rising TV advertising share is not necessarily as gloomy a prospect for printers as it is for the press. While TV is used for awareness campaigns, printed mediums remain the key to dissemination of much of the background factual information needed to sell goods and services. Furthermore, market research and increasing ranges of electronic databases enable progressively finer market segmentation for targeted advertising using printed materials. Similarly, changes in the nature of press advertising have contributed to increased newspaper bulk with "advertising" features and inserts increasingly being used. Soft-sell publications, often provided for free (e.g. in-flight airline magazines), are also proliferating - Boots, the UK retailer and manufacturer, for example, is due to start publishing a quarterly women's magazine in 1995 which will "aim to apply Boots' brand values to a publication rather than a product".

The market for the press in Southern European countries remains relatively underdeveloped. Huge disparities are shown by the following figures on the ratio between daily newspaper circulation and population: Germany and the UK are the top ranking in the EU with 321 and 243 copies respectively sold daily per 1 000 inhabitants in 1992 against 122 in France, 88 in Spain and only 40 in Portugal. In addition, the press is highly competitive. In European countries on average, ten daily titles together account for more than 50 % of national circulation. This situation is most pronounced in the UK, where that percentage is reached by the combined circulation of only four titles.

As the 1990s progress the printing and publishing industry will be progressively challenged by technological developments. Given the enormous text and image data storage capacity and know-how of CD technologies, these will play a major role in shaping future markets for publishing and printing. The idea of paperless reference libraries or offices remains utopian, but the mere fact that this is the case and that movement in that direction has proved insignificant in the last decade is not a cause for the printing and publishing industries to be lulled into a false sense of security. Where CD-ROM copies of publications exist many businesses/institutions opt for them as a supplement to printed versions, but such instances are falling. This also appears to be the case among private consumers if the experience of Encyclopaedia Britannica is a guide. Available in printed, CD-ROM and on-line versions, sales of printed versions continue to rise with most people who buy a CD-ROM version also purchasing the printed set. The continued popularity of printed material even in "business" which can access the same information in electronic form reflects the level of familiarity which most people have with "hard" copy materials as opposed to their "soft" counterparts. It is likely to take considerable time before such attitudes are eroded and to this extent the view of the "paperless" office remains a concept which is beyond the medium-term horizon.

### Production process

The printing and publishing sector is characterised by strong value added and a high dependence on skilled personnel. In Denmark, where manpower is particularly expensive, printing labour costs represented about 38 % of total costs in 1993. This corresponds with 17 % of total costs in Portugal, a country with relatively low labour costs. Labour costs as a proportion of the total have, however, fallen across EU Member States. The fall is most evident in south European countries such as

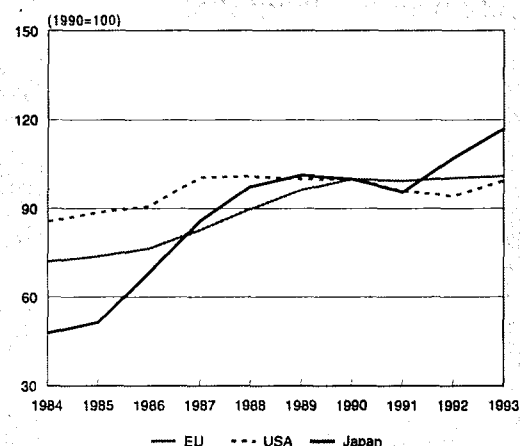
Portugal where modernisation of the industry's technological base and the achievement of scale economies transformed the printing and publishing sector during the 1980s. The price of paper, the key input to the industry, was quite depressed until the second half of 1994 when it increased sharply following rises in pulp prices. Nevertheless, paper production has accelerated and could eventually stem price increases.

The main stages in the manufacture of a book are: editing the work following acceptance of the author's manuscripts; a technical stage where typesetting and pagination allow a calculation of the costs of production and the raw materials needed; return of the composed text to the publisher in proof form; initial correction; layout and illustration with preparation of a "dummy" copy for the printer; checking printer's final proofs; printing a determined number of copies; distribution of the requisite number of copies to points of sale; and acceptance of returns or unsold copies at the publisher's expense. A special feature of publishing is the cost burden of "returns", unsold copies. This burden is all the more difficult to bear in a period of recession. Publications which are not sold are burned and destroyed/recycled. In the book market part, of the problem is that available sales space tends to remain constant, whereas the number of titles on the market continues to grow. Inevitably, this disparity leads to a reduction in the time a book is on display, and its overall life-span. Volume and speed of returns have affected some book publishers disproportionately, with several experiencing rates of return over 60 %.

In the course of the last few years, computer-assisted publication (CAP) and desk-top publishing (DTP) have generated professional interests. As CAP is suitable to limited print runs it has proved particularly cost-advantageous to smaller publishers. Computerisation of design and manufacture has allowed considerable gains in time and cost, but CAP will add to salary costs in the short term, since the process requires new skills from the workforce. The Intergraf/PIRA report suggests that lack of suitably skilled personnel is likely to become a serious problem for the printing and publishing sector. On the one hand training may not keep pace with the industry's needs, whilst on the other the sector's image as "old and diminishing" will deter many "high calibre graduate personnel".

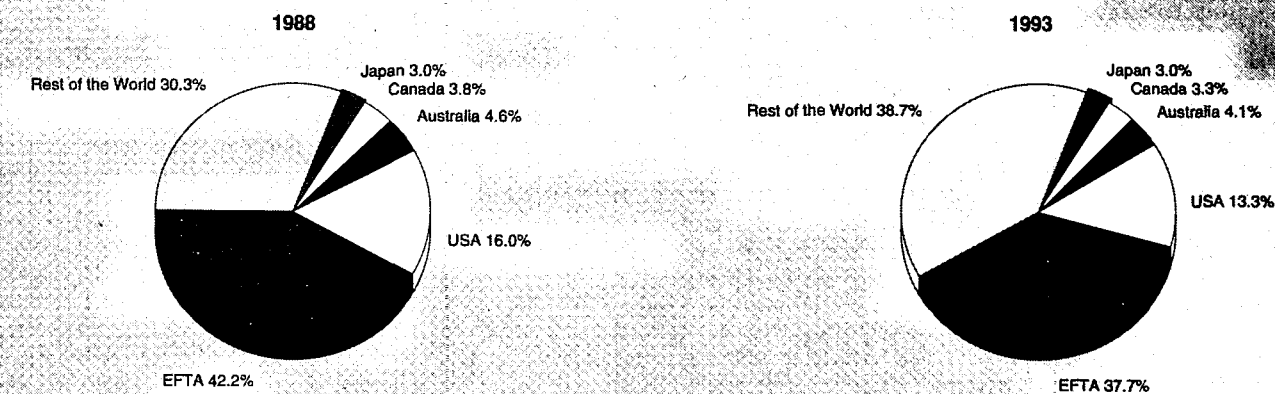
The growth of computer power is the major factor shaping publishing and printing technology in the 1990s. According to the Intergraf/PIRA study, in 10 years time computers are

**Figure 5: Printing and publishing**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Printing and publishing  
Destination of EU exports**



Source: Eurostat

expected to be 40 times more powerful at an equivalent or reduced cost compared with today. Software programmes are also being developed rapidly to utilise the associated increases in computer speeds and memory sizes. The digitisation of all means of communication is generating vast quantities of digital information which the printer needs to be able to process as an alternative to "camera ready copy". In these circumstances, pre-press systems have seen more rapid development than any other production machinery used by printers and publishers. At the pre-press stage, falling costs of equipment and simpler systems of monochrome and colour origination have been assisted by many new processes including Photo-CD, digital photography and colour calibration, high fidelity colour, stochastic screening etc.

At the printing stage, photo composition has replaced hot metal as the main technology. Press control systems, new and improved printing systems and electronic printing systems are developing rapidly, including automatic/computer make-ready, waterless litho, laser printing and plate-making, short run colour copiers and printers. The growth of computers' capacities are assisting these trends. Micro-publishing (desktop publishing) has also brought about considerable changes in the sector by facilitating PC-driven integrated text and image processing. These technological innovations imply improved qualifications for staff and increases in productivity. Labour productivity rose by 35 % in the ten years to 1993 whilst unit labour costs increased by just 13 %. In time, machines will be available which unskilled operators can use in offices to produce short runs of high quality colour print with clear implications for subcontracted out printing. At the same time this technology is opening up opportunities for small printers such as "network or in-plant" printers to large companies or groups of companies, and desktop publishing kiosk ordering systems in precinct locations where the customer does the job and pays by credit card.

Competing with printed media, digital electronic media (where information is held in digital form) are developing rapidly, including electronic books, prototype electronic newspapers, but above all new forms of published product such as CD-ROM and CD-I. For example, a 9-volume dictionary weighing 50 kg can now be captured on 6 cm disc weighing a few grams and the entirety of its information accessed in a matter of seconds. The main barriers to development are lack of software standardisation, a limited installed hardware base for CD-ROM drives and lack of good portable devices for reading digital media of all types, but in all these cases development is taking place and there are predictions that 40 % of all publishing revenues will come from digital media. The message is that

printers and publishers need to be closely involved in these developments.

Both the printing and the publishing industries require an increasing level of capitalisation, the best-known example is dictionaries and encyclopaedias, where long production and commercialisation lead times presuppose financial resources to absorb heavy cost burdens both during the period of investment and to cover the costs of promotion and publicity to launch the title on the market. These subsectors, however, are increasingly suitable for having parts of their production process sourced in lower labour cost countries.

## INDUSTRY STRUCTURE

### Companies

Europe's printing and publishing industry is highly fragmented. Most of the sector's constituent companies are small in size and serve local or regional markets. This is particularly true in the printing industry. There are, however, a number of major players whose activities involve both publishing and printing, as well as a wider range of economic activities involving paper-based and other media. The main groups such as Bertelsmann (D), Hachette (F), Pearson (UK) and the Anglo-Dutch group Reed Elsevier range even further afield. Pearson, for example, is heavily involved in the tourist sector. Other important companies include Groupe de la Cite (F), Mondadori (I), Watmoughs (UK), Wolters-Kluwer (NL) and VNU (NL). Axel Springer (D) top PIRA International's listing of Europe's top newspaper groups. Non-EU multi-media groups such as Time-Warner (USA), Paramount (USA) and News Corporation (AUS), with a presence in all the main mass media markets (books, cinema, television, press), are all extensively involved in EU markets.

The trend towards concentration by acquisition and merger is not equally marked in all countries, but it is growing everywhere. It has been most evident in the UK, where the aim is more to secure economies of scale in the domestic market than to expand internationally. However, there are important exceptions, for example, EMAP's (UK) 100 million ECU deal with Edition Mondiales (F).

### Strategies

The two main aspects of strategy are concentration and globalisation. Publishing groups are developing both vertical (publishing and distribution) and editorial (diversification) strategies in these new areas as well as in traditionally profitable areas, the net result being to favour economies of scale.

Scale is not the only motivation, however. Other reasons for media company expansion are the exploitation of trade-marks or other kinds of intellectual property, the desire to become multi-media firms utilising a range of technologies, particularly those which may create new markets, and a desire for geographical diversification as protection against cyclical domestic markets.

Mixed books/press houses are becoming more numerous, as a result of a growing synergy between the two activities: newspapers and magazines remain the most reliable media for book promotion. However, small publishing houses have a capacity for creativity and flexibility which allows them to stay in the market. In addition, the nature of the market, both in terms of technologies which facilitate small scale production and geographically defined niche markets, will continue to enable small firms to provide the bulk of the industry's firms, particularly in printing. While the impact of the Single European Market has accelerated the trend towards larger groups, change is not particularly rapid. Where there are casualties they tend to be medium-sized, rather than small companies. Recognising the growing importance of international links within the overall European market, Intergral have established a service to facilitate cross-border co-operation between small and medium-sized printing firms.

Globalisation strategies are generally pursued by way of subsidiaries or by acquisitions. In practise, publishing groups - acknowledging their limited knowledge of international markets and the cultural differences implicit in language and business practices - are more likely to expand by acquisition rather than by industrial or commercial means. Bertelsmann and Hachette are the most international of the major global groups but are being joined by groups such as Pearson and Reed Elsevier, which are diversifying away from their current Anglo-Saxon orientation. However, there is still a considerable emphasis on expansion by the latter companies in North America, particularly in electronic publishing where Reed Elsevier is making large acquisitions in the USA.

Major EU publishing and printing firms are now looking beyond their own national boundaries for less expensive methods of production. Thus, in sectors where time is not one of the critical factors, where economies of scale are important and transport costs form a relatively low proportion of output value, European companies have been sourcing production, or parts of production, elsewhere. This has favoured the subcontracting of work such as mail order catalogues, although advances in digital technologies which allow rapid and high quality transfer of images may open up additional niches in

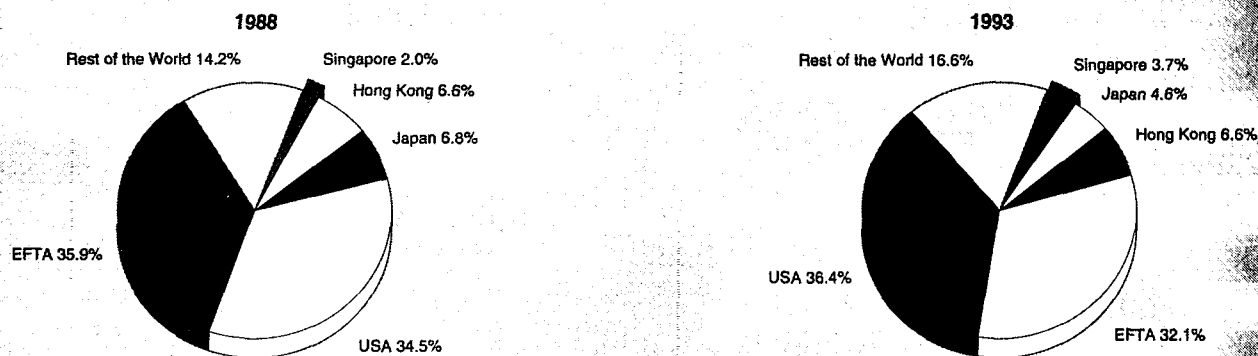
the medium term. UK companies have favoured locations such as Singapore and Hong Kong. German companies have been looking towards Eastern Europe and firms in all Northern European countries have transferred capacity to Mediterranean Member States such as Portugal and Spain. Alongside rapid production growth, consumption in these two Member States also grew rapidly during the latter half of the 1980s and into the 1990s, thereby increasing their attractiveness for investment by Northern European firms. While the pattern established in Portugal and Spain may be followed in East and Central Europe, plants in these countries are well behind EU technological standards.

The Single European Market is obliging publishers to consolidate their positions in Europe: what is at stake is not so much Europe itself, but the principal European languages which predominate on world markets: English, Spanish, and, to less extent, French. With the growing importance of Eastern Europe, the importance of German is also growing. Expansion both in Europe and throughout the world is nevertheless limited by the national character of information.

### Impact of the Single Market

Most regulations in the Internal Market programme are of some relevance to the printing and publishing industries. However, because of the importance of local markets to many printing and publishing companies and because of the existence of language barriers their impact has been fairly muted. Reflecting this, horizontal policies relating to consumer protection, competition policy, SMEs, the social dimension, environment and training and education are considered by the industry associations to be of the greatest relevance to their members. Apart from horizontal policies, most other measures considered important to the publishing and printing industries are either under discussion or remain in the pipeline. These include liberalisation of telecommunications services, liberalisation of broadcasting, the harmonisation of VAT rates on newspapers and other publications and the issue of uniform postal rates for publications material across the EU. A key influence of the Single Market programme on the European printing and publishing industries has been the cumulative effect of ongoing integration of the EU market. Among the major players, this has reinforced the trend towards globalisation, while among smaller companies European issues have become more important and contacts between firms in different EU markets have increased.

**Figure 7: Printing and publishing  
Origin of EU imports**



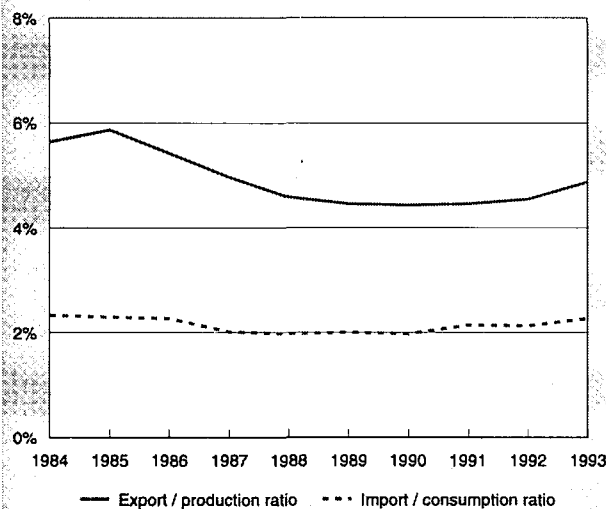
Source: Eurostat

The production processes of the printing and publishing industries are relatively non-polluting. Nevertheless, firms in the industry are responding positively to environmental pressures to make their operations more environmentally friendly. This includes the introduction of new technologies aimed at reducing the amount of solvents used (both in inks and cleaning fluids), limiting VOC (volatile organic compounds) emissions from web-offset printing, more environmentally sensitive handling of liquid waste, encouraging the recycling of other waste and greater use of recycled paper. A key improvement in production technology has been the shift towards dryer and cleaner technologies and use of more environmentally-friendly inks (e.g. vegetable-based). The EU Commission is currently considering studies on emission controls/solvent recovery in the printing process and on water pollution and disposal of toxic wastes in the printing industry.

Recycling is only one of the pillars of the EU strategy towards conserving natural resources, with reduction in use being regarded as equally important. Legislation, such as the Directive on Packaging and Packaging Waste, is based on the philosophy that packaging, and hence printing output, should be reduced, as well as encouraging recycling. Total yearly paper and board consumption in the developed countries in 1993 was around 220 kg per person. Demand in the developed countries for paper and board is projected by the FAO (Food and Agricultural Organisation) to increase from 194 million tonnes in 1991 to 310 million tonnes in 2010. In 1993, Western Europe used a total of 30 million tonnes (including 26.8 million tonnes in the EU) of graphics papers, of which newspapers consumed 8.2 million tonnes. Of the remaining 21.8 million tonnes, the approximate breakdown is: books 1.5 million tonnes, magazines 5 million tonnes and advertising, free sheets, directories and catalogues 15 million tonnes.

The use of recycled paper is increasing. The publishing industry is itself involved in the debate about collection and recycling. Research is being carried out, not merely on how to increase paper recycling, but to analyse the overall environmental economics of the paper chain. New areas of interest include the valorisation of the energy content of paper fibres that have undergone different life cycles and have lost their useful mechanical properties.

Figure 8: Printing and publishing Trade Intensities



Source: DEBA

There are no regulations at EU level which pertain specifically to the printing and publishing industry although this is not the case at national level. As a cultural product, books ought to remain affordable to consumers. For this reason, most European countries apply various forms of resale price maintenance. Portugal being a notable exception. For example, in the UK, the Net Book Agreement governs the fixing of book prices and it is for the publisher to decide whether its books should be sold at a free or an imposed price. In Germany, publishers themselves operate the rules on price fixing and bookshops are bound by collective contract with 1 700 affiliated publishers to respect the fixed cover price. A similar arrangement operates in Italy. In France and Spain, legal provisions exist to enforce the obligation to sell at the published cover price. Such measures are important to the continued existence and development of the distribution networks needed to keep books available to the public and, by extension, for the survival of literary creativity in all its diversity.

Books, newspapers and magazines also benefit from zero (Italy, Portugal and the UK) or low rates of VAT in a number of EU Member States. Another key benefit in some Member States is preferential postage rates. Harmonisation of VAT rates across the EU was postponed from January 1992 until at least 1997 and the present differences in taxation policy with some zero-rate strongholds may come to an end if the EU were to decide to harmonise the rates applicable to publications. The industry is currently lobbying to safeguard the possibility of having zero VAT on printed products.

Competition in the printing sector is sufficiently strong not to attract the interests of EU competition authorities. However, there is growing concern both within some Member States and at the EU level about concentration of media ownership. In Ireland, for example, the government recently intervened to curtail Independent Newspapers increasing its dominance of the Irish Sunday newspaper market. At the EU level, rules are likely to emerge defining permitted levels of media concentration and proposing criteria for approving major mergers and take-overs. Finally, the development of EU regulations on media concentration as well as EU research programmes may influence the way the European media houses adapt to technological change and become competitive multimedia operators.

OUTLOOK

The publishing sector is best described as a mature sector with growth on a moderate upward trend. Because of its peculiar mix of historical and cultural factors, some publishing sub-markets are relatively immune from economic swings. The cultural habits of consumers are the key to future development in the sector. Its evolution depends on socio-economic factors such as demographic trends, education, industrialisation, political trends (as in Spain, Greece and Portugal) and, not least, tradition.

For over a decade it has been forecast that the demise of publishing and printing sectors was nigh as information technologies gathered speed. Into the 1990s the convergence of computer, telephone and television technologies has further fuelled this prognosis. Printed media are, and for the foreseeable future are likely to remain, the major players in the communications market. They currently represent around 60 %, by value, of the total consumption of communications media in Europe. The relative cost of distributing publishing products via a growing range of rapidly developing electronic media is becoming increasingly important, as are also the cost-related issues of waste reduction and environmental management. For publishers, the message is that the medium for communicating will change and there is a need to reformulate expansion strategies based on print to take account of screen-





**Table 5: Printing and publishing  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.78	0.95
Danmark	1.56	1.33
BR Deutschland	N/A	N/A
Hellas	0.52	0.62
España	0.76	1.38
France	1.16	1.04
Irland	0.75	0.72
Italia	0.95	1.02
Luxembourg	N/A	N/A
Nederland	1.61	1.67
Portugal	0.74	0.90
United Kingdom	1.48	1.56

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

based media. A report for DG XIII of the European Commission predicts that the electronic publishing market in Europe will be worth 12 billion ECU by the year 2000.

However, whilst information technology races ahead, corporate and individual consumers take time to adjust, not just to the new leisure and information possibilities offered, but to acquire a familiarity which allows them to forsake the printed products which have dominated their normal needs in this regard. To date, information technology advancements have complemented rather than substituted for the written word. In fact, those countries which have emerged as the prime consumers of images are also those which remain most attached to the written word. The application of new technologies in publishing - either as production aids or as new media per se - is still at an embryonic stage.

New products derived from books or developed from synergy between different media - sound, images, text and data - can be expected to multiply and stimulate global markets. As businesses and other consumers become more familiar with emerging information technology applications, the rate of substitution of electronic means of communication for paper-based media will increase. The emergence of this new information-driven economic paradigm, however, remains sufficiently unclear to preclude firm predictions on its net impact on printing and publishing. For example, there is little doubt that alongside the growing importance of digital technologies the demand for "information" itself will also expand rapidly. The synergies between traditional publishing activities and the demands of the users of new information technologies will also encourage the major firms in the industry to diversify into relevant information technologies such as "electronic publishing".

In terms of printed product sectors, prospects vary. The electronic media are likely to impact on corporate sector printing the most, hitting business forms in particular. A second area where they are vulnerable is books, particularly reference books, educational text books, coffee table books as a source of information and technical documentation. Newspapers will tend to acquire the characteristics of periodicals and both will develop fax and other interfaces with electronic communications. Promotional printed products will be impacted in a limited way by their delivery by fax and by electronic shopping, with catalogues probably the least affected, and advertising in newspapers and periodicals the most. In all of these cases, of course, the message is that publishers need to deliver their products across a wide and changing spectrum of media, and printers need to collaborate closely with them. The most promising subsectors of the publishing industry are those connected with knowledge itself - teaching, professional training, business information and specialised interests. Product markets which will gain include dictionaries, encyclopaedias, textbooks, practical guides and books, research reports and special interest publications. As the importance of post-compulsory education and training, both for adults and post-secondary students, increases across Europe, and service industries, particularly knowledge-based ones, continue to expand, so will the demand for information in all its guises.

In the medium-term the ongoing economic recovery in Europe, and indeed throughout the world economy, will contribute to relatively rapid growth in consumption and production. Reflecting the increasing internationalisation of the sector, exports are expected to outpace production growth. However, with the accession of three new Member States in 1995, the importance of intra-EU trade will grow substantially at the expense of extra-EU exports. Abstracting from the statistical implications of the accession of these new members, the EU's trade surplus in the publishing and printing sector will expand.

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The industry is represented at the EU level by: Confederation for Printing and Allied Industries (Intergral). Address: Square Marie Louise 18, Bte 25-27, B-1040 Brussels; tel: (32 2) 230 8646; fax: (32 2) 231 1464; and European Newspaper Publishers' Association. Address: Gosseftaan 30, B-1702 Groot Bijgarden, Brussels; tel: (32 2) 466 8875; fax (32 2) 466 1500.



# Printing

## NACE 473

Comprising more than 60 000 firms and employing some 1 116 000 people, the graphic industry in the 15 countries of the Community handles a turnover of over 75 billion ECU. The industry consists mainly of small enterprises, as 85 % of them employ fewer than 20 persons. The graphic industry is a modern, high-technology industry which, by keeping up with the latest manufacturing processes and investing heavily in new machinery over the last few years, has placed itself at the forefront of technical progress. Image processing in modern printing is now carried out by computer or computer assisted equipment, requiring highly-skilled workers.

### INDUSTRY PROFILE

#### Description of the sector

Printing firms produce a wide variety of products ranging from visiting cards printed in one colour to bulky, four-colour direct mail catalogues. The smaller firms work mainly with local clients for whom they produce personal or commercial printed matter whereas bigger firms often deal with a more widespread clientele and supply for example printed advertising material, books or continuous stationery. Besides their printing activity some large enterprises run a publishing house specialising in newspapers and magazines.

In some countries of the Community, some larger firms involved in gravure printing produce catalogues, magazines and advertising material for the international market. The majority of printing companies operate however on a local or regional market as a consequence of their size and their products.

#### Recent trends

Production and employment figures in the printing industry have been decreasing since the beginning of the nineties as a consequence of the world-wide recession. The printing industry was affected by the decline of the economic activity to the same degree as other industry sectors on which it depends for its orders. In most West-European countries the worst seems to be over and growing trends can be perceived.

There are however persisting uncertainties, linked to increased competition and the sensitivity of customers to pricing policies. The narrow margins are worsened by the difficulty for printing companies to transfer the higher cost of raw materials, particularly of steadily increasing paper prices, on to the price of finished products.

#### Foreign trade

No detailed figures can be given on foreign trade for graphic products nor on the trade structure because foreign trade statistics do not distinguish between the trade of printing firms and that of publishing houses.

The production of graphic products in EU-Member States is mainly determined by the internal demand. The export rate, that is the percentage of the industry's turnover achieved by exports, is in general below 10 %. This relatively low rate is due to several characteristics of the industry, such as the need for frequent contacts with the client, the great need for communication during the work, linguistic barriers or the relatively high costs of transport. Exports concern mainly large runs or special contracts, such as catalogues or other printed advertising material, books or magazines. Exports are in general made by a small number of large firms working in gravure or web-offset.

Most of the external trade with non-EU countries is done with other Western European countries. The amount of printed work done by EU-printers for outside clients has increased considerably in recent years. Trade with Eastern countries remains low but is expected to develop in the near future. Exports to non-EU countries are about twice as important as imports.

### MARKET FORCES

#### Demand

In the graphic industry there is a direct link between demand and production, because this sector supplies mainly to order or to long-term contracts in the case of publishing and packaging. Printing firms are rarely able to manufacture for stock as other industrial sectors can.

Demand for printed products is influenced by a number of demographic and economic factors such as population growth, composition of households, training and education as well as economic growth. The graphic industry, just like the publishing

**Table 1: Printing Turnover**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)
Austria (2)	N/A	1 008	1 034	1 044	1 068	1 179	1 256	1 341	1 343	1 276	N/A
Belgique/België	1 675	1 853	2 059	2 150	2 323	2 522	2 728	2 867	3 049	3 109	3 140
Danmark (3)	1 552	1 747	1 975	2 096	2 200	2 224	2 355	2 348	1 995	1 914	N/A
BR Deutschland (2) (6)	10 329	10 905	11 849	12 756	13 518	14 660	16 296	18 605	18 911	18 996	19 372
España	2 923	3 174	4 147	4 550	5 160	6 173	7 424	7 628	7 142	N/A	N/A
Finland (4)	N/A	1 865	1 963	2 111	2 672	3 671	3 738	3 399	2 551	2 049	2 053
France (5)	N/A	N/A	N/A	12 196	13 680	14 875	15 930	15 777	15 276	9 716	9 424
Italia (2)	N/A	3 242	3 233	3 738	4 231	4 505	4 427	4 412	4 453	4 479	4 630
Luxembourg	N/A	N/A	N/A	89	97	104	114	132	138	N/A	N/A
Nederland (2)	N/A	3 376	3 513	3 604	3 832	4 014	4 836	5 018	5 109	4 973	5 064
Sweden (5)	N/A	2 737	2 993	3 368	3 650	4 029	3 936	5 615	5 624	4 258	4 341
United Kingdom	N/A	N/A	N/A	N/A	4 184	4 561	4 621	4 582	5 399	N/A	N/A

(1) Estimates or provisional figures.

(2) Enterprises with 20 or more employees.

(3) Enterprises with 6 or more employees until 1987, and 20 employees from 1988 onwards.

(4) Enterprises with 5 or more employees.

(5) Enterprises with 10 or more employees.

(6) The figures from 1991 onwards relate to unified Germany.

Source: Intergraf

**Table 2: Printing  
Employment**

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)
Austria (2)	N/A	18 128	18 278	17 900	17 232	17 468	22 609	22 537	16 854	15 322	14 490
Belgique/België	26 956	26 918	26 850	27 064	28 351	29 362	29 358	28 595	27 896	23 000	N/A
Danmark (2)	N/A	N/A	N/A	37 450	37 411	37 318	36 921	34 813	34 333	25 895	N/A
BR Deutschland (3)	210 185	211 399	214 654	220 211	222 495	227 222	234 429	244 890	264 355	253 214	241 600
España	83 655	76 500	78 000	78 100	82 000	85 000	85 000	92 143	85 240	N/A	N/A
Finland	N/A	38 490	38 320	37 669	37 959	37 657	37 412	35 453	32 956	30 200	30 500
France	N/A	N/A	N/A	133 968	136 601	139 420	139 971	140 862	135 814	107 500	105 350
Italia (2)	55 468	49 512	46 366	48 316	48 410	48 849	48 260	47 150	46 254	45 372	44 918
Nederland	46 970	47 774	49 144	54 517	53 191	53 686	55 653	56 966	56 841	56 600	54 300
Portugal	18 634	17 878	24 242	24 845	23 586	N/A	27 862	28 970	28 251	N/A	N/A
Sweden	N/A	42 551	42 621	42 700	42 735	43 350	41 800	53 745	47 860	54 270	53 570
United Kingdom	N/A	N/A	N/A	293 500	301 300	313 500	312 300	299 400	N/A	N/A	N/A

(1) Provisional figures.

(2) Enterprises with 20 or more employees.

(3) The figures from 1991 onwards relate to unified Germany.

Source: Intergraf

sector, is above all a supplier of products which disseminate information and knowledge and cater for leisure activities. Its role stems from its cultural, intellectual and educational vocation within the context of the exchange of ideas and information in democratic societies. Despite the low growth of population, the number of households and managerial jobs continues to grow as does the proportion of income available for education and information. All this continues to stimulate the demand for newspapers, magazines, periodicals and books. Consequently, the number of books printed has never been so high. New technologies have opened up new and ever growing markets, such as for computer manuals and educational material.

Advertising expenditure by trade and industry is one of the most important factors influencing demand and production in the graphic industry. Almost two thirds of the industry's turnover depend directly or indirectly on advertising. Any political decision affecting advertising, in general or in particular also affects the graphic industry and consequently can jeopardise employment.

The printing of catalogues, advertising brochures, pamphlets and company reports, as well as advertising inserts in newspapers and magazines, are steadily increasing.

Another determining factor for the graphic industry are orders for printed products either for private or commercial use. This market includes for instance visiting cards, tickets, note-paper and all kinds of forms. The majority of small printing firms produce such printed products for local circle of private or business customers, such as authorities, small trades, industrial or commercial companies. These printed products in single sheets remain an important and stable market segment.

Forms produced as continuous stationery - with a side perforation intended to adapt to the printing units of computerised

systems are generally produced by larger printing houses, which operate on a trans-regional market area. Production for this market declined however over the last years and trends are expected still to worsen considerably. The market for this kind of forms is adversely affected by the growing use of laser printers, desktop publishing systems, and of electronic data interchange (EDI). To ensure the maintenance of a reliable market, forms producing companies have to offer customers flexible and multi-functional products by mixing, coupling and combining documents using the new IT, IC and digital printing technologies. Developing niche services likely to bind customers to the printer is the key for success.

Labels, printed packaging products, wall calendars, illustrations and postcards form another sector of the graphic industry. These products are often printed by specialised firms.

The upward trend in overall demand has been stimulated by the development of both new and existing products. At the same time, printers are trying to cater for special requests. Quality standards reached by printed products considerably rose. Multicoloured pictorial information is increasingly required for advertisements, magazines and company reports, and newspapers are now also making a considerable use of colour printing.

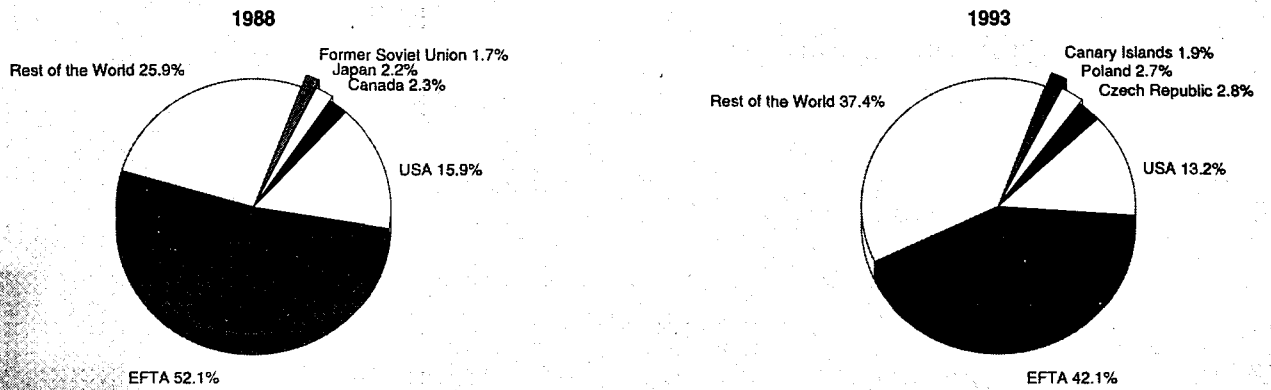
Information needs are satisfied by an increasing variety of electronic means and communication devices. Nevertheless, the permanence and high degree of information stored in the printed product have enabled it to retain its position as a simple, easily accessible and efficient means of communication. In future specific information will also be conveyed via electronic media, either by means of diskettes or CD-ROM, or via data transmission networks (ISDN), as it is the case for on-line data banks and E-mail (electronic mail). In some countries, Italy for instance, tariffs applied by the State, in

**Table 3: Printing  
External trade at current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	730.1	866.4	930.2	1 008.4	1 004.3	1 095.5	1 204.5	1 263.2	1 285.2	1 473.3	N/A
Extra-EU imports	361.8	390.9	505.4	466.8	493.9	572.2	612.9	722.9	717.4	729.5	N/A
Trade balance	368.3	475.5	424.8	541.6	510.4	523.3	591.7	540.3	567.7	743.8	N/A
Ratio exports/imports	2.02	2.22	1.84	2.16	2.03	1.91	1.97	1.75	1.79	2.02	N/A

Source: Eurostat

**Figure 1: Printing  
Destination of EU exports**



Source: Eurostat

a situation of monopoly, are very low and cause a fast shift of economic operators towards electronic mail.

Multimedia is also to be mentioned among the new communication media. It presents information involving text, images (static or in motion) and sound (speech or music). Multimedia is consequently the meeting point of many skills in the various communication services, and printers will increasingly have to find their way in new partnership circles.

These new forms of distribution and presentation of information have a direct impact on some products of the printing industry. For instance, some kinds of books (encyclopaedia, directories, scientific or legal reference books) are also available on CD-ROM. It is also the case for some magazines or catalogues. On-line data banks increasingly make available similar information to the one provided by printed products. Although a few printed products are expected to be replaced by these new media, in most cases the new media will be complementary to the printed products. Opportunities for new markets can consequently be expected for printing companies.

**Supply and competition**

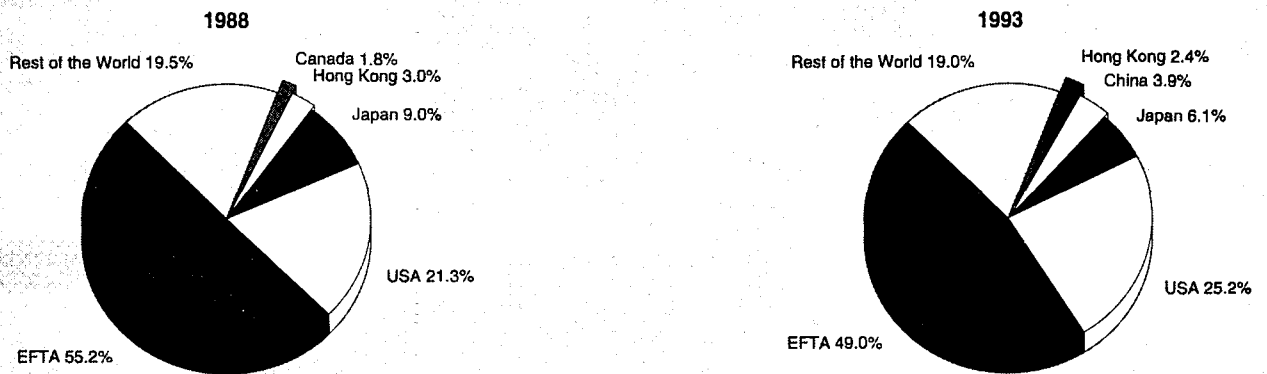
Publishers remain one of the printer's main clients, and account globally for about 40 to 50 % of production.

The printing of newspapers is almost exclusively carried out for publishing firms. Furthermore, in this area, publishing houses and printing houses often form a legal entity and belong to one owner. The printing of newspapers accounts for just under one-fifth of the total printing production.

Publishing houses are also important clients of magazine printers. In countries such as Germany, consumer magazines are often produced by printing houses which are owned by publishing houses. In other countries, United Kingdom and France for instance, such a situation is rare: printing and publishing represent two distinct and different activities. These publishing houses are increasingly operating on international markets. Other types of publications, such as specialised periodicals - religious, scientific or trade magazines - are printed for independent publishers or for publishing houses linked to printing houses. The production of periodicals accounts for just under one-fifth of the total print production.

Book printing follows a similar pattern. Orders for book printing, paperbacks or hardbacks, do not come exclusively from book publishers - independent or linked to printing houses. Industry, public authorities and other organisations are also regular customers. Book printing accounts for about one-tenth of the total printing production.

**Figure 2: Printing  
Origin of EU imports**



Source: Eurostat

**Table 4: Printing  
Trade by country, 1993**

(million ECU)	Extra-EU exports	Share (%)	Extra-EU imports	Share (%)
EU	1473.3	100.0	729.5	100.0
Belgique/België, Luxembourg	45.2	3.1	27.7	3.8
Danmark	70.2	4.8	42.8	5.9
BR Deutschland	558.0	37.9	263.6	36.1
Hellas	4.3	0.3	6.5	0.9
España	51.5	3.5	21.1	2.9
France	214.6	14.6	111.7	15.3
Irèland	6.7	0.5	8.3	1.1
Italia	124.5	8.5	45.2	6.2
Nederland	78.7	5.3	49.7	6.8
Portugal	1.6	0.1	6.2	0.8
United Kingdom	318.0	21.6	146.6	20.1

Source: Eurostat

The market for printed advertising material consists of a wide range of goods, such as direct mail catalogues, prospectuses, advertising inserts, posters or leaflets. The structure of this market is as diversified as its products as a large proportion of the clients are made up of direct mail companies, commerce and industry. Political parties and other organisations are also big consumers of printed advertising material. This sector has grown considerably over the last few years, stimulated mainly by the development of new forms of advertising, such as direct mail. The production of printed advertising material accounts for a quarter of the total printing production.

Printed matter for individuals and professionals is often taken on by the small printing firms. These cater for the municipalities, various organisations, industry, commerce and local individuals to whom they supply visiting cards, business forms, headed paper, invoices and also possibly transport tickets. These small firms often print in single sheets. Larger, or more specialised firms deal with continuous printing and produce different types of continuous forms, completed on computer by the clients themselves. Some highly specialised firms are involved in the production of another category of printed products, i.e. security printing. The production of such printed matters accounts for about one-fifth of the total printing production.

Printing production also includes various products such as calendars, fine-art prints, postcards and greetings cards, cartographic products etc. Alongside these products the sector also produces rubber or polymer stamps, reprographic products such as photocopies, overhead foils and microfilms.

Services such as the design of printed matter and the production of layouts and dummies are also offered to the client. In the future, firms which will offer new services through desk-top-publishing processes will complete the existing structure of the graphic industry.

#### Production process

Current developments in the industry indicate a close link between the printing sector and progress in communication and information technologies.

Innovations in equipment and graphic machinery have put the printing industry in the forefront of technological progress. Equipment has therefore a major impact on the type, the quantity and the flexibility of the work carried out, as well as on the professional skills and the organisation of the work in general. Many aspects of the print production process are now commonly automated, measured and controlled by computers. In the last few years, there has been a substantial

**Table 5: Printing  
Breakdown of production by market segment, 1993**

(%)	A (1)	D (2)	F	NL (3)
Books and brochures	12.0	7.2	4.6	6.0
Newspapers	27.6	16.7	N/A	14.8
Magazines and periodicals	-	12.7	12.0	13.0
Catalogues and directories	N/A	5.4	3.5	N/A
Packaging	N/A	6.4	13.1	9.6
Cards and calendars	1.2	1.4	1.3	N/A
Printed advertising	27.0	18.6	18.8	25.2
Commercial printing	16.3	15.7	14.0	-
Forms	N/A	-	10.3	5.2
Cartographic products	0.7	0.4	0.1	N/A
Other printed matter	N/A	2.5	6.7	13.1
Reproduction	8.1	4.1	7.4	5.0
Binding and finishing	N/A	2.2	5.4	7.0
Composing	2.2	1.2	2.0	0.9

(1) Newspapers, magazines and periodicals are combined.

(2) Commercial printing and forms are combined.

(3) Printed advertising and commercial printing are combined.

Source: Intergraf



increase in investment in new printing machinery in several Community countries.

There have been particularly fast changes in the pre-press sector. Even small printing and reproduction firms now use totally electronic pre-press systems.

New digital colour printing machines are gradually being introduced in workshops. This new type of machinery is mainly intended for 4-colour short runs up to DIN A3 size. Such colour presses are likely to affect the printing-on-demand market segment for existing products such as advertising material, and also to enable the emergence of markets for new products and new services.

Digitalisation is also increasingly applied to traditional presses and finishing equipment. Microprocessors allow for the operation of presses, as well as for measurement and control functions. Technology and know-how developed by machinery manufacturers are exploited world-wide. The printing industry in almost all West-European countries operates consequently under rather similar technological conditions.

The use of electronics in information and communication now plays a significant role on the whole printing process. A particularly significant effect is that the transmission of information from client to printer is now in most cases carried out through electronic media. The transmission of information within a printing house - for example, in newspaper printing, from the editing department to the printing floor or in the case of magazine printing, from one printing department to another - has become quite common.

On the other hand, publishing firms have tried to evaluate the impact of this new technology in communication on printed products and are looking into ways of becoming more involved in these areas. Publishers and printer/publishers have often invested in such areas as data-processing units, data banks, videotext and even local radio stations, whereas the printers tend to remain faithful to purely technical operations.

## INDUSTRY STRUCTURE

### Companies

The graphic industry in the Community, is made up of small and medium-sized companies. A typical printing firm employs fewer than 20 employees, as some 85 % of all the firms belong to this category. The remaining 15 % are essentially firms employing between 20 and 500 workers. Only a very small number of printing firms employ over 500 workers; in Germany this category stands for 0.3 % of all the firms and this percentage is even lower in a number of other countries.

### Labour and training

Printing has traditionally been a high wage industry, reflecting the above-average levels of skill required from its labour force. Printers have also often been among the first to benefit from improved working conditions - shorter hours, longer holidays and other advantages. In half the Community countries the working week is 37.5 hours or less. In most other countries it is below 40 hours. Only Portugal still has a basic week of 43 hours. German printers already enjoy 6 weeks annual holiday and in five other countries they have at least 5 weeks.

At the same time, wage costs have a considerable impact on total production costs and have even increased in the last few years. Furthermore, important investment costs need to be made to ensure that the necessary qualified personnel is available. Despite all this and the swift technological developments in recent years, which have enabled the emergence of new markets, employment has remained relatively stable in the graphic industry.

Training goals have been adapted everywhere over recent years to attract trainees with the necessary qualities to the industry, to give them broad-based knowledge of new technologies. Printing technology, which has undergone great changes in the last quarter of a century, is still evolving to become faster, more automated and better controlled with the help of electronics. The industry's labour force has to be receptive to continuous training to adapt to changing techniques with a view to greater flexibility, in which print workers are not limited to a single speciality.

## ENVIRONMENT

The European Graphic Industry is an industrial branch which has only a marginal impact on the environment. Nevertheless, the industry is devoting increased resources to meeting the stricter environmental requirements. For example, it has invested large amounts of money to limit emissions caused by web-offset printing, to improve the quality of water and to encourage the recycling of waste.

In some EU-countries the graphic industries federations collaborate closely with government departments to agree on the best measures for environmental protection. At international level, the international association for the graphic industry, Intergraf, is co-operating with the EU-Commission to define appropriate directives in this area. To maintain fair competition, the Single Market requires the harmonisation of legislation in all EU-Member States, particularly in the field of the environment. The graphic industry considers it has a responsible role to play in safeguarding the environment and therefore our living space.

## OUTLOOK

Further developments are expected in the future as a result of the structural changes in communication media. Innovations in information technologies call for deep modifications in organisational structures.

This new phase of development in the printing industry reminds us in some aspects of the deep changes occurred in other periods of economic-industrial history. The transition period is once again marked by recessive effects leading to reductions in employment and drastic re-organisations.

Technological progress leads towards a new configuration of the communication industry as a whole, and to new types of relationship with the printing industry. The new communication techniques reduce the distance between the printer and his customer, facilitate and intensify data transfer.

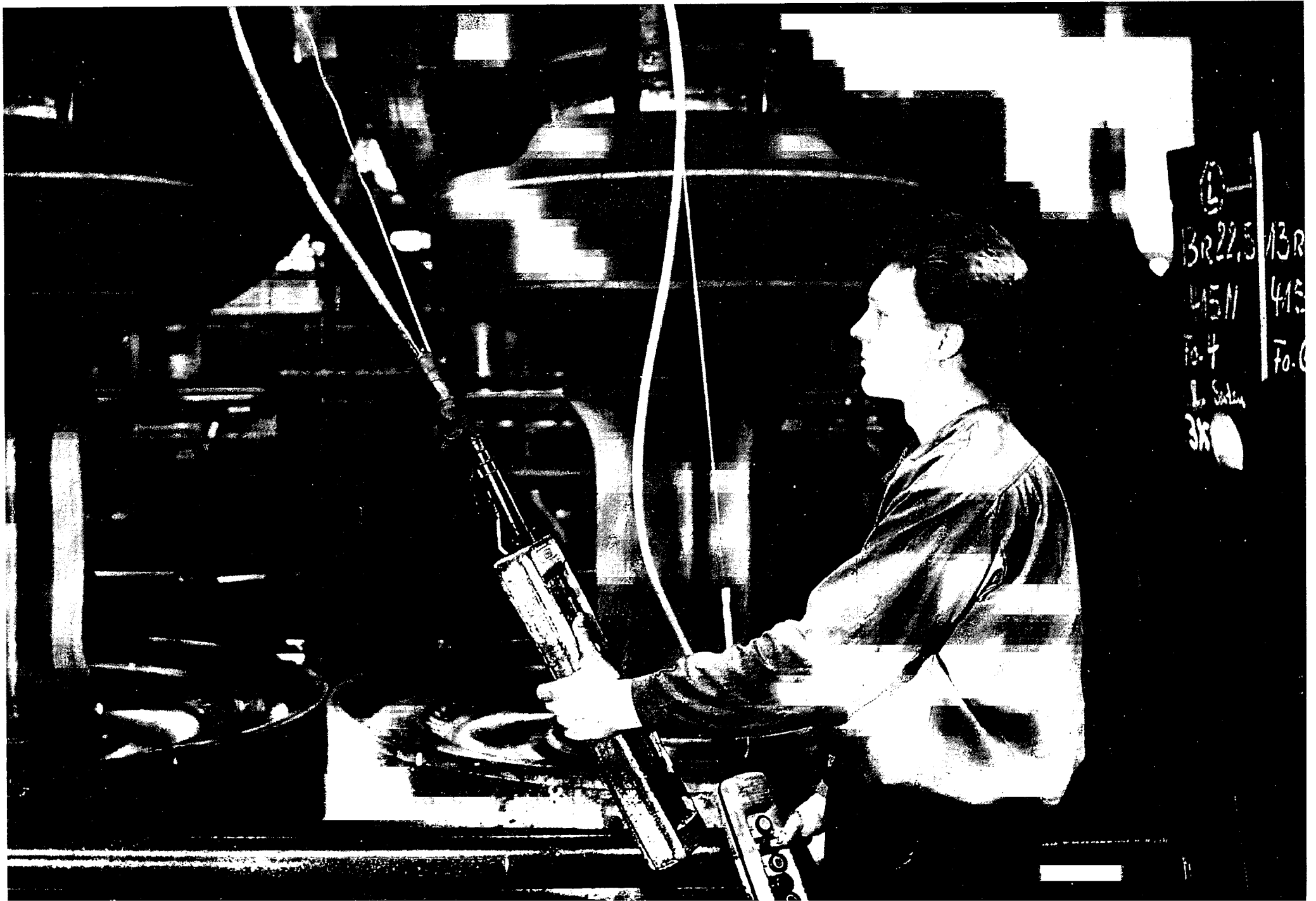
Frontiers are expected to fall down: between suppliers and users, between specialised markets and mass production. A new industry is emerging: the "digital printing" industry.

However, printed products will continue to be more than ever a communication means oriented to the future. The graphic market is innovative; graphic products perfectly meet individual needs and respect the environment.

Written by: Intergraf

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## Rubber products

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After the economic recession and the resulting production losses, demand for rubber products is showing some signs of recovery, leading to increasing sales of car tyres. The European manufacturers will increasingly come under threat from non-EU suppliers of cheaper brands. This will put further downward pressure on prices and profit margins. In order to stay competitive, the industry must continue its current strategy of cost reductions and development of new product and processing technologies. For 1994 a small increase in EU consumption was estimated. In the period leading to 1998 modest growth rates are forecast as the economic recovery is expected to persist.

### INDUSTRY PROFILE

#### Description of the sector

The rubber industry comprises two main subsectors, the tyre and inner tube industry and the manufacture of industrial rubber products (also including some rubber consumer products).

The tyre and inner tube industry manufactures tyres and tubes for passengers cars, trucks and buses, agricultural vehicles, earth moving and mining machinery, bicycles and motorbikes, and other applications.

Industrial rubber products include pipes, hoses, sealings, belts, profiles, foam, soles, adhesives, etc. which are manufactured for such end-markets as vehicles, machinery, electrical engineering, construction, the chemical industry, the food and drink industry, the medical sector and sporting goods.

The rubber industry is related to the plastics processing industry (NACE 483). Both process polymeric material based on hydrocarbons. The larger enterprises in the sector of rubber products are often also active in the plastics processing industry. The processing machinery for both sectors is similar, with the exception that the rubber industry also uses mixing equipment because the raw material is mixed by the product manufacturers.

Compared with the processing of plastics and other related industries the manufacture of rubber products is a modest-sized industry. In 1993 the processing of plastics and the manufacture of basic industrial chemicals created a value added of 29 and 34 billion ECU respectively, compared to 12 billion ECU in the manufacture of rubber products.

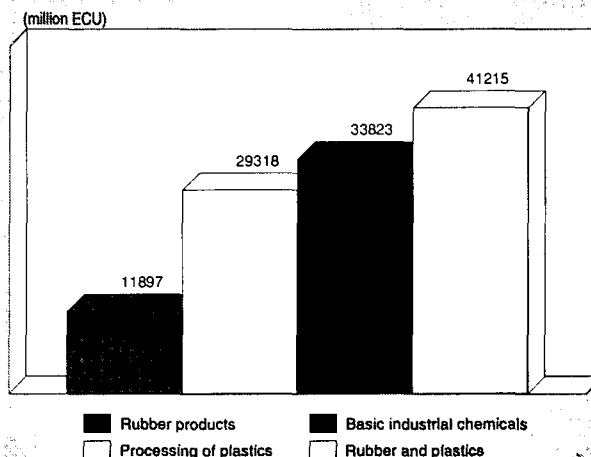
Germany is by far the leading manufacturer of rubber products within the EU, accounting for about 30 % of total EU production. France is the next largest producer constituting 24 % of production, and the United Kingdom ranks third with a share of 14 %.

The production of tyres accounts for about 60 % and industrial rubber products for 40 % of the total rubber products output in the EU. As relatively more information is available about the European tyre market more attention is paid to that segment in this monograph.

#### Recent trends

In the 1980s the market for rubber products was affected by intensifying competition, technological progress and environmental concerns. EU production in current prices increased at an annual rate of 4.5 % between 1983 and 1992. In constant

Figure 1: Rubber products  
Value added in comparison with related industries, 1993



Source: DEBA

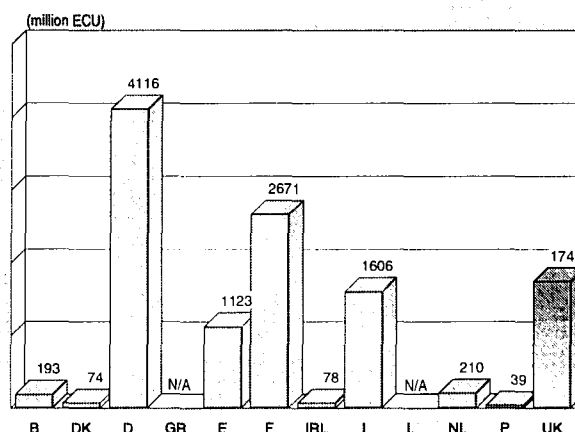
prices however, total production only increased by 1.2 % per annum in the same period. Demand expanded at a slightly higher rate than production, resulting in imports growing faster than exports. Due to the low output growth and rationalisation in the industry, employment declined from 1989 onwards.

In 1993 the economic downturn resulted in further drops in production, consumption and employment. The recession was especially felt in Germany where production declined by 12 %, resulting in a drop in employment of 10 000 people. Production decreases were also substantial in Italy (-11 %) and the United Kingdom (-5 %). In 1994, however, the market for rubber products improved. For the EU as a whole a production increase in current prices of nearly 6 % is expected.

#### International comparison

Measured in production value the EU has become the leading producer of rubber products in the world, followed by Japan

Figure 2: Rubber products  
Value added by Member State, 1993



Source: DEBA



**Table 1: Rubber products**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	18 769	20 227	21 364	22 123	24 080	25 411	26 362	26 881	27 527	25 167	N/A
Production	20 627	22 182	22 974	23 560	25 354	26 724	27 357	27 654	28 090	26 017	27 506
Extra-EU exports	3 200	3 467	3 216	3 236	3 464	3 790	3 515	3 509	3 681	3 962	N/A
Trade balance	1 858	1 955	1 610	1 437	1 274	1 314	995	773	563	850	N/A
Employment (thousands)	375.4	365.7	360.8	358.3	356.6	357.6	355.9	341.3	325.9	307.1	298.4

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

Source: DEBA

**Table 2: Rubber products**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	3.82	-2.45	0.98	-6.83
Production	2.97	-2.76	0.38	-5.76
Extra-EU exports	1.29	-0.32	0.57	2.76
Extra-EU imports	10.57	3.82	7.52	-4.59

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Rubber products**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	3 200	3 467	3 216	3 236	3 464	3 790	3 515	3 509	3 681	3 962
Extra-EU imports	1 342	1 513	1 607	1 799	2 190	2 477	2 520	2 736	3 118	3 113
Trade balance	1 858	1 955	1 610	1 437	1 274	1 314	995	773	563	850
Ratio exports / imports	2.38	2.29	2.00	1.80	1.58	1.53	1.39	1.28	1.18	1.27
Terms of trade index	99.9	100.7	99.6	99.0	98.4	99.5	100.0	97.8	97.4	97.4

Source: DEBA

**Table 4: Rubber products**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	81.4	85.3	88.4	91.4	97.5	98.9	100.0	100.1	102.9	102.9
Unit labour costs index (3)	86.5	88.6	90.7	92.8	92.1	95.4	100.0	104.6	107.5	109.4
Total unit costs index (4)	88.9	91.9	91.0	90.6	92.3	96.4	100.0	103.7	107.2	106.1
Gross operating rate (%) (5)	8.4	10.2	11.5	11.8	11.8	11.1	9.2	10.4	9.9	10.1

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

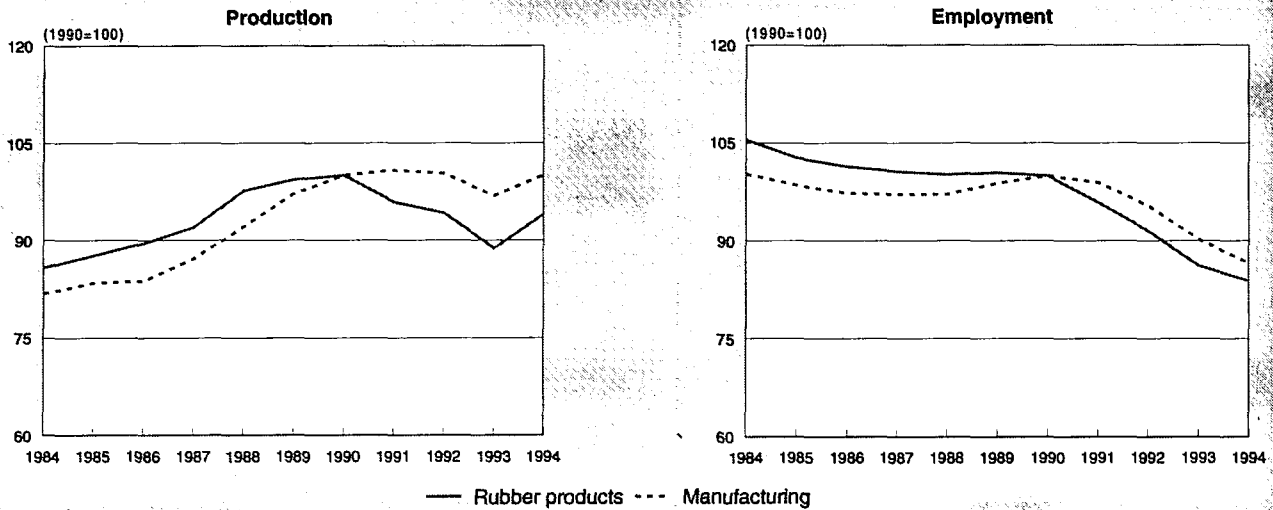
(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

**Figure 3: Rubber products**  
**Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
 Source: DEBA

and the USA. In 1984 this position was occupied by the USA. Although the Japanese production of rubber products has recorded relatively high growth rates during the 1980s, Japan still ranks third after the EU and the USA.

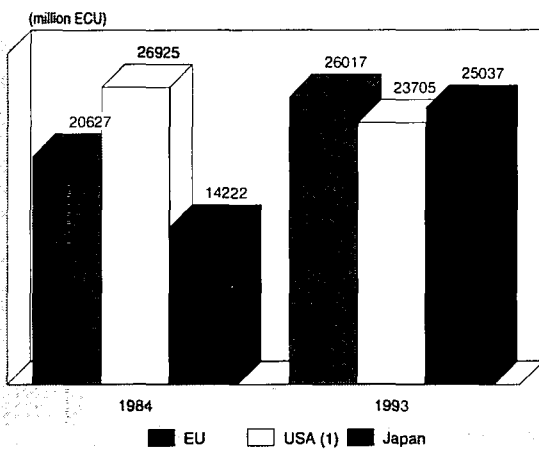
The USA is by far the largest consumer of rubber for tyre manufacturing, with a consumption estimated at 1 771 thousand tonnes in 1994. Japan follows with a consumption of 913 thousand tonnes. Within the EU, France is the major consumer with an estimated 335 thousand tonnes, followed by Germany (281 thousand tonnes), the United Kingdom (166 thousand tonnes) and Italy (137 thousand tonnes). Also in consumption of rubber for non-tyre products the USA has by far the largest requirements, at an estimated 1 337 thousand tonnes for 1994. Synthetic rubber mainly finds its destination in tyre manufacturing. Therefore production is concentrated in the countries mentioned above. The production of natural rubber, on the other hand, is dominated by Far Eastern countries, such as Thailand, Indonesia, Malaysia, India and China.

In the EU the car production and the accompanying sales of original equipment tyres (OE) has recovered in the course of 1994. For instance, in the first 6 months of 1994 German car production was 6 % higher than in the same period of 1993. Sales of replacement tyres and the manufacture of non-tyre rubber products also showed signs of recovery in the course of 1994.

**Foreign trade**

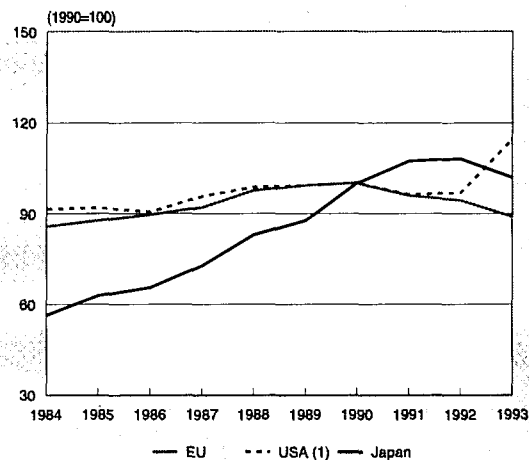
The EU is a net exporter of rubber products. In 1993 extra-EU exports reached nearly 4 billion ECU, whilst imports totalled over 3.1 billion ECU. Germany is the largest exporting country with extra-EU exports of over 1.3 billion ECU, representing one third of total extra-EU exports. German intra-EU exports, equalling 1.6 billion ECU, are even higher. The same picture applies to German imports. Extra-EU imports amount to just over 1 billion ECU, whilst intra-EU imports reached nearly 1.7 billion ECU in 1994.

**Figure 4: Rubber products**  
**International comparison of production in current prices**



(1) NACE 481 only.  
 Source: DEBA

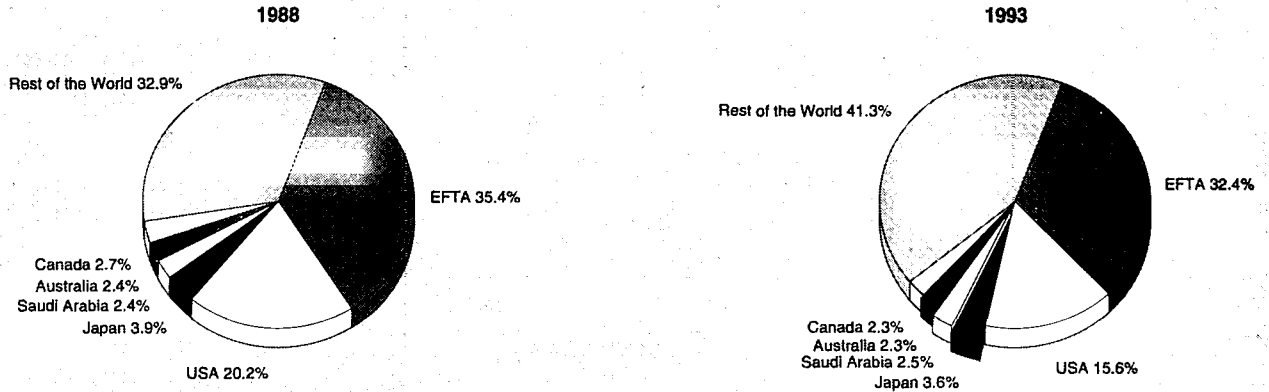
**Figure 5: Rubber products**  
**International comparison of production in constant prices**



(1) NACE 481 only.  
 Source: DEBA



**Figure 6: Rubber products  
Destination of EU exports**



Source: Eurostat

The EFTA countries are the most important export markets of EU rubber products, accounting for roughly one third of total extra-EU exports, followed by the USA, Japan and the OPEC-countries. Furthermore, the growing importance of East European countries is worth noting. Within the EFTA, Austria, Sweden and Switzerland are the major foreign markets for EU rubber products.

With respect to EU imports, Japan is the major supplier of rubber products accounting for nearly 20 % of total extra-EU imports. The share of the EFTA-countries decreased significantly from 1987 to 1992 and became eventually lower than Japan's. In 1993 the EFTA countries Austria, Sweden and Switzerland together constituted about 18 % of EU imports, followed by the USA with 14 %. Malaysia has become a major supplier of natural rubber. During the 1987-93 period this country has more than doubled its share on the European market, and in 1993 accounted for 8 % of total extra-EU imports.

## MARKET FORCES

### Demand

Over the period 1984-92 demand for rubber products increased at an average rate of 4.9 % per annum. In 1993 the industry

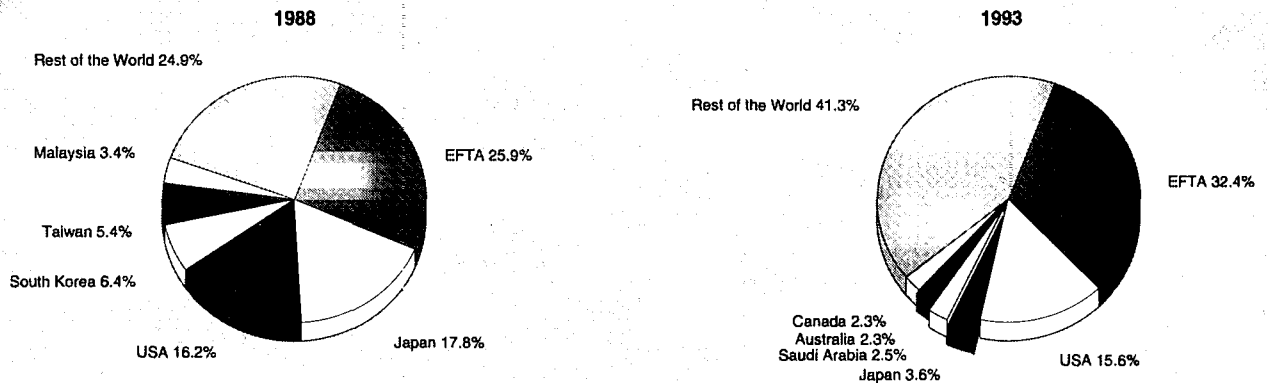
demonstrated its cyclical character, as sales were hit by the recession in major client industries. The fall in car production was the single most important factor behind the 7.4 % drop in rubber products sales in 1993. As a result, consumption in real prices only recorded a meagre annual growth rate of 0.98 % over the period 1984-1993.

The problems on the car market have forced the car manufacturers, the major client industry for rubber products, to rationalise production and lower costs. Moreover, cars are more and more tailored to the requirements of the end-user. This entails the production of many different types of tyres, which also last longer. Due to technological progress in materials the production of radial tyres with warranties of 80 000 miles has become possible, whereas 40 000 miles was customary only a few years ago.

Industrial products account for 40 % of the volume of total EU production of rubber products, while tyres account for 60 %. Sales values, however, are about the same for both sectors owing to the higher specific value of industrial products.

The European market for tyres can be subdivided into tyres for original equipment (OE-tyres) and tyres for replacement. In 1993 almost 33 % of tyre sales were OE-tyres and 67 % consisted of replacement tyres. The European tyre market

**Figure 7: Rubber products  
Origin of EU imports**



Source: Eurostat

can be further subdivided into car tyres, truck tyres, farm tyres and motorcycle tyres. Car tyres account for nearly 92 % of total tyre demand. Truck tyres constitute 5 %, followed by motorcycle tyres (2 %) and farm tyres (nearly 1 %). The remainder is made up of bicycle tyres, tyres for earth movers and tractor graders, industrial tyres and deep-loading trailer tyres.

An important segment of car tyres is formed by the market for winter tyres. These tyres represent 10 to 12 % of replacement tyre market shipments of new car tyres (between 13 and 15 million units). This segment is characterised by accelerating development and competition. Technological developments include the use of new compounds for winter tyres.

On the market for passenger car and light truck tyres a proliferation of brands and micro-segmentation has taken place in the recent past. In the economic recession demand for and supply of lower-priced products has increased. These products are either private brands from a host of sources, affiliate brands of major companies, or new brands coming from the Far East or from East Europe. House and private brand tyres account for only 10 % of market demand, but their share is rising.

### Supply and competition

The supply of low-priced tyres has expanded in a period when industry-wide utilisation of capacity was below 80 %, prices were under pressure, and OE production was a money loser. The resurgence of private brands and emergence of affiliate brands can be traced to the early 1990s when the major tyre makers instituted price increases across Europe of 10 to 12 % on their main product lines, thus creating a market opportunity for lower-priced products. These market opportunities have been picked up by new brands coming in from the Far East and Eastern Europe, but also by private brands from a host of sources, or affiliate brands from major companies. Goodyear (USA) and Pirelli (I), in particular, have been very aggressive in courting private brand business. The introduction of many new products into lower end price-conscious segments raises fears that prices across the range of products will be dragged down, and the difference between standard and premium products will become blurred.

The increasing share of imports in total EU consumption reflects the growing supply of non-European tyres. Over a 9 year period import penetration increased from 7.2 % in 1984

to 12.4 % in 1993. In contrast, the export to production ratio remained at a rather stable level, ranging between 12.9 % to 15.6 %.

### Production process

The pressure on prices and profits in the market for tyres induces constant efforts to reduce production costs, especially labour costs, by automation. As a result, employment in the industry has decreased by nearly 70 000 people since 1984, of which 48 800 since 1990.

Although the decrease of the number of employees has led to a higher labour productivity, unit labour costs could not be controlled by the industry. Labour costs have increased at a larger pace than total unit costs.

Automating production processes also yields other advantages, such as a better repeatability, shorter down-times during size-changes and more flexibility. Implementation of these technical developments will reduce labour costs. Currently, these costs represent 25 to 40 % of a tyre firm's turnover, depending on the data used.

The rubber industry processes natural and synthetic rubber. Natural rubber is especially used in truck and bus tyres because of its low heat build-up. For technical rubber products a much higher fraction of synthetic rubber is used, depending on the specifications of the product. An important raw material for the rubber industry is carbon black, besides textile and metal components.

## INDUSTRY STRUCTURE

### Companies

The world tyre market is dominated by large multinational companies. Among the world's top ten tyre makers three European companies are represented: Michelin (F), Pirelli (I) and Continental (D). Only Continental recorded a net profit in 1993, whilst the other two companies incurred losses.

Although foreign suppliers are gaining market share, European manufacturers still dominate the EU market. Michelin is the largest European tyre manufacturer with a leading market share of 31.7 % of total sales. Continental and Pirelli hold market shares of 13.8 % and 9.2 % respectively.

The largest tyre manufacturers usually produce industrial rubber products as well. However, specialised small and medium-sized enterprises only producing technical products or products for end-consumers dominate in this market segment.

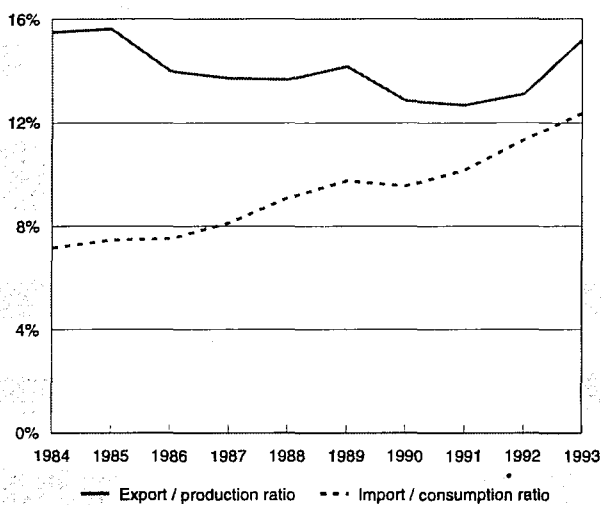
### Strategies

At least three responses to the challenges resulting from intensifying competition can be identified. Firstly, higher investment in cost-reducing processes; secondly, increased efforts in research and development; and thirdly, mergers and acquisitions and/or alliances.

Investment activity in Europe is oriented towards cost-reduction and productivity-increases, not to new capacity, whereas in the Far East new plants dominate investment. In Europe capacity has been reduced in the recent past in answer to stagnating, or even declining demand and to reduced expectations. Michelin, Continental and Pirelli have all closed capacity in Europe since 1993. The low capacity utilisation has resulted in a proliferation of private brands. In order to utilise their remaining capacity and to face the price competition with cheaper foreign brands, the European tyre manufacturers are producing more and more private brands or associated/house brands.

As the car market became increasingly international, tyre manufacturers were forced to follow and adopt a worldwide strategy. The concept of dominant position at both national and EU level has disappeared. The recent past saw a reshaping

Figure 8: Rubber products Trade intensities



Source: DEBA

**Table 5: Rubber products**  
**The ten largest companies in the EU, 1993**

(million ECU)	Country	Turnover	Gross operating surplus	Employment (thousands)
Michelin	F	9 560	993	124.6
Pirelli	I	5 026	373	42.1
Continental	D	4 844	533	51.0
Hutchinson	F	1 212	184	12.9
Pneumatique Kleber	F	561	41	7.4
London International	UK	509	29	8.5
Avon Rubber	UK	337	31	5.3
Vredestein	NL	213	26	2.0
Gates	UK	123	12	1.4
A.G. Petzetakis	GR	76	14	0.6

Source: DABLE, DEBA

of the structure of the world tyre industry, in which the size of the large groups increased. Bridgestone (J) took over Firestone (USA), Michelin took over Uniroyal Goodrich (USA), Pirelli (I) acquired Armstrong (USA) and Metzeler (D), Continental took over Semperit (A), General Tyre (USA), and Uniroyal-Englebert (USA). Fulda (D) was acquired by Goodyear (USA) and Dunlop (UK) by Sumitomo (J). Besides acquisitions firms also engage in strategic alliances.

The European manufacturers are seeking and gaining presence in Asia through strategic alliances, but also by investing in new plants or by relocating European plants to this continent. Michelin for instance actively pursues manufacturing deals in India and China. In 1993 the French company invested more than 400 million ECU for expansion in Asia. Also Continental is expanding strongly in Asia with capital investments equalling more than 300 million ECU. Pirelli is already heavily active in China and is pursuing off-take agreements, technology licensing and joint ventures throughout the Far East. In 1993 the Italians invested nearly 100 million ECU in this region.

### Impact of the Single Market

The overall impact of the Internal Market programme is positive as the industry, like other industries, has been able to benefit from the horizontal measures which were adopted. Besides these there were few measures of direct relevance

to the rubber products industry. Among the remaining barriers or market distortions, the cost of inputs and especially of labour is perceived to be a real problem by the industry. An important remaining internal barrier concerns EU legislation with respect to waste management and the free movement of waste products, which is not sufficient to enforce proper action by the Member States and which leaves too much room for different interpretation. Removing this barrier should have the highest priority. Another priority is also related to waste management and concerns the imports of cheap non-retreatable rubber products, which creates problems from an environmental point of view.

### ENVIRONMENT

The main environmental issue for the rubber industry is the recycling, incineration or disposal of scrap tyres and rubber products. Retreading used tyres is a widespread recycling method which has many positive aspects from an ecological point of view. Also, the longer duration of tyres in comparison with the past contributes to limiting the amount of disposal. In contrast, the growth in the number of cars has a negative influence on the environment. Despite these developments, every tyre has to be incinerated or disposed at dumps at the end of its lifetime. There have been attempts to make chemical recycling by pyrolysis in order to get hydrocarbons, but so far this technology has turned out to be too expensive and to generate itself air pollution.

The EU is world leader in research and development of ecological technologies. In the long run this could lead to export opportunities either in the form of machinery and plants, or in the form of licences for ecological incineration technology. The United Kingdom has recently inaugurated a power plant fuelled by used tyres.

Other environmental developments which might affect tyre sales are the attempts by the EU and by most Member States to reduce car traffic by raising excise duties on fuel and/or planning the introduction of other taxes such as the carbon tax which might not only influence mobility, but also the production of tyres. Such a tax, however, will only be implemented in the long run and the direction and magnitude of the impact is not quite clear.

### OUTLOOK

In 1993, the economic downturn has caused a difficult period for most European manufacturers of rubber products, leading to disinvestments and job losses in Europe. The recession has shifted demand towards low-price tyres. Especially the new Asian brands constitute a real threat to the market positions

**Table 6: Rubber products**  
**Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.57	0.56
Danmark	0.37	0.33
BR Deutschland	1.00	0.97
Hellas	0.62	0.52
España	1.22	1.24
France	1.17	1.29
Ireland	0.65	0.71
Italia	1.13	1.14
Luxembourg (2)	5.13	3.69
Nederland	N/A	0.38
Portugal	0.76	0.26
United Kingdom	0.91	0.91

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

(2) NACE 480.

Source: DEBA

of European manufacturers in the coming years. The latter are responding by producing house and private brands. Already in 1994, a small increase in EU consumption was estimated. For the coming years a recovery in demand and production is expected, although growth figures will be modest and not sufficient to prevent a further decrease of employment in the industry.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Liaison Office of the Rubber Industry of the EC (BLIC). Address: Avenue de Arts 2, Bte 12, B-1040 Brussels; tel (32 2) 218 4940; fax: (32 2) 218 6162.



# Plastics processing

## NACE 483

After a difficult 1993, with production and consumption of plastic products declining more than 3 %, plastic sales bounced back in 1994 with growth of about 5 %. Competition in the sector has become more intense, resulting in low profit margins. Rationalisation of production capacity resulted in a decline of employment of 5 % during the past two years. Environmental legislation and shifts in consumer preferences contribute to the substitution of materials, the development of new product designs and the introduction of plastic recycling schemes. Nevertheless, with expected overall growth rates of 3-4 % for the coming years, prospects for plastic processors are favourable.

### INDUSTRY PROFILE

#### Description of the sector

Consumption of plastics material in the EU plastics processing industry was approximately 30 million tonnes in 1994. The main plastics materials processed for the different plastic markets are: polyvinylchloride (PVC) 5.0 million tonnes, high density polyethylene (HDPE) 3.0 million tonnes, low density polyethylene (LDPE) 4.6 million tonnes, polypropylene (PP) 4.8 million tonnes, polystyrene (PS) 1.7 million tonnes, polyurethanes (PUR) 1.4 million tonnes and fibre reinforced plastics/composites (FRP/C 0.9 million tonnes).

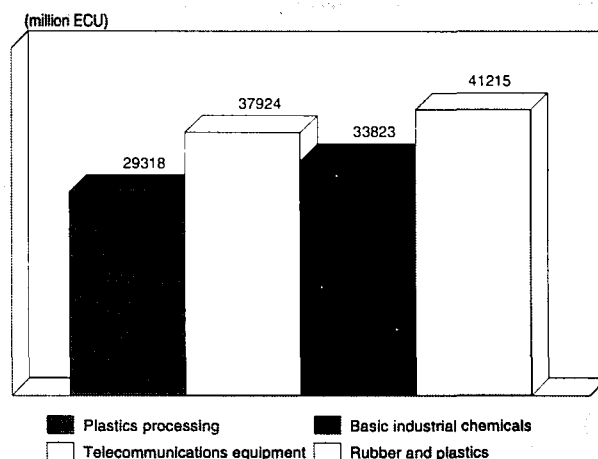
In 1994 the industry employed around 752 000 persons in about 20 000 companies. Sales in the plastics converting industry are estimated to have reached about 97 billion ECU in 1994. The sector's main business is to convert plastic resins and compounds into products. The sector operates a range of different technologies, such as injection moulding, compression and blow moulding extrusion, and hand lay-up of fibre reinforced plastics and coating. It also carries out ancillary operations, such as decoration by silk printing, hot stamping and a variety of subassembly operations.

Plastics converters may produce finished articles which are used by other industries like food packaging and building articles, or distributed to consumers. They may also be custom processors who produce components on a subcontract basis for other manufacturers, or in-house operations integrated into the manufacturing process. Major markets for plastics are packaging, building materials, electrical goods and electronics, automotive components, furniture, and agriculture.

#### Recent trends

A production increase of 5.3 % was forecast for 1994 which will lead to a total processed volume of about 28.6 million tonnes in Europe. Both consumption and production increased during the 1984-1993 period, by 5.7 % and 5.4 % per annum, respectively. Trends in plastic processing differ between Member States though. During 1993, demand was down by 3 % in Germany (accounting for nearly one-quarter of total EU demand) and 1.4 % in France, but during 1994 growth resumed by 3-4 %. Spain, Italy and Benelux experienced growth below 1 % during 1993, but reportedly 1994 showed higher growth rates. The temporary dip in demand during 1993 was mainly caused by a fall in demand for cars (e.g. down by 0.5 million cars in France; 0.3 million in Spain; and Fiat selling 21 % fewer cars) and the worst crisis in the building industry for many years, affecting downstream sectors such as the manufacture of PVC-pipes. In contrast, demand for thermoplastics in the UK experienced growth of 3.6 % in 1993 after three years of poor performance.

Figure 1: Plastics processing  
Value added in comparison with related Industries, 1993



Source: DEBA

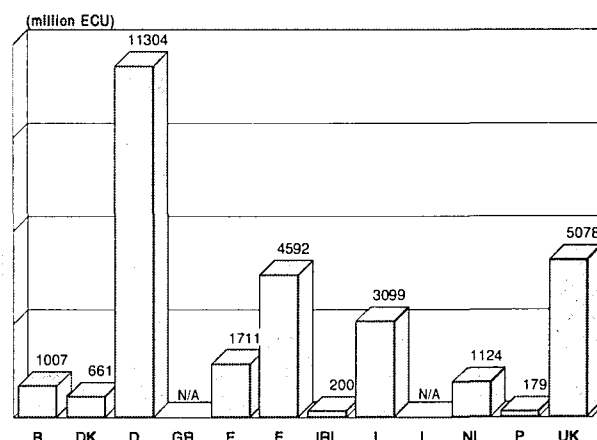
General trends indicate that PVC, conventional LDPE, polystyrene and ABS (acrylonitrile-butadiene-styrene) were among the materials that had a particularly difficult 1993, while propylene, high density and linear polyethylene and PET (polyethylene terephthalate) showed the strongest growth.

From 1984 to 1990 employment in the sector increased on average by 4.6 % per year, reaching a peak of 798 400 in 1991. Since 1991, however, employment has fallen by 4.8 % to 760 400 in 1993 and is expected to drop to 752 000 in 1994. Nevertheless, the decline of employment in plastics processing has been less pronounced than for manufacturing in general. Furthermore, there has been a trend towards greater rationalisation with larger processing groups getting ever bigger.

#### International comparison

In 1984, the USA was the largest producer of plastic materials. However, in 1993 Japan was on top of the list with the EU as a close second. During the past decade, average annual growth rates were 3.7 % for the USA, 6.1 % for Japan and

Figure 2: Plastics processing  
Value added by Member State, 1993



Source: DEBA



**Table 1: Plastics processing**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	39 027	41 783	45 705	50 807	57 875	67 075	72 960	77 688	79 049	76 041	N/A
Production	41 286	44 409	48 201	53 166	60 021	69 366	75 118	79 388	80 803	78 224	82 336
Extra-EU exports	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 222	7 575	8 345	N/A
Trade balance	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 700	1 755	2 183	N/A
Employment (thousands)	598.6	601.3	632.2	662.6	691.8	741.9	782.8	798.4	791.9	760.4	752.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 2: Plastics processing**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	8.50	2.34	5.72	-2.40
Production	8.00	2.19	5.38	-1.68
Extra-EU exports	5.02	4.54	4.81	9.11
Extra-EU imports	10.92	7.82	9.53	2.44

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Plastics processing**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 222	7 575	8 345
Extra-EU imports	2 341	2 577	2 693	3 019	3 834	4 494	4 823	5 522	5 821	6 162
Trade balance	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 700	1 755	2 183
Ratio exports / imports	1.96	2.02	1.93	1.78	1.56	1.51	1.45	1.31	1.30	1.35
Terms of trade index	96.8	94.1	97.5	99.3	99.4	97.8	100.0	101.2	101.6	99.2

Source: DEBA

**Table 4: Plastics processing**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	83.7	87.0	89.5	93.1	96.0	99.2	100.0	100.3	103.1	105.6
Unit labour costs index (3)	86.6	88.9	90.6	90.8	92.5	94.5	100.0	106.0	109.7	108.1
Total unit costs index (4)	86.7	89.0	87.9	89.1	94.7	97.9	100.0	102.5	103.4	101.6
Gross operating rate (%) (5)	10.7	11.1	12.0	12.4	11.5	11.5	11.2	11.8	11.3	11.3

(1) Some country data has been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

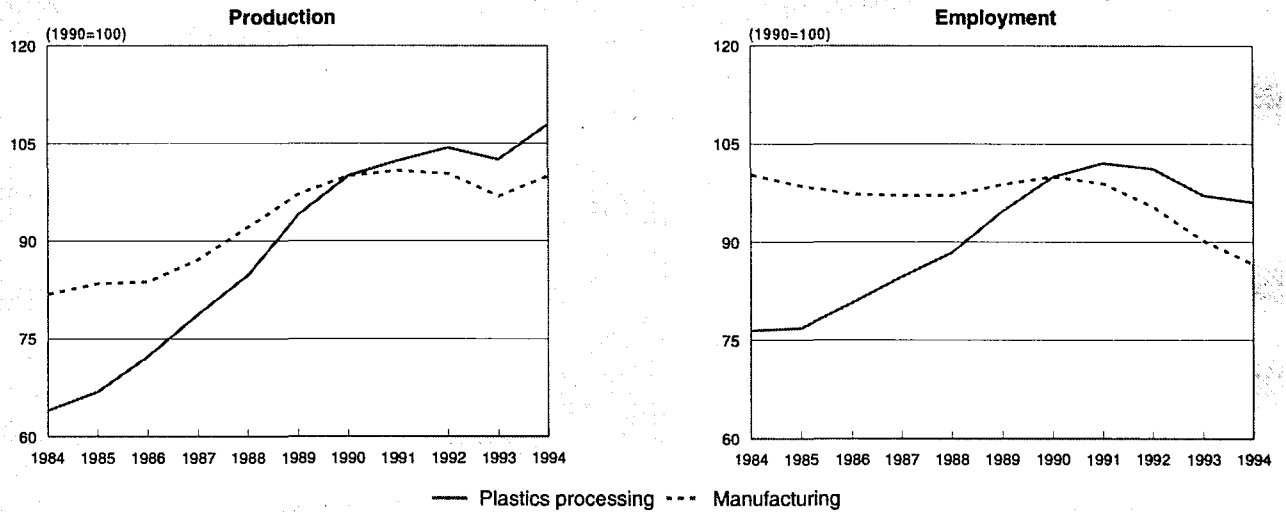
(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat



**Figure 3 : Plastics processing  
Production and employment compared to EU total manufacturing industry**



1994 are DEBA estimates.  
Source: DEBA

5.4 % for the EU. Nevertheless, during 1993 production decreased in the EU by 1.6 % and 1 % in Japan, while a surge in the American economy resulted in growth of 2.8 % in plastics processing.

The chemical and plastics converting industries are the only technology-intensive sectors in which Europe is ahead of Japan and the United States, although a lot of Japanese firms operate in Europe or have set up joint ventures with European manufacturers. Asian economies are becoming more integrated and less dependent on the US and Europe. Japan, Korea, Taiwan, China and Singapore are the main plastics processing countries with production of more than 25 million tonnes; i.e. one-quarter of world production. China's output of plastics products has been growing at an annual rate of more than 20 % during the 1990s.

**Foreign trade**

Extra-EU imports grew at a spectacular annual rate of 9.5 % during 1984-93. In 1993, extra-EU imports increased by 5.9 %. Extra-EU exports, with average annual growth of 4.8 % since 1984, increased by 10.2 % during 1993 compensating for the cyclical downturn in the EU. As a result, the trade balance increased by 24 % in 1993. Extra-EU imports in 1993 accounted for 8.1 % of plastics consumption in the EU, while exports accounted for 10.7 % of production.

The combined share of imports from the EU's two main trading partners, the USA and EFTA, decreased from 63.7 % to 57.4 % from 1988 to 1993. Imports from Japan, Taiwan and Hong Kong are giving way to rising stars such as China, Thailand and Indonesia. While Japan's and Taiwan's combined share in EU imports declined from 17 % to 13 % from 1988 to 1993, China's share nearly quadrupled from 2.8 % to 10.2 %. In general, imports diversified with respect to country of origin.

The share of extra-EU exports to the EU's main trading partners, EFTA and the USA, decreased from 58.6 % in 1988 to 49.7 % in 1993. Exports to Sweden, Finland and Canada decreased in absolute terms. Meanwhile, exports to countries, such as Poland, the Czech Republic, Hungary, Russia, Turkey and South Africa increased tremendously. Trade between EU Member States increased, reflecting an increase of both intra-EU imports and exports in EU production from 19 % to 22 %.

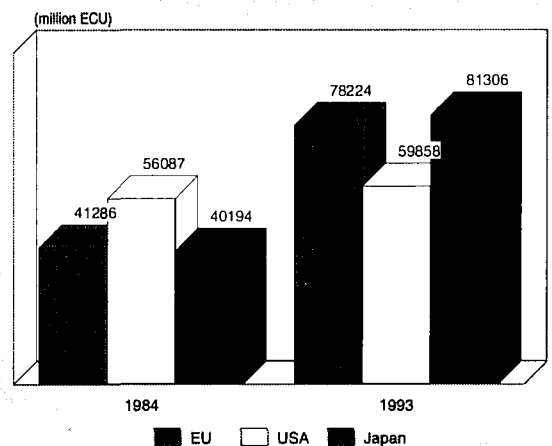
**MARKET FORCES**

**Demand**

Annual growth rates of thermoplastics consumption in the EU steadily decreased from 16 % in 1989 to -3.8 % in 1993. However, 1994 is expected to be a turning point with growth of approximately 4-5 %. Products made by plastic processors range from such mass produced items as small injection mouldings and continuously produced low density polyethylene packaging film to such specialised products as composites used in space shuttle components. In short, virtually every product manufacturer uses, or can use, plastic components.

There is an extensive and diversified demand for plastics goods. Consumer goods and technical applications are characterised by continuous developments. Demand for plastics can be subdivided in to six important markets: packaging (food, beverages, etc.); building (window frames, insulation, etc.); electrical/electronics (office automation, telecommuni-

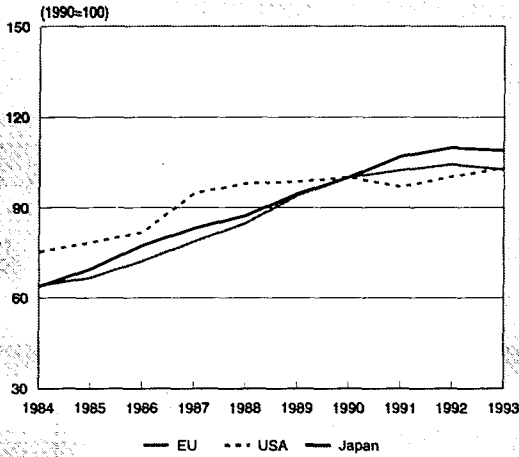
**Figure 4: Plastics processing  
International comparison of production in current prices**



Source: DEBA



**Figure 5: Plastics processing**  
**International comparison of production in constant prices**



Source: DEBA

cations, etc.); automotive; other transports (railways, shipping, aircraft, etc.); and other markets (agriculture, leisure, toys, household, garden, furniture etc.). The first five sectors deliver to other industries, while the last one delivers directly to consumers via distribution outlets, such as department stores.

Many industries use components made of numerous types of polymers. About 5 000 types of polymers, alloys and combinations enhance the design and manufacturing of various applications from compact discs to medical instruments. The energy crisis increased the need for low-weight materials. For example, in the automotive industry plastics have been replacing several parts previously made out of metal.

#### Packaging

Accounting for one-third of demand, production of packaging material is the largest subsector of the plastics processing industry. In the packaging sector, plastics have been replacing glass for bottles (mineral water, soft drink, milk) and jars (yoghurts). The food industry constitutes the major end-user followed by the distribution and beverage industries. Despite environmental concerns, the European market for plastics packaging is forecast to rise from 10.5 billion ECU in 1992

to over 13.67 billion ECU by the end of 1995. Nevertheless, the drive to reduce packing weight and volume is leading to long term changes in demand for materials. In spite of economic downturns in the EU and the burst of legislation which could impose severe pressure, pharmaceuticals, toiletries and cosmetics are large users of packaging. Cleaning powders are starting to move away from cartons to blow-moulding plastics, while cleaning fluids are changing from blow-moulding containers to bag-in-box packaging. The motor oil business is still moving away from metal cans to plastics containers. The greatest growth rate is expected for PET, particularly in the carbonated drinks market (from 512.8 million ECU in 1992 to 940.2 million ECU by 1995).

#### Plastic films

Film should remain the most common polymer grade used in packaging (although losing to blow-moulding and injection moulding) until 1995. Plastic films are mostly based on polyethylenes, but also on polypropylene, PVC, PET or co-extruded resins (polyamides, ethylene-vinyl acetate etc.). Major end uses of plastic films are printed films for automatic packaging, shrink and stretch film for overpacking films for agriculture and horticulture (greenhouses, mulching), films for construction, shoppers, carrier bags, refuse bags, heavy duty sacs, and films for a wide range of technical applications, such as magnetic tapes, credit cards, hot foil stamping, cables, motor insulation, furniture films and office films.

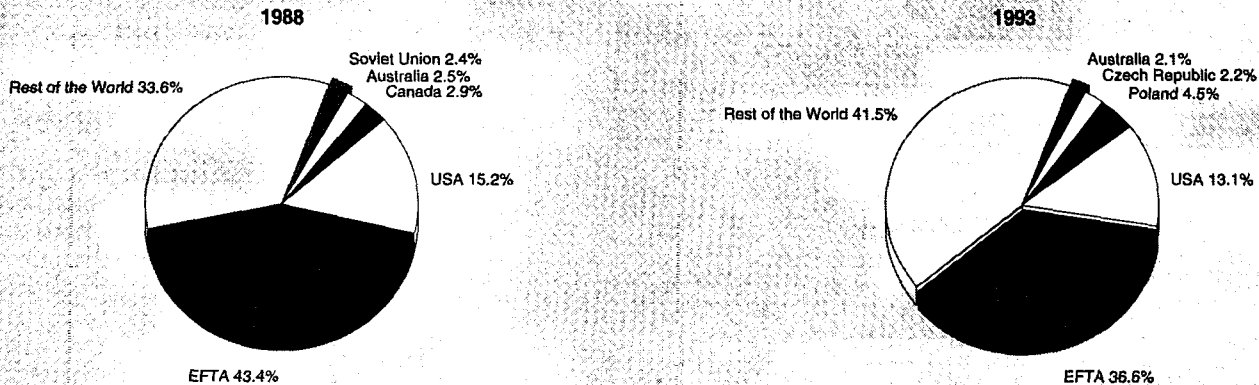
#### Building

On average, the building sector represents 20 % of plastic demand in the EU. Plastic window frames have a good market share in Central Europe, whereas in Southern and Northern Europe other materials prevail. Other applications of plastics in building are: insulation materials, floor and wall coverings, pipes and roof applications. In Germany, demand for pipes and windows has been buoyant in recent years because of reconstruction demand in the new eastern states.

#### Electrical appliances

Consumption of plastics in the West European household electrical appliances sector accounted for 7 % in 1993. Major polymers processed in household electrical appliances are polystyrene, polypropylene and ABS. The main household electrical appliances are: refrigerators and freezers, washing machines/dishwashers, ovens, food processors, coffee makers and vacuum cleaners.

**Figure 6: Plastics processing**  
**Destination of EU exports**



Source: Eurostat



### Automotive sector

This sector accounts for 7 % of EU plastic consumption. The West European average for plastics in vehicles is 11 % of total weight. In 1993, 1.35 million tonnes of plastics were used in car applications; 0.37 million tonnes of PP, 0.32 million tonnes of PUR and 0.16 million tonnes of PVC. PP consumption in cars is predicted to increase by almost 40 % by the year 2002. At the same time, PUR consumption is set to grow by about 10 %, while PVC consumption should remain stable.

### Agriculture

Agriculture accounts for 3 % of total plastics consumption in Europe. Plastic films for covering greenhouses have enjoyed spectacular growth over the last twenty years. From their original use as a simple tunnel, they have evolved into sophisticated multi-span structures which offer the same advantages of traditional glass-covered structures.

Consumption of plastics materials for 1993 in the EU was about 28 million tonnes. Although the global market for thermoplastic polymers increased, demand varied by individual polymers and markets. The following breakdown by material illustrates growth rates for total consumption in Western Europe.

### PVC (Polyvinylchloride)

PVC has maintained a 3 % annual world-wide growth, although in Europe demand for PVC grew by 1-1.5 % in 1993 after remaining static in 1992. PVC is increasingly being substituted by polyethylene in cable applications, by PE in stretch film, by PP and PS in sheet thermoforming applications, and by PET in drinking bottles. On the other hand, more home owners are installing PVC window profiles, replacing traditional wooden frames. The use of PVC in packaging applications, particularly films, tended to decline partly because of substitution by PP and PET films.

### PP (Polypropylene)

PP has been the fastest growing of all the thermoplastics, because of its increasing substitution of other materials; notably ABS, polystyrene and PVC. However, rising demand has been swamped by overcapacity in recent years, due to high investments in the PP subsector. For example, in France investments by Polychim, Exxon, Hoechst, Solvay and Shell have resulted in an increase of production capacity of 37.5 % since 1987.

### LDPE (Low Density Polyethylene)

The European polyethylene market is mired in recession and overcapacity, although performance is different for various grades. The increase in demand for low density and linear polyethylenes in 1993 was slightly more than 1 %. This can partly be explained by the fact that the markets for LDPE are more mature than other polymer markets and suffer from competition from other polymers, such as HDPE in bottle and film applications. Recycling is also a key issue and increasing use of recycled material will continue to limit growth for virgin polymers.

### LLDPE (Linear Low-density PE)

Consumption of LLDPE rose by 10 % as low prices caused converters to switch from low-density PE (LDPE). In addition to its lower price, an advantage of LLDPE is the down-gauging possibilities that it offers, allowing less material to be used to produce the same square metrage of film.

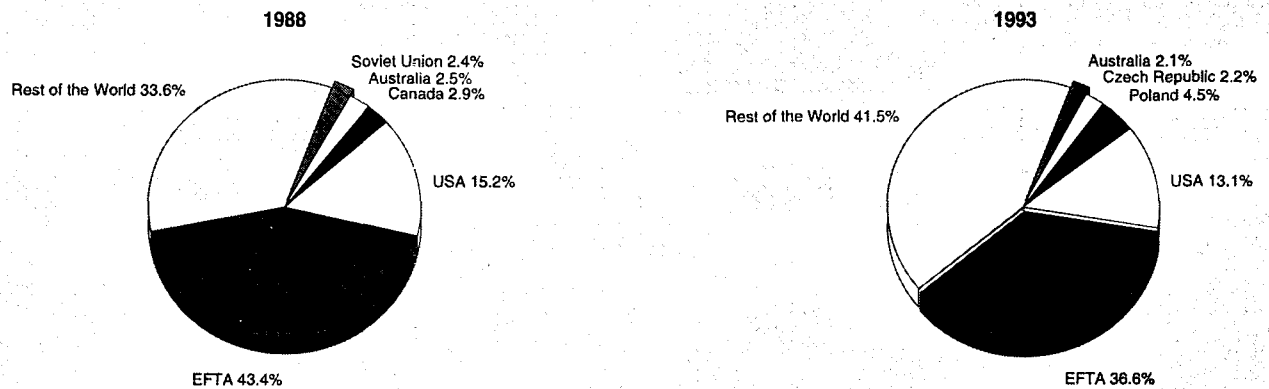
### HDPE (High Density Polyethylene)

Growth of demand is expected to continue at 3-4 % as HDPE competes well with other polymers and traditional materials. Growth in demand has been strongest in extrusion applications; especially for pipes and cables. More than 35 % of HDPE consumption in the EU is for injection moulding. The market for smaller bottles has been growing more slowly than other sectors because of the development of refill packs and concentrated household chemicals, which require smaller containers. With film, HDPE has found favour over LDPE and PVC in certain packaging uses, and injection moulding, especially for wheeled refuse bins. Virgin products will be increasingly vulnerable to substitution by recycled material.

### PS (Polystyrene)

With regard to PS, operating rates are high and supply is relatively tight all over Europe, due to good demand from packaging and electronics, in addition to new applications, such as 3.5-inch floppy disks. The use of OPS sheet in transparent packaging applications has increased, but growth has not achieved the speedy success its supporters expected. However, demand of PS is declining because of competition from producers in Southeast Asia (for teletronic products) and because of the substitution of PS by PP in some domestic and packaging applications. The future holds little prospect for growth.

Figure 7: Plastics processing  
Origin of EU Imports



Source: Eurostat

**Table 5: Plastics processing  
Plastics consumption by market, 1993**

(%)	Building	Packaging	Teletronic	Transport	Furniture	Agriculture	Others
EU	20	33	7	7	6	3	24
Belgique/België	28	33	1	11	6	1	20
Danmark	23	29	7	3	3	2	33
BR Deutschland	25	21	15	7	5	4	23
Hellas	5	36	6	0	0	0	53
España	10	37	2	7	8	6	30
France	15	39	9	10	15	6	6
Italia	14	43	7	5	5	5	21
Nederland	28	30	2	3	7	0	30
Portugal	24	30	3	9	0	0	34
United Kingdom	23	36	11	7	5	3	15
Austria	20	33	12	6	7	4	18
Finland	23	52	7	2	2	3	12
Norway	25	28	18	4	0	0	25
Sweden	25	26	17	14	0	0	18
Switzerland	24	23	13	4	5	6	25

Source: IPAD, EuPC

### Other plastics

Market performance of engineering polymers was variable in 1993. PET performed well, with growth of 9 % in Italy. Italy is the leading consumer of PET resins accounting for nearly 23 % of European demand. Consumption in 1993 was put at 1 993 tonnes, of which approximately 85 % went into bottle production. The UK has the second largest market for PET, being one of the first European countries to adopt wide scale use of PET bottles for soft drinks.

The key end markets for polyurethane are furniture, transport and construction which together account for two-thirds of polyurethane consumption. The main constituents of fibre reinforced plastics/composites (FRP/C) are reinforcing fibres dispersed or imbedded in a continuous matrix (polymer). Glass fibres represent over 98 % of the total tonnage of reinforcing fibres used and the remaining 2 % is shared between carbon and aramid fibres. The main resins converted are: Unsaturated Polyester Resins (UP), Epoxy Resins (EP), Phenolic Resins (PF) and Melamine Resins. The most important markets are electrical engineering (wiring devices, electronics), domestic appliances (pot and pan handles, tableware), automotive industry (brake parts and other car parts), sanitaryware (toilet seats, bathroom equipment), closures (caps for pharmaceutical and cosmetic use) and other markets (sliding elements, sealings).

### Supply and competition

Existing capacity of polymer production, mostly in the hands of the main petrochemical groups, is in general in accordance with the demand of raw materials by processors.

The plastic processing industry is mainly composed of small and medium-sized companies. For the procurement of raw material, the medium-sized plastics processor has to deal with strong polymer producing companies, while it has to sell plastic products through large scale industries, like car makers, manufacturers of electrical and electronic equipment and department store chains.

The highly advanced technology in European processing companies enables them to export nearly 11 % of their total production, in spite of high transportation costs for plastics products. However, the general downturn that hit all major European markets in 1993 resulted in a number of small and medium-sized injection moulders going out of business with the automotive moulding firms having a particularly hard time.

Polymer producers need higher prices if they are to achieve decent margins. For European plastics markets, some products still experience price erosions due to overcapacity and the pursuit of market share over margins. In addition, competition is increasing because of the emergence of a world-wide market for polymers.

### Production process

The plastics processing industry utilises a variety of production methods and plastic materials. For every production method, a skilled labour force and important investments in numerically controlled machines are necessary. Professional training is very important for plastics processors in the EU. Different technologies are operated such as injection moulding, compression, extrusion, blow moulding extrusion, calendaring, thermoforming, film extrusion blowing, blow moulding, hand lay-up of fibre reinforced plastics and coating. Decoration by printing, hot stamping and other subassembly operations are also carried out.

During its early years in the 1950s the only technologies known for FRP/C were manual hand lay-up and spray lay-up. The first mechanisation appeared only in the 1960s, while pultrusion and winding were only introduced in the 1970s. The breakdown of EU production of thermoset GRP by manufacturing technique shows that manual techniques still account for about 35 % of production, followed by automated techniques like SMC and BMC. Semi-finished products in SMC (Sheet Moulding Compound)/BMC (Bulk Moulding Compound) and finished parts (118 000 tonnes) are at the centre of new technological developments, mainly linked to requirements of the automotive industry and transport sector, in general.

## INDUSTRY STRUCTURE

### Companies

Statistics from national plastics federations in the EU show that the number of plastics converting companies in Europe adds up to 20 000 (mostly small and medium sized companies), while only a dozen plastic processing companies employ more than a thousand persons. Plastics processors in Germany are generally larger than in other European countries. The average sized processor in Germany uses some 1 780 tonnes of polymer/annum compared with 1 280 tonnes in France, 1 110 in the UK and only 780 tonnes in Italy. Italy has a very fragmented

processing industry, accounting for at least 4 000 injection moulding companies.

In 1993 the industry employed around 760 400 persons in the EU. It is expected that rationalisation will result in a further decline of 9 000 people during 1994. Although the sector consists mainly of small and medium-sized companies, the plastics processing industry in Europe includes large companies such as: Wavin (NL); Dynamit Nobel (D); Plastic Omnium (F); Alphacan (F); Gebr. Otto (D); Rehau (D); CMB Packaging (F); BPI (UK); Scholler (D); Autobar (UK); Allibert (D); Klockner Werke (D); Peguform-Werke (D); Freudenberg (D); subsidiaries of Hoechst (D) and Solvay (B); Fardem (NL) and Nyborg (DK).

### Strategies

The general downturn in economic activity has resulted in rationalisation programs in the major firms. The impact of new manufacturing techniques and increasing use of Japanese work practices mean that only the leanest and fittest companies are likely to survive. The best growth opportunities may come from new markets in Eastern Europe and new applications in leisure and health care. Plastics lead to many new applications in consumer products, as well as in high tech applications. For example, the injection moulding industry has the ability to respond quickly and adapt to modifications in demand and technological developments.

Concentration is expected in different fields, such as subcontracting for the automotive sector and consumer electronics. The biggest companies in the field are establishing links within the EU and Eastern Europe and are looking for partners. For example, many of Spain's leading processors, particularly in injection moulding, are falling prey to foreign investors as the trend towards international markets grows. Several leading fuel tank producers, such as Plastic Omnium, Dyno and Solvay, have established production facilities in Spain to serve the local automotive industry on a just-in-time basis. Similarly, Sommer Allibert and Plastic Omnium are establishing US plants to supply BMW's new factory at Spartanburg in South Carolina.

### Impact of the Single Market

The impact of the creation of the Single Market has been positive, mostly because of the increased market potential for EU firms and because of the acquisition of a European

identity for producers and products. Nevertheless, some internal barriers, mainly in the area of environmental legislation, remain. The industry favours common environmental policies for the EU, as unilateral legislation by individual Member States results in internal barriers which hamper the creation of a Single Market. Two other types of measures from the Internal Market programme which are particularly relevant to this sector relate to improving access to finance for SMEs and the stimulus to privatisation within the EU.

## ENVIRONMENT

A difficult environmental situation for the plastics industry relates to the recycling discussion. Recycling quotas imposed by national and European authorities in the packaging sector, pending EU and national legislation for automotive waste, teletronic waste, building waste, and others are restricting growth, particularly in the PVC and packaging sectors. However, the plastics industry is taking up this challenge. The plastics converters industry is very conscious that plastics have become increasingly popular because of the immense social benefits they have brought and that they now constitute a prominent and durable component in the waste stream.

In France, a system for recycling packaging came into existence during 1993. The implementing organisation, Eco-Emballage, set up a subsidiary company, Valorplast, to be responsible for the disposal and recycling of plastic packaging. The aim is to recover 75 % of packaging by weight through either recycling or incineration by 1997. Like the Green Dot system in Germany, the scheme is funded by charging a levy on packaging. The French system has been discussed openly between government and industry. The result seems to be more realistic than in Germany, as incineration with energy recovery has been accepted by all parties from the very beginning. The European directive on household waste has been inspired by the French approach. Italy introduced an 'ecological contribution' tax of 10 % on polyethylene destined for film production and a similar tax on raw materials used for non-reusable liquid containers, which will be used to fund recycling schemes. The aim was to recycle 60 % of liquid containers in 1994.

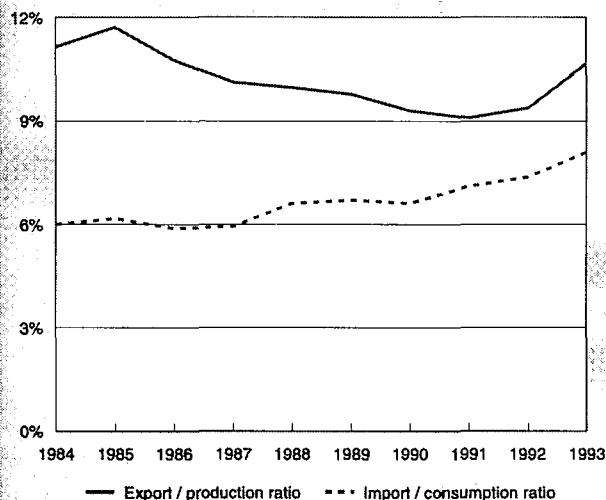
The amount of plastics being recycled in Europe is growing at more than 20 % per year. The volume of post-consumer plastics recycled in the EU is forecast to grow from 1.5 million tonnes in 1993 to 2.4 million tonnes in 1996. In 1996 generated plastic waste is expected to amount to 14 million tonnes, while the proportion of recycled plastic will be 17 %.

Designing is a new trend for recycling. Products will be increasingly designed using compatible materials with the aim to remove or reduce the need for dismantling products into individual component parts at the end of their life, thus improving the economics of the recycling process. Relevant features include: minimising the number of fasteners used; using re-openable moulded-in snap-fit connectors; providing easily accessible fasteners; and confining contaminants to discrete areas of the product.

In Germany, there have been attempts by certain local authorities to ban the use of PVC in building applications. Although the industry has managed to lobby against such bans, they have been unable to stop the rapid decline in its use in packaging.

The industry wants to see common environmental policies for the EU. Unilateral legislation by individual Member States can lead to undesirable distortions in the market causing trade barriers which will delay the creation of a truly single European market. Such legislation must give due consideration to the entire life span of plastic materials and products. Recognition must be accorded to the environmental benefits they can impart from their initial conception (by saving energy) through their service life to their ultimate manifestation as waste, ensuring that their full potential for re-use is exploited.

**Figure 8: Plastics processing Trade Intensities**



Source: DEBA

**Table 6: Plastics processing  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	1.06
Danmark	1.30	1.17
BR Deutschland	1.15	1.14
Hellas	0.86	0.76
España	0.99	0.84
France	0.84	0.88
Ireland	0.75	0.64
Italia	1.07	0.91
Luxembourg (2)	5.13	3.69
Nederland	N/A	0.91
Portugal	0.79	0.55
United Kingdom	0.96	1.05

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.

(2) NACE 48.

Source: DEBA

There is no single solution to the problems of plastics. To different extents, waste management and recycling, incineration and landfill all have their part to play according to particular local circumstances. Possible waste management options include: resource efficiency and waste avoidance; material recycling/feedstock recycling; energy recovery/recycling; incineration; and landfill.

Plastics converters stand resolutely against limiting the use of any plastics material, as this would constitute an unacceptable barrier to trade. To encourage the development of plastics recycling, plastics converters wish to encourage the adoption of an EU-wide product marking system to facilitate easy identification and encourage the appropriate standards in those applications in which recycled products fulfil 'suitability for purpose' criteria. If replacement of materials by plastics proves advantageous to the environment, an announcement of these advantages in advertising is considered acceptable.

## REGULATIONS

The European Commission is designing and has designed directives, decisions or regulations which effect the industry of plastics converters. Concerning food contact applications, the Commission is specifying positive lists for monomer, additives, colorants, etc. used in plastic products. The building sector is awaiting the pending directive for building products.

One of the major concerns in the plastic industry is the management of waste. The EU Commission developed legislation, based on the framework set by the Directive on waste (91/156/EEC), which covers different fields touching the industry. Directives on packaging and packaging waste and other waste streams (e.g. automotive, building, hospital, teletronic) should soon be finalised and are of major concern to the plastics converters industry. The likely impact of these Directives and the packaging ordinance is a shift in favour of certain materials at the expense of others. This can be seen in PVC packaging, which appears to be in a permanent downward spiral in various countries.

## OUTLOOK

It is expected that consumption of plastics in the EU will grow by an average of 3-4 % per year until the end of the decade. The best growth opportunities will come from new markets in Eastern Europe and new leisure and health care applications. Despite the improving market, polymer processors also face some difficult long term challenges. High wages, social environmental and energy costs could increasingly lead larger enterprises to move production capacity to lower cost locations in Asia or Eastern Europe; particularly with regard to lower value goods. The plastics industry is working at heightening public awareness of its many initiatives to contribute to a cleaner environment. Taking into consideration the efforts in developing recycled plastic products, the plastics processing industry looks to a bright future.

Written by: the Netherlands Economic Institute

The industry is represented at the EU level by: European Plastic Converters (EuPC). Address: Avenue de Cortenbergh 66, B-1040 Brussels; tel: (32 2) 732 4124; fax: (32 2) 732 4218.







# Furniture

NACE 316.6, 467

The furniture industry is one of the largest manufacturing industries in the EU. Germany, Italy, the UK and France are the main EU producers in this sector. The furniture industry is highly fragmented, and is dominated by small and medium-sized firms. Concentration is increasing because of stiffer competition by foreign suppliers and the higher level of concentration of the retail business.

Demand for furniture depends greatly on the general economic climate. After a slowdown caused by the recession in the early 1990s, the furniture industry was on its way to recovery in 1994, and the outlook is brighter for the short term.

## INDUSTRY PROFILE

### Description of the sector

Furniture is a typical consumer durable good. It may be manufactured with a wide range of materials such as wood, metal, plastics, rattan, etc.

Today, traditional materials such as unfinished wood and wooden products (i.e. wooden boards, parts of furniture, etc.) represent less than 30 % of the materials used. Metal accounts for 12 %, hardware for 9 %, plastics and foams for 9 % and textiles for 6 % (see Table 1). In NACE 1970, furniture production was classified according to the main materials used: NACE 316.6 for metal furniture and NACE 467 for wooden furniture and upholstery. Wooden furniture generally represents 75 % of the total EU production of furniture. Since 1993, the NACE Rev. 1 classifies all types of furniture under the code 36.1, without distinction of the materials used.

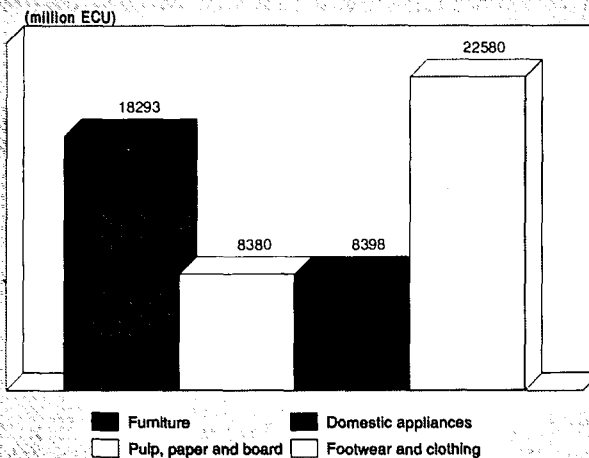
More than 90 000 enterprises (among which are many very small enterprises) employ 842 880 persons. If only enterprises employing more than 20 employees are considered (total production of 48 164 million ECU in 1993), then Germany is the largest furniture producing country in the EU (with 38.7 % of the production), followed by Italy (17.7 %), the United Kingdom (14 %), France (13.1 %) and Spain (7.4 %). Italy and France have a proportionally higher weight if all the enterprises of the sector are considered.

In terms of value added, Germany remains the largest producing country followed by Italy, the UK and France. The furniture industry is a diversified, price-good industry in which technology and labour skills are of great importance. The contribution of labour costs to the value added, however, has been decreasing for the past twenty years because of spreading automation (either low-cost automation or fully automated operations) for serial production.

But the part of labour costs in the value added remains high in comparison with other manufacturing industries and the productivity (i.e. value added per worker) is less important than in other major manufacturing sectors. Nevertheless, productivity in the furniture industry increased by about 25 % in the ten years up to 1993.

The Danish furniture industry has the highest productivity (value added per employee: 37 000 ECU). Apart from the Danes, only the German, Italian and Belgian furniture industries reach a productivity above 30 000 ECU of value added per employee.

Figure 1: Metal and wooden furniture Value added in comparison with related industries, 1993



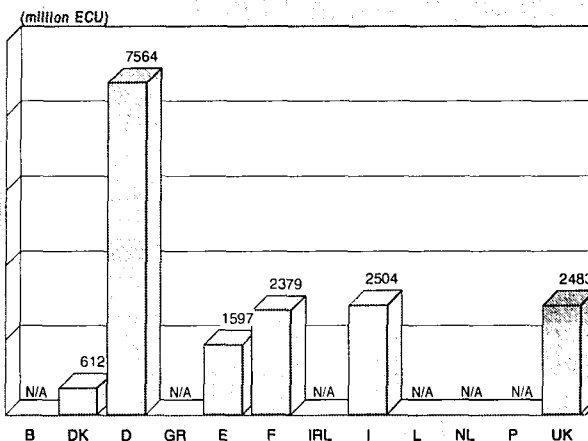
Source: DEBA

The furniture industry is made up of very distinct sub-sectors. Furniture manufacturers are usually highly specialised in one or two types of furniture (e.g. upholstery manufacturers only produce upholstered furniture; kitchen furniture manufacturers only produce kitchen furniture, office furniture manufacturers produce only office furniture, etc.).

In all, the furniture industry may be subdivided into ten main categories: kitchen furniture, upholstered furniture, bedroom furniture, dining room furniture, office furniture, chairs, mattresses, garden furniture, shop furniture and other furniture (e.g. contract furniture, furniture for laboratories, rattan furniture and furniture parts).

Together, the production of upholstered furniture, kitchen furniture, dining room furniture, office furniture and bedroom

Figure 2: Metal and wooden furniture Value added by Member State, 1993



Source: DEBA



**Table 1: Furniture**  
**Breakdown of consumption of raw materials, 1993**

(%)	
Energy	2.8
Wood, veneers, plywood, particle-board and MDF	27.8
Parts of furniture	15.8
Glass	1.7
Hardware	9.3
Marble and stones	0.5
Textiles	6.2
Leather	2.8
Plastics	8.9
Rubber	0.6
Metal	11.7
Coatings	3.1
Glues	1.6
Others	7.3
Total	100

Source: U.E.A.

furniture represent just over 60 % of the total EU furniture production. The production of upholstered furniture has the largest share of EU furniture production: it amounted to 9 201 million ECU in 1993 (+4 % in value; -0.2 % in volume from 1992). In terms of volume, EU production amounted to 37 million armchair-equivalent units or between 7 500 000 and 10 000 000 full suites of upholstered furniture. In the EU, 70 % of the upholstery production value is in fabric and the remaining is in leather. The largest producers are Germany and Italy, with about 30 % of the total production each.

In 1993, the EU production of kitchen furniture amounted to 7 963 million ECU (13.2 % of all furniture production). This represented an increase of 7.2 % over 1992 figures (due to substantial growth of the German industry, which accounts for 40 % of the EU production). In volume terms (+3 % in 1993), 4 million complete fitted kitchens were manufactured in the EU. This industry is the most concentrated segment of the EU furniture sector, with 50 manufacturers producing 50 % of the total production and exporting 50 % of the total EU exports.

The total production of the EU office furniture manufacturers equalled 5 867 million ECU in 1993. This meant a decline of 13.9 % in value compared to 1992. This was the second

**Table 2: Metal and wooden furniture**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	27 194	37 486	41 256	45 400	48 493	49 569	48 164	47 989	55 900	55 700	60 300
Production	29 121	39 102	43 077	47 083	49 720	50 439	48 908	49 903	57 700	57 000	61 400
Extra-EU exports	3 162	3 459	3 957	4 017	3 986	3 956	4 240	4 796	6 600	5 800	6 400
Trade balance	1 926	1 616	1 821	1 683	1 226	870	744	1 914	1 800	1 300	1 000
Employment (thousands)	590.4	587.4	606.9	624.9	627.5	612.0	581.5	572.6	580.0	590.0	590.0

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Metal and wooden furniture**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	4.24	0.68	2.64	-3.51
Production	3.69	0.22	2.13	-3.19
Extra-EU exports	0.34	0.82	0.55	8.14
Extra-EU imports	7.97	9.30	8.56	7.04

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

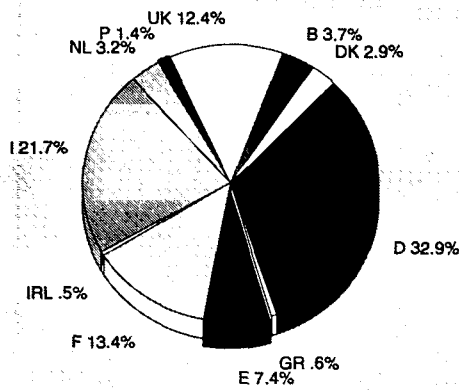
**Table 4: Metal and wooden furniture**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	3 162.2	3 649.5	3 447.4	3 389.4	3 458.6	3 956.8	4 016.9	3 986.1	3 955.7	4 239.7	N/A
Extra-EU imports	1 235.7	1 293.2	1 345.6	1 558.4	1 842.3	2 135.7	2 333.8	2 760.1	3 086.1	3 496.1	N/A
Trade balance	1 926.5	2 356.3	2 101.8	1 831.0	1 616.3	1 821.0	1 683.0	1 226.0	869.7	743.6	N/A
Ratio exports / imports	2.6	2.8	2.6	2.2	1.9	1.9	1.7	1.4	1.3	1.2	N/A
Terms of trade index (1)	94.3	96.6	97.3	96.9	97.5	98.4	100.0	96.0	94.3	88.0	N/A

(1) NACE 467

Source: DEBA

**Figure 3: Metal and wooden furniture  
Share of production by Member State, 1993**



Source: U.E.A.

year of decline, caused by the weak demand for office furniture as a result of the recession, following twelve consecutive years of increase. The office furniture sector was the fastest growing segment of the furniture industry (average annual real growth rate of 7.5 %). Production rose from 2 149 million ECU in 1980 to 6 905 in 1991 (+221 %).

Office furniture production can be sub-divided into two product groups. The first includes any and all seating arrangements. The second comprises other types of office furniture including desks, tables, cupboards and cabinets. EU production of office seating fell by 11.4 % in 1993 (-1.7 % in 1992 and +4.3 % in 1991). Meanwhile, on a global level, the production of seating, which accounts for 25 % of the total office furniture production, nearly tripled (+289 %) from 1980 to 1993. In volume terms, this represents 8 million seats.

The production of other types of office furniture declined by 14.7 % in 1993 (-1.7 % in 1992 and +12.3 % in 1991). 30 % of the total office production consists of office automation systems, 15 % traditional workstations, 10 % executive workstations, 10 % filing and storage systems and 10 % fitted partitions. In volume terms, other types of furniture globally represent 4 million workstations. 90 % of the EU office furniture production is concentrated in five countries: Germany (42 %), Italy (17 %), France (13 %), the UK (11 %) and Spain (6 %).

In 1993, dining and bedroom furniture represented 11.9 % and 9.7 % of the total EU production of furniture. The production of bedroom furniture is dominated by the Italian and German manufacturers which together make up about 60 % of the total production. The EU bedroom furniture manufacturers produce 13 million wooden wardrobes annually, 6 million chests of drawers, 5 million wooden beds for adults, 3 million bedside tables, 600 000 wooden beds for children and 500 000 metallic beds.

#### Recent trends

After five years of decrease in the early 1980s, the production of furniture in the EU increased from 1986 to the beginning of 1991. The volume of production grew yearly by 4.3 % on average during this period (outperforming the total manufacturing industry by 1 %). Over 65 000 jobs were created during this period (+2.1 % per annum in the furniture industry compared with a stagnation in the total manufacturing industry).

The furniture industry suffered a lot from the recession. In real terms, production fell 3.2 % between 1992 and 1993, and 46 000 jobs were lost between 1991 and 1993. Since the beginning of 1994, furniture production has increased again in nearly all the EU countries but with different growth rates. Meanwhile, the level of employment has remained stable.

In the EU, furniture enterprises with more than 20 workers employed a total of 581 500 people in 1993. If all companies are considered, 842 880 persons worked in the furniture industry in 1993.

Broken down by sub-sector, the upholstered furniture industry employs about 130 000 persons in about 7 000 enterprises. Meanwhile, total employment in the kitchen furniture industry exceeds 70 000 persons. This demonstrates the high concentration in the kitchen furniture sub-sector, where a limited number of large firms controls an important part of the production.

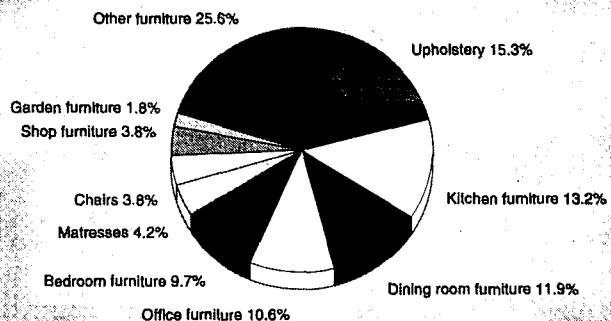
Employment in the office furniture sector is estimated at 62 000 persons in 1993. The four largest countries of the EU produce 84 % of the office furniture production with only 74 % of the work force. This demonstrates the high productivity and automation reached in these countries in comparison with the others.

In general, salaries are lower for the furniture industry than for other major manufacturing industries. Increases in real wages have averaged 3.5 % during the period under consideration.

#### International comparison

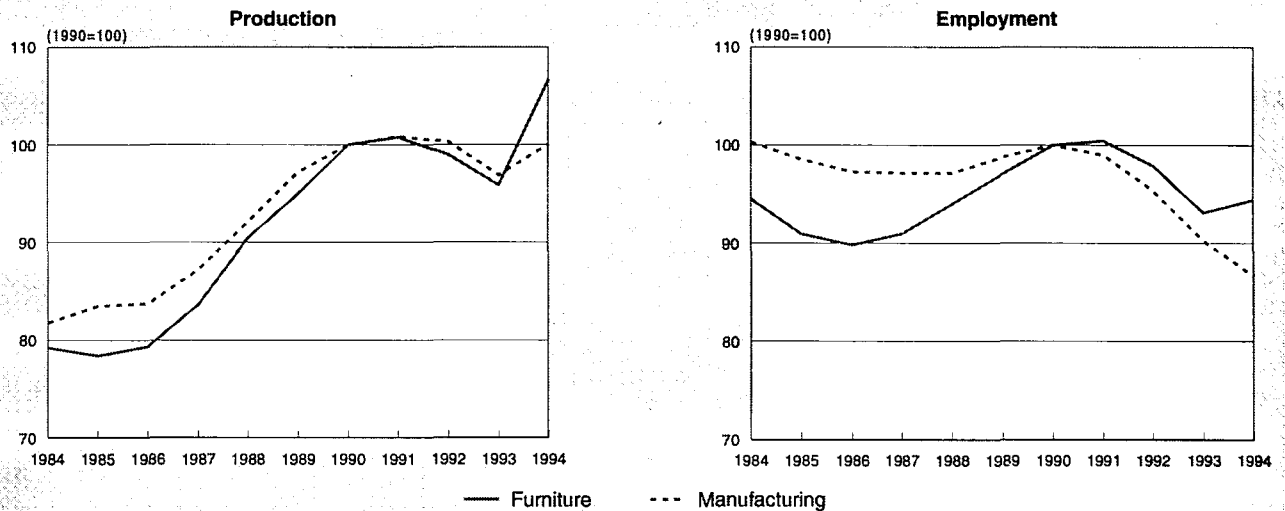
As is typically the case with other US manufacturing sectors, the US furniture industry has followed business cycles more markedly than its European counterpart. At the end of the 1980s, US furniture production volume dropped significantly. Since 1992, production has grown by exceptional annual growth rates of about 10 % (an average +5 % in volume). Now that the US economy is growing, the production of furniture is forecast to increase at least until 1995. The production value of wooden furniture reached 25 459 million ECU in 1993 and the production of metal furniture equalled 10 256 million ECU. Imports to the US are increasing and have recently exceeded 4 billion ECU or 7 % of the apparent con-

**Figure 4: Metal and wooden furniture  
Share of production, 1993**



Source: U.E.A.

**Figure 5: Metal and wooden furniture  
Production and employment compared to EU total manufacturing industry**



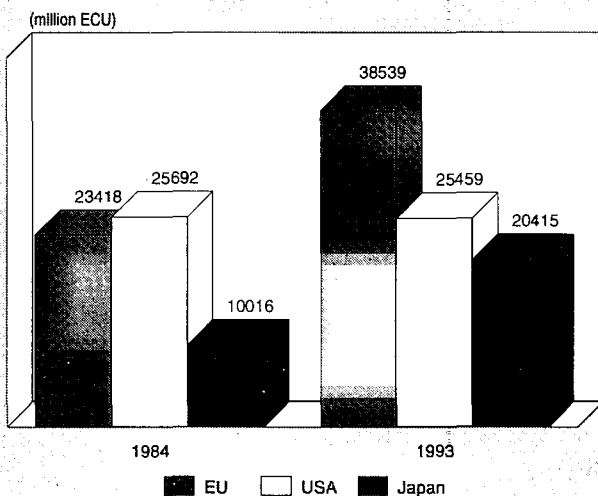
1994 are DEBA estimates.  
Source: DEBA

sumption: imports from the Asian countries are rising faster than imports from the EU.

In Japan, the production value of furniture increased constantly from 1985 to 1991. Since 1992, the production value has been declining due to a sluggish demand and a slowdown in the service sector activities. In 1993, production value of Japanese furniture totalled 25 873 million ECU of which 27.8 % was office furniture. The Japanese furniture manufacturers dominate in their domestic market, and about 95 % of furniture sold in Japan is Japanese furniture. The EU manufacturers account for a mere 1 % of the market.

EFTA countries are all important furniture producing countries. Their production amounted to 4 475 million ECU in 1993 (-4.3 % compared with 1992). Austria represented 40 % of the production, Sweden 21 %, Switzerland 14.3 %, Finland 12.7 % and Norway 12 %.

**Figure 6: Metal and wooden furniture  
International comparison of production in current prices**



(1) NACE 4670.  
Source: DEBA

### Foreign trade

Since the beginning of the 1980s, EU furniture manufacturers have exported between 23 % and 25 % of their total production. Among the EU countries, Italy was the largest furniture exporting country with about 4.5 billion ECU worth of furniture exports in 1993 (Germany's exports totalled 3 billion ECU and France's exports equalled 1.3 billion ECU). Meanwhile, the largest importing country was Germany (4.8 billion ECU) followed by France (2.2 billion ECU) and the Netherlands (1.5 billion ECU). Excepting Italy, Denmark, Spain and Portugal, all the EU countries have deficits in their trade balance in furniture.

Exports of upholstered furniture represented 18.3 % of the total EU furniture exports (of which about 50 % came from Italy). Exports of dining room furniture totalled 1 780 million ECU in 1993 (or 13.3 % of total exports). Exports of bedroom furniture reached the value of 1 276 million ECU or 9.5 % of the total exports.

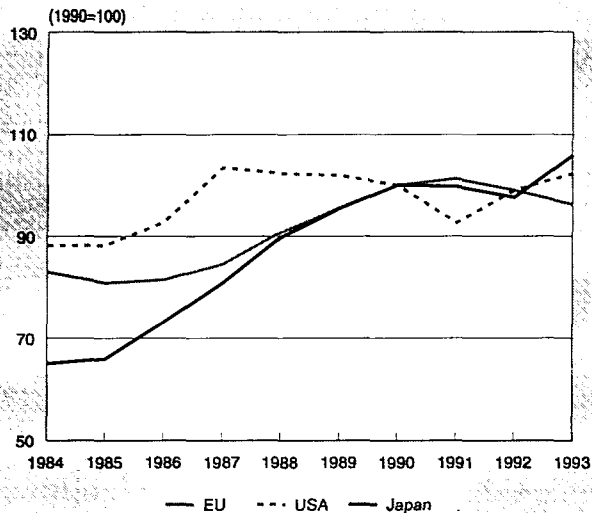
The kitchen furniture manufacturers do not export much of their production which is mainly aimed at the domestic market (only 771 million ECU in 1993). Total exports of office furniture totalled 1 127 million ECU in 1993, showing a decline of 8.1 % from 1992. Meanwhile, imports of office furniture amounted to 790 million in 1993 (-15.1 %). All the large office furniture manufacturers operate more or less internationally within the EU markets and are attempting to strengthen their positions further.

In 1993, 36.4 % of total exports were extra-EU exports and 31.5 % of total imports were extra-EU imports. For the most part, extra-EU exports have increased since the second half of the 1980s, except in 1992 and in 1993 when they fell because of the recession in the EFTA countries and in the USA, markets to which the majority of the EU furniture exports are oriented.

In 1993, the main trading partners for the extra-EU exports of wooden furniture are the EFTA countries, the USA, Saudi Arabia, Russia and Japan. Important destinations for the extra-EU exports of metal furniture are the EFTA countries, the USA, Russia, Saudi Arabia and Hong Kong.

Extra-EU imports have risen by more than 10 % each year since 1987. The East European countries and the south-east Asian countries have become important suppliers to the EU.

**Figure 7: Metal and wooden furniture**  
International comparison of production in constant prices (1)



(1) NACE 4670.  
Source: DEBA

In 1993, extra-EU imports of wooden furniture came mainly from the EFTA countries (26.9 %). Poland (13.5 %) and Romania (7 %). The majority of extra-EU imports of metal furniture originate in the EFTA countries (35.3 %), with Taiwan (19.8 %), the USA (11.2 %) and the Czech Republic (7.2 %) following behind.

The export/import ratio has been deteriorating since 1989. In 1993, the surplus of the EU trade balance in furniture was below 1 billion ECU for the first time and it is only one-third of the surplus of 1985.

## MARKET FORCES

### Demand

Furniture is an investment item (for both enterprises and households) as well as a casual consumer article that is sensitive to fashion trends. The substitution goods or services are cars, consumer electronics, vacation/travel packages, insurance, etc. Furniture is a durable good characterised by a high unit price

and an enduring life-span (some furniture is passed on to the next generation). Consumers need a certain amount of capital to purchase furniture, and buying furniture can be easily postponed as has been the case during the recent recession. In the industrialised countries, households are well-equipped and the market for new furniture is saturated. Generally speaking, 70 % of furniture purchases are replacement purchases, bought only when tastes change, incomes increase, etc. Only 30 % of the furniture purchased is bought after births, during the setting up of a new household, or to replace broken or tattered furniture.

Demand for furniture is very cyclical and mainly depends on its elasticity towards the disposable income of a household, which varies from country to country. The average elasticity is 1.5 which means that if the income increases by 1, the demand for furniture rises by 1.5 and vice-versa. In addition, demand is affected by the general economic situation (consumer confidence in the economy, growth of the GNP and therefore of purchasing power, level of unemployment, etc., as well as the level of investments in housing). Since the end of 1991, a deterioration in the consumer confidence in the economy has led to a decline in the consumption of furniture. At the same time, lower investments in the industry and services sector have led to a reduction in the purchases of office furniture.

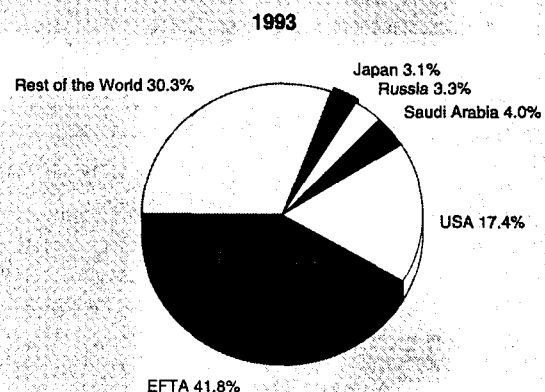
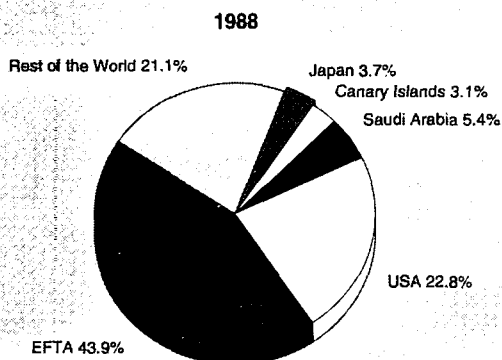
Furthermore, the evolution of interest rates sometimes results in increased costs to borrow for the purchase of furniture and housing. Likewise, the distribution of wealth has a part to play. Demand for furniture is higher in countries where wealth is more evenly distributed than in countries where wealth is more concentrated. Finally, demographic variables (e.g. marriage statistics, formation of households, birth rates and the age of the population), as well as the intensity of advertising and of marketing (often times based on demographics) are two other important factors.

### Supply and competition

The production of furniture and the distribution of furniture are two separate fields. Although some manufacturers either have their own distribution networks or sell their furniture directly to the consumers, in general manufacturers sell their production to retailers (specialised or not) who sell to the final consumers.

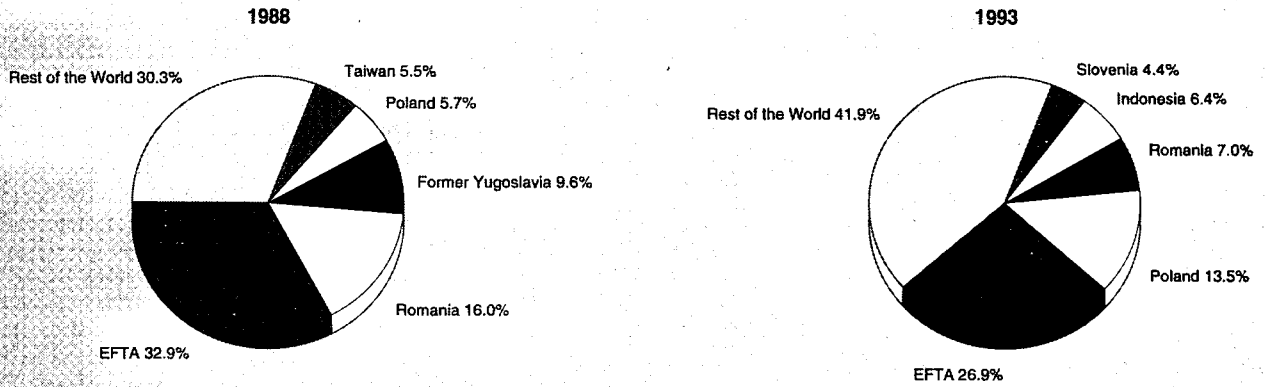
Furniture distribution is changing quickly, and is more concentrated (especially in Northern Europe) than the furniture manufacturing industry. In Germany ten buying groups and furniture chains control about 50 % of the furniture market;

**Figure 8: Wooden furniture**  
Destination of EU exports



Source: Eurostat

**Figure 9: Wooden furniture  
Origin of EU Imports**



Source: Eurostat

in France, the share is 40 % and in the UK 20 %. This leads to an increased bargaining power for the distribution sector. The concentration process has several forms. Apart from IKEA and a few German and French groups, the distribution is nationally concentrated. Distributors that make a part of their turnover outside their own country are scarce. Some retailers and buying groups are growing and forming alliances with their counterparts in different countries.

Most large retailers combine a good location with an attractive external store presentation, which they consider as an investment in advertising. There are over 100 000 furniture sales outlets in the EU. Among them, it is possible to distinguish different distribution networks.

First, there are the buying groups, which buy large volumes of furniture from different sources and sell them to their affiliated independent retailers. These are the most prominent in Germany (where the four largest buying groups represent 20 % of the sales), the Netherlands and France.

Next, one sees independent retailers (specialising in one or many types of furniture). Manufacturers' sales representatives and agents contact these retailers to sell them furniture. Ware-

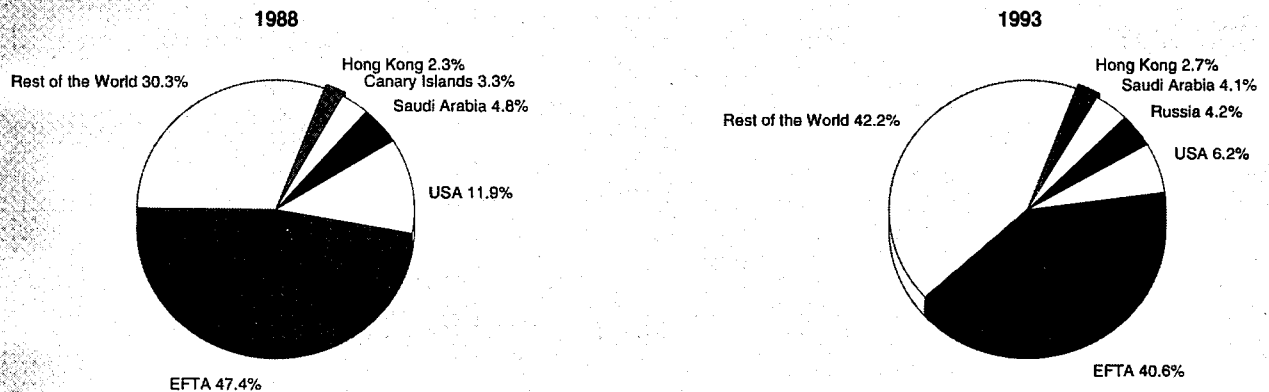
housing can be a problem (i.e. not enough space available), mainly when importing furniture.

Meanwhile, furniture chains are essentially oriented to the mass market. Generally, they operate with assembled ranges and also are leaders in ready-to-assemble (RTA) and flat-pack items. Their products are usually modern and appeal to young people. In addition, they have good customer facilities and discount prices. Examples are IKEA (from 1 to 3 % of the market in the seven EU countries where it is present), Conforama (about 10 % of the French market and also present in Spain) and MFI (10 % of the British market).

On the other hand, mail-order firms (between 2 to 4 % of all furniture distribution) mainly sell rental furniture, RTA and self-assembly ranges. Products are warehoused before dispatch to the consumer, who picks and orders the product directly from the catalogues.

For the most part, direct distribution is provided by small manufacturers who sell locally, while in department stores, furniture is a part of the total turnover. Distribution channels also vary according to the different sectors of the furniture industry. For the office furniture industry, one-third of the domestic markets is covered by the firms themselves (i.e.

**Figure 10: Metal furniture  
Destination of EU exports**



Source: Eurostat



**Table 5: Metal and wooden furniture  
Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	83.9	86.2	88.4	92.0	96.3	97.8	100.0	100.4	101.1	103.0
Unit labour costs index (3)	87.0	89.5	91.4	91.4	92.9	96.6	100.0	106.9	111.7	111.3
Total unit costs index (4)	79.5	83.1	85.3	87.9	91.3	96.2	100.0	104.7	108.0	108.2
Gross operating rate (%) (5)	7.7	8.1	8.5	9.1	9.9	9.3	8.9	9.0	8.6	8.7

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

those which are present in the country) and two-thirds through office equipment or general furnishing outlets. In export markets, nearly a half of all sales are made by subsidiaries of firms and the rest by agents or importers. All of the large companies have subsidiaries in the different EU countries.

For the upholstered furniture industry, independent furniture retailers account for 52 % of the sales, buying groups for 30 %, large department stores for 8 %, direct sales for 7 % and mail-order for 3 %. For the kitchen furniture segment, 50 % of sales are made through buying groups and independent retailers, 25 % through kitchen furniture specialists and 10 % through direct sales.

### Production process

Typically, innovation in the production process within the furniture industry is either necessitated by competitiveness and a need to reduce costs, or is market-led. In the first instance, automation, the use of Computer-Aided Design or Manufacturing and the introduction of new materials which are more resistant and/or cheaper than the existing ones are typical. Meanwhile, market-led innovation, which is guided by the market and consumers, touches more upon the design of furniture and the types of materials used (upholstery, recyclable materials, etc.). In addition, environmental concerns (e.g. safety and health) also may lead to changes in the production process (e.g. using coating without solvents).

## INDUSTRY STRUCTURE

### Companies

The number of enterprises in the furniture industry varies greatly, depending on whether the enterprises with less than 20 employees are considered or not. In 1993, there were 7 776 EU enterprises with more than 20 employees employing a total of 559 000 persons. However, there were also more than 80 000 enterprises with less than 20 employees. Real productivity is thus not easily seen: the high productivity of large-scale enterprises may be hidden by the low productivity of small and labour-intensive enterprises.

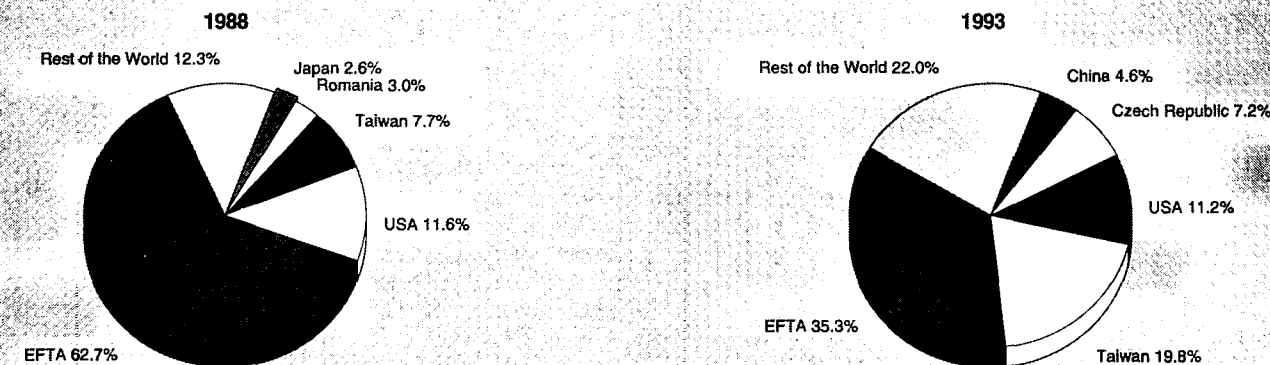
The distribution of the small, medium-sized and large enterprises depends on the country in question. For example, nearly all the enterprises in Germany employ more than 20 people, with the average number of employees in a firm being 78. In Italy, where there are 33 400 enterprises employing 220 000 persons, the average number of employees is six.

### Strategies

A concentration process is underway in the furniture industry. Furniture manufacturers are investing huge amounts of capital to expand their activities either by further developing the existing plants, creating new ones, or buying out other existing enterprises.

The average size of firms in the industry has increased recently. All enterprises are investing in automation and computerisation, in order to standardise their production, especially in the kitchen and office furniture segments. This requires huge

**Figure 11: Metal furniture  
Origin of EU imports**



Source: Eurostat

**Table 6: Furniture**  
**Number of enterprises and employees in the furniture industry, 1993**

(units)	Enterprises	Employment
EU	92 291	842 880
B/L	1 550	23 340
DK	490	18 060
IRL	400	6 130
F	1 900	118 000
D	2 665	206 550
GR	10 500	24 300
I	34 000	19 500
NL	4 136	20 000
P	2 000	37 000
E	11 550	80 500
UK	6 000	114 000

Source: U.E.A.

amounts of capital which may be collected more easily by large firms than by smaller ones.

In Germany, for instance, the largest enterprises have invested in Poland and, to a lesser extent, in other East European countries, where labour costs are only one-tenth that of Germany's. In Italy, strong co-operation exists between small entrepreneurs in the area of design, marketing and production. Moreover, small enterprises often act as sub-contractors for larger firms (they produce components, semi-finished, finished or assembled furniture). This results in exceptional flexibility.

Almost all of the EU furniture firms are family-owned businesses. A few of them are quoted in the stock markets (mainly in the UK). The furniture firms usually have to borrow money or use part of their profits instead of raising capital on stock markets.

Some important furniture groups appeared in the late 1980s through internal and external expansion. The majority of the groups has one or more production units in several EU countries and sometimes even in the USA. These groups produce and sell either different types of furniture or only one type

of furniture. There are about 50 (groups of) enterprises with a turnover exceeding 100 million ECU.

#### Investments

Globally, the EU furniture manufacturers invest about 4 % of their turnover. In general, these investments are made in four main areas:

- New machinery: about half of all investments. Objectives are generally to automate production processes (Computer-Assisted Manufacturing) and to create synergy between different lines or sites of production. Important investments are made in this area by the medium-sized and large enterprises to maximise their mass production with very high quality/price ratios (i.e. economies of scale).
- Design and creation of new models are made either within the enterprise or by external designers and experts. These include changes in appearance (e.g. through the use of a combination of different types of materials), in ergonomics, in ecology (e.g. recyclable furniture), etc. The new models are presented to the retailers and consumers during furniture fairs or in the show rooms of the furniture manufacturers.
- Advertising and communication: this includes the development of a brand image, detailed catalogues for retailers and consumers, advertising through the media, participation in fairs, training of sales personnel, etc.
- Creation and/or management of distribution channels (see above).

Investments are higher in the office furniture industry than in the rest of the furniture industry. However, all the sectors seriously reduced their investments between 1992 and 1993.

#### Impact of the Single Market

The creation of the Single Market has not had any impact on this industry so far. For example, no increase in the already substantial intra-EU trade has been observed. Furthermore, some measures with relevance to the industry, such as the technical harmonisation and the mutual recognition of rules, and public procurement, are not yet fully implemented. Remaining internal barriers still exist with respect to public procurement markets and safety regulations. Inconsistent applications of both competition and advertising guidelines also constitute internal barriers. Differences in technical standards are not explicitly regarded as trade barriers. According

**Table 7: Furniture**  
**Largest furniture producers in the EU, 1992**

Company	Country	Turnover (million ECU)	Types of furniture (1)
Welle	D	400-800	b;d;u;k
Schieder	D	400-800	b;d;u
Steelcase-Strafor	F/USA	400-800	o
Alno	D	300-400	k
Wellmann	D	300-400	k
Groupe Parisot	F	300-400	b;d;u;k
Samas Group	NL	200-300	o
Skandinavisk Group	DK	200-300	o
Christie-Tyler	UK	200-300	u;m
Skane-Gripen	D/S	200-300	k
Klaussner Gruppe	D	200-300	u
Nobilis	D	200-300	k
Voko	D	200-300	o
Himolla	D	200-300	u
Natuzzi	I	200-300	u
Scharf Gruppe	D	200-300	o

(1) b: bedroom; d: dining room; k: kitchen; o: office; u: upholstery; m: mattresses

Source: U.E.A.



**Table 8: Metal and wooden furniture  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	N/A	N/A
Danmark	1.88	1.78
BR Deutschland	1.17	1.20
Hellas	N/A	N/A
España	1.20	1.13
France	0.76	0.70
Ireland	N/A	N/A
Italia	1.28	1.25
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	N/A	N/A
United Kingdom	0.90	0.89

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

to this industry the next priorities should be policies to facilitate the working environment for SMEs, which dominate this sector.

## REGIONAL DISTRIBUTION

Furniture enterprises are relatively concentrated in the different EU countries. In Germany, the enterprises are concentrated in three Länder: North Rhine-Westphalia, Bavaria and Baden-Württemberg. In Italy, about two-thirds of the enterprises and employment are situated in the northern part of the country. In France, the greatest concentration of firms and employment is in the regions of Brittany, Ile-de-France, Normandy and Rhône-Alpes. In Belgium, nearly all the firms are in the western part of Flanders.

## ENVIRONMENT

The furniture industry is very attentive to the protection of the environment, and the eco-label regulation is an important piece of legislation for the furniture industry. Also, as it is an important user of packaging, the industry already has invested in recyclable packaging to respect the packaging and packaging waste directive.

At the time of this writing, the furniture industry is closely following the development of the integrated pollution prevention and control draft directive, which would ask manufacturers to explain how their firms work and what they are doing to protect the environment in order to obtain permits for their activities.

## REGULATIONS

There are no restrictions between the EU and the EFTA countries: manufacturers can export furniture freely in these countries. As far as access to the Single European Market is concerned, there are different possibilities.

The EU has recently signed Association Agreements with six East European countries in order to prepare them for their eventual accession. The import duties on furniture will gradually decrease until 1997 when they will reach a zero rate. Imports into the EU are duty-free under certain ceilings but imports are taxed if they exceed these ceilings.

In the framework of the GATT, a double zero rate option has been adopted. From 1995 to 2000, import duty rates will decrease by 15 % per year (to eventually reach zero) in the

signing countries. Under the Generalised System of Preferences (GSP): there is a zero rate under certain ceilings, and Member States must ask for the application of the import duty when ceilings are exceeded.

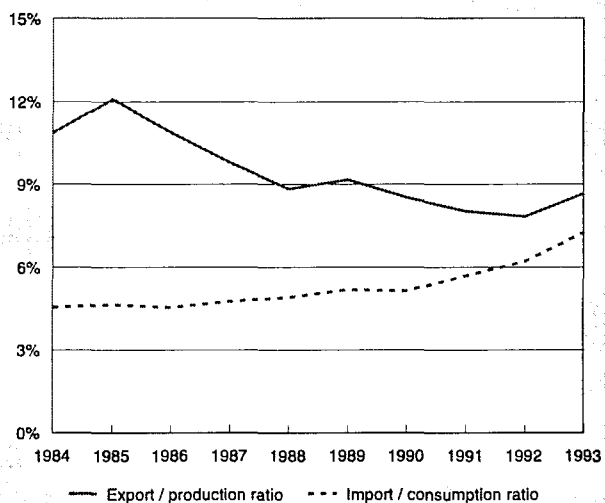
The EU countries often have their own labelling requirements and quality and performance standards, which they try to harmonise with the standards of the Comité Européen de Normalisation (CEN). The CEN/Technical Committee 207 specifically concerns furniture. It has appointed groups for the specific sectors of the furniture market to decide on EU standards. In all, five working groups (WG's) have been set up to discuss and draw up specific standards and testing methods: WG1 for domestic furniture, WG2 for kitchen and bathroom furniture, WG4 for outdoor furniture, WG5 for contract and educational furniture and WG6 for methods of fire safety. In addition, one sub-committee (SC), i.e. SC3 for office furniture, has been devised, and there is also a joint "SC3-WG5" for reception area furniture.

Three standards on furniture have been finalised (i.e. adopted and published): EN 747, Parts 1 and 2 on bunk beds; EN 1021, Parts 1 and 2 on the assessment of flammability of upholstered furniture and prEN 1178, Parts 1 and 2 for high chairs. Two standards have been formally adopted but not yet printed: prEN 597, Parts 1 and 2 for the assessment of the flammability of mattresses and upholstered bed frames and prEN 1129, Parts 1 and 2 for foldaway beds.

In addition to these, many other regulatory measures are being discussed. For example, the EU is awaiting legislation on design protection which could be very important for the furniture industry. The proposed regulation outlines the creation of a registered and unregistered design for the EU. Under this method of registration, furniture manufacturers would have the possibility of registering their model or design with the EU Office of Designs and Models for either the twenty-five years (split up into five-year segments) offered by the registered design option, or for five-year protection under the unregistered design alternative. On the other hand, a proposal of directive would harmonize the different national legislations on the protection of design.

EUFAC is a voluntary industry labelling system made to identify upholstered furniture that is cigarette resistant, i.e. that which has a combination of materials (e.g. fillings, covers and/or interliners) that make it so. This is an alternative to

**Figure 12: Metal and wooden furniture  
Trade intensities**



Source: DEBA

a draft directive on the fire resistance of upholstered furniture. The European Commission supports this voluntary initiative and therefore has decided not to present a directive on this matter.

Another draft directive requires that the new furniture factories using organic solvents (mainly in coatings) or the existing ones exceeding specified threshold limits of VOC emissions shall be registered and authorised by the national authorities. Hence, firms will be required to limit their VOC emissions.

The directives concerning the minimum safety and health at the workplace are generally applicable to the furniture industry. One of these directly concerns the office furniture industry: the Directive on Working with Visual Display Units, which outlines specific requirements for the equipment in the office (desks, chairs, computers, etc.), the environment and the interface of computers and people at the workplace.

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## OUTLOOK

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Optimistic macro-economic forecasts (rise in the GDP, increase in the private consumption, stagnation and even a decrease in unemployment and interest rates) should result in positive trends for the furniture industry for at least the next three years. The increase in production in 1995 should result from the strong demand for exports from EU countries with a competitive exchange rate or to those countries where the economy has completely recovered. The consumption of furniture in the Member States themselves should be moderate and even slightly negative in Germany (re: new taxes). In 1996 and 1997, the recovery should be more pronounced (real growth rates exceeding 4 %) both because of increasing intra- and extra-EU exports and domestic consumption. Rising imports from East European and Asian countries will remain a threat for the less competitive EU furniture manufacturers who should be helped a bit by the cooperation of and/or sub-contracting with other EU or non-EU manufacturers. The concentration process in the industry should continue and the large groups should reinforce their positions.

The outlook for the office furniture segment in 1994 also was slightly more favourable. Overall, the decline seems to have come to an end, even though a decrease of 8.5 % was registered in the German office furniture production in that year. Many vacant office buildings remain available which should stimulate the demand for office furniture from 1995 on once they are let. A number of long-term developments in the sub-sector will continue, e.g. investment in office automation and growth in the service sector which also will increase the demand for office furniture in the long run. The attention focused on the office workstation can only increase.

Written by: UEA and FEMB

The industry is represented at the EU level by: European Furniture Manufacturers Federation (UEA). Address: 109 rue Royale, B-1000 Brussels; tel: (32 2) 218 1889; fax: (32 2) 219 2701;  
Fédération Européenne du Mobilier du Bureau (FEMB). Address: Boerhaavelaan 40, PO Box 190 NL-2700 AD Zoetermeer; tel: (31 79) 53 12 80; fax: (31 79) 53 13 65.

# Jewellery

## NACE 491

The current economic recovery following the two years of recession in 1992 and 1993 will positively affect market demand for jewellery. As the economy recovers and disposable income increases again, demand will shift somewhat towards the higher end of the market. A growing demand for more valuable jewellery with a superior level of service and quality is also caused by the expanding segment of the population made up of middle-aged people. A contrasting trend - the decline of the amount of young people - will negatively influence the lower end market in the medium term. Overall, the outlook for 1995 is optimistic in view of the economic upswing. After 1995 prospects remain promising, as general economic growth is expected to persist.

### INDUSTRY PROFILE

#### Description of the sector

The jewellery sector is divided into six subcategories:

- precious metal or precious plated ware;
- goldsmiths' and silversmiths' wares;
- costume (or "fancy") jewellery;
- diamond cutting;
- precious and semi-precious stones; and
- coins and medals.

An article made of base metal that is simply coated with precious metal and then set with imitation stones would be regarded as costume jewellery. However, if the plating is of high quality, the metal may be set with natural stones, making it difficult for some to recognise the difference between costume and precious jewellery. The industry also includes objects made of precious metals (particularly silver) that are not worn on the person. It is estimated that the share of precious jewellery is somewhat less than 80%; costume jewellery accounts for more than 20% of total market demand for jewellery.

It should be noted that Eurostat data on production and employment show the relative volume of the industry in each country and the trends in production and employment. However, the absolute figures underestimate the importance of the industry, as units with less than 20 employees are not counted in the official statistics. Small firms can account for more than 40% of the jewellery production in a country.

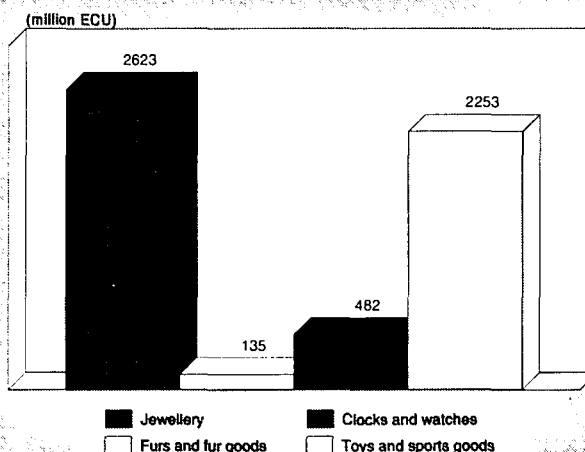
#### Recent trends

On a global scale, the demand for gold for the specific purpose of jewellery fabrication rose markedly in the 1980s, from 54% of total gold production in 1980 to 70% in 1990. In the early 1990s this share fluctuated, and was at 71% in 1993. Demand increased from 2 128 in 1990 to 2 693 tonnes in 1992. In 1993 demand dropped by 7%, equalling 2 501 tonnes of gold. In the course of 1994 some recovery of gold demand occurred, with a small increase recorded in the third quarter (1.4% against the same period in 1993). This upswing, however, is mainly caused by rising investments in gold, rather than by a rising need for gold in order to manufacture jewellery.

In 1993 the economic downturn caused a drop of 4.5% in the EU fabrication of carat gold jewellery, mainly due to a slowdown in Italy, where gold fabrication dropped by 4%, down to 441 tonnes.

The EU market for costume jewellery expanded during the 1980s. In 1993 the total retail sales of costume jewellery was

Figure 1: Jewellery  
Value added in comparison with related industries, 1993



Source: DEBA

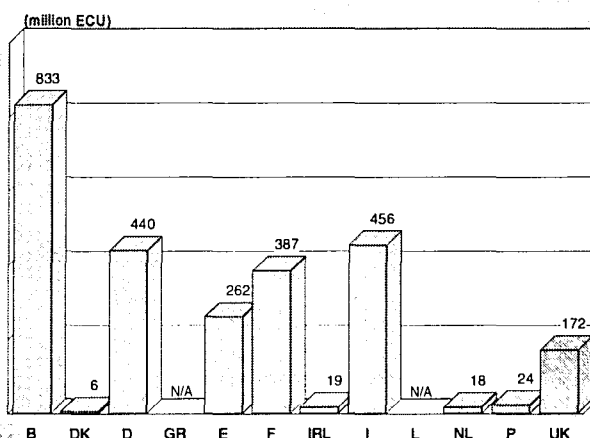
estimated at 1.6 billion ECU for the EU. Total retail value of diamond jewellery amounted to nearly 630 million ECU. In 1993 the sales were under pressure throughout Europe leading to drops in jewellery sales of 6% in Italy, 4% in the United Kingdom and 2% in Germany. In France sales increased by 1%.

Due to the economic recession, employment in the jewellery industry has been decreasing since it peaked in 1990, after which it has fallen by an average of 3.5% per annum. Labour costs, however, do not demonstrate a similar downward trend. Until 1992 these costs increased before decreases were recorded in 1993 and 1994.

#### International comparison

The European production of gold jewellery is mainly concentrated in Italy. Globally, however, jewellery manufacture is concentrated in the Far East and Middle East, which constitute nearly 58% of production worldwide.

Figure 2: Jewellery  
Value added by Member State, 1993



Source: DEBA

**Table 1: Jewellery**  
**Main Indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Production	3 906	5 562	7 129	6 991	7 511	7 640	7 288	7 494	7 800 (4)	8 000 (4)	8 100 (4)
Extra-EU exports	9 655	10 054	11 855	10 716	10 733	10 744	12 938	13 918	15 100	16 200	17 500
Trade balance	2 938	4 039	4 599	4 018	4 294	4 374	2 545	2 882	3 400	3 900	4 400
Employment (thousands)	57.2	57.6	61.3	63.9	62.9	61.1	57.2	55.4	55.0 (4)	55.0 (4)	55.0 (4)

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

(4) NEI forecasts

Source: DEBA

**Table 2: Jewellery**  
**Gold fabrication in carat jewellery - production (including scrap)**

(tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
EU (1)	311.9	356.9	344.1	336.1	395.4	498.1	554.7	583.4	621.1	593
Belgique/België	1.9	1.9	1.7	1.6	1.8	2.0	2.2	2.1	2.1	1.9
Danmark	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	1.0	1.0
BR Deutschland	28.6	29.5	30.3	33.9	38.3	44.1	49.8	51.0	45.4	44.5
Hellas	9.1	11.5	11.0	10.7	10.7	10.5	10.5	10.0	9.3	9.0
España	12.6	15.7	15.6	17.0	24.0	30.0	34.0	32.5	30.0	26.0
France	16.7	17.6	19.9	20.9	22.9	25.7	31.0	31.1	32.2	32.1
Italia	220.0	253.0	238.0	222.0	262.0	345.0	381.0	415.0	461.0	441.0
Nederland	0.8	0.8	0.9	1.0	1.1	1.3	1.5	1.6	1.6	1.5
Portugal	2.4	3.5	3.5	4.0	4.5	5.5	7.5	9.1	11.4	10.5
United Kingdom and Ireland	19.0	22.6	22.3	24.2	29.3	33.2	36.3	30.1	27.1	25.3
Rest of Europe	34.1	38.0	38.6	37.0	44.7	54.6	63.1	55.2	50.7	46.2
North America	115.3	121.9	126.3	127.5	135.7	146.2	135.7	129.9	140.7	149.3
of which, USA	104.7	111.1	116.0	117.8	125.6	135.8	126.6	121.2	132.1	140.0
Latin America	24.2	32.1	45.0	35.9	36.8	44.4	44.8	51.0	54.5	58.9
Middle East	208.7	226.4	223.4	216.4	228.5	298.8	365.9	388.7	504.7	473.6
Indian Subcontinent	170.5	199.9	175.9	190.2	222.5	258.5	277.4	268.5	338.3	305.5
Far East	215.7	201.3	198.0	253.0	442.5	571.2	556.8	607.5	716.3	640.0
of which, Japan	50.2	60.7	80.7	84.0	95.0	112.5	109.5	106.7	104.0	87.0
Africa	18.3	17.8	21.0	22.4	31.6	35.5	42.8	43.3	43.6	32.3
Australia	2.6	3.2	4.4	4.2	4.0	5.1	4.7	4.0	3.9	3.3
China and former Soviet Union	33.1	33.6	34.0	34.2	35.1	43.5	82.0	153.0	219.5	199.1
World total	1 134.4	1 231.1	1 210.7	1 256.9	1 576.8	1 955.9	2 127.9	2 284.5	2 693.3	2 501.0

(1) Excluding Luxembourg.

Source: Gold Fields 1994, Gold Fields Mineral Services Ltd.

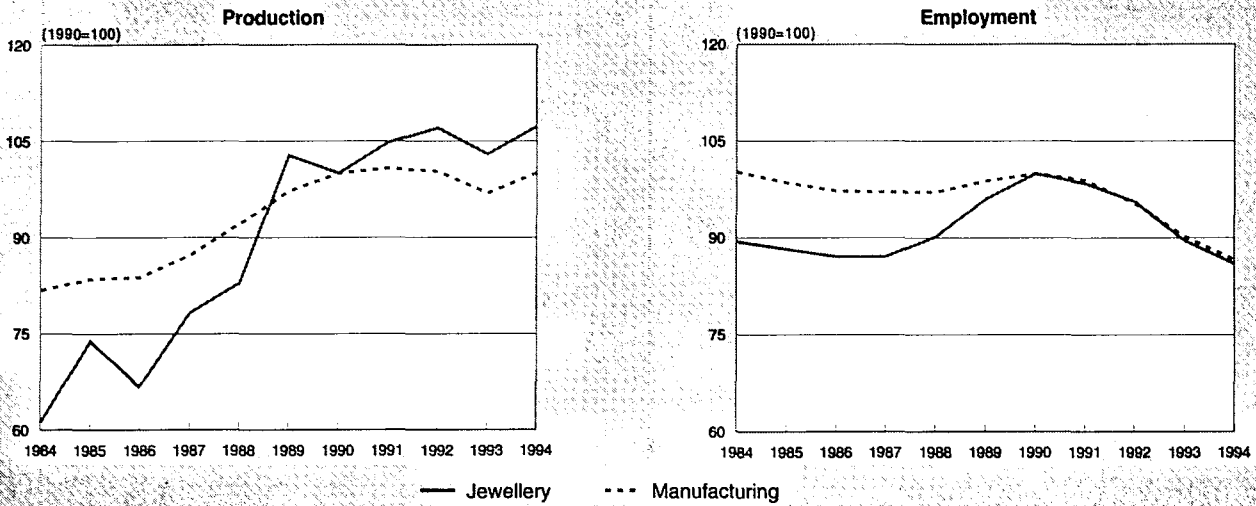
**Table 3: Jewellery**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Production	10.95	0.04	5.97	-3.82
Extra-EU exports	12.15	-6.83	3.28	15.59
Extra-EU imports	14.83	13.27	14.13	95.02

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Figure 3: Jewellery**  
Production and employment compared to EU total manufacturing industry



1994 are DEBA estimates.  
Source: DEBA

When one looks at the demand for diamond jewellery, some noticeable geographical differences can be observed. Retail sales in Japan and the USA are estimated at around 10 billion ECU. However, retail sales per capita are higher in Japan, which has fewer inhabitants. With 1993 retail sales of close to 2 billion ECU, or 35 ECU per capita, Italy has a retail value per capita comparable to that of the USA, and is by far the largest market within the European Union. In contrast, retail sales per capita do not exceed 20 ECU in the Netherlands, Germany and other Western European countries.

**Foreign trade**

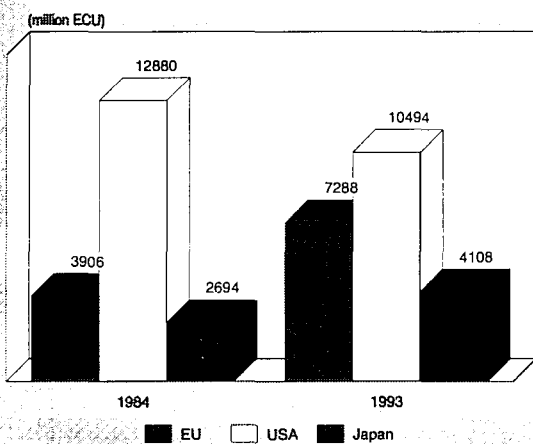
The US dollar exchange rate has a large influence on trade and demand in the global jewellery market. In 1993, devalued local currencies vis-à-vis the US dollar in large European markets for jewellery had a negative impact on sales volumes. In contrast, in 1994 the weakness of the US dollar vis-à-vis European currencies resulted in drops in local currency prices

of gold. The impact of these lower prices, however, may not have been passed on to the consumer yet.

Another characteristic of the jewellery industry is that trade is quite intense, resulting from the fact that the enhancement of raw materials and production of end products often involve cross-border trade. Over the 1987-1992 period, import growth rates kept up with export growth, resulting in a fairly stable trade surplus between 4 and 4.5 billion ECU. The EU remains a net exporter of jewellery.

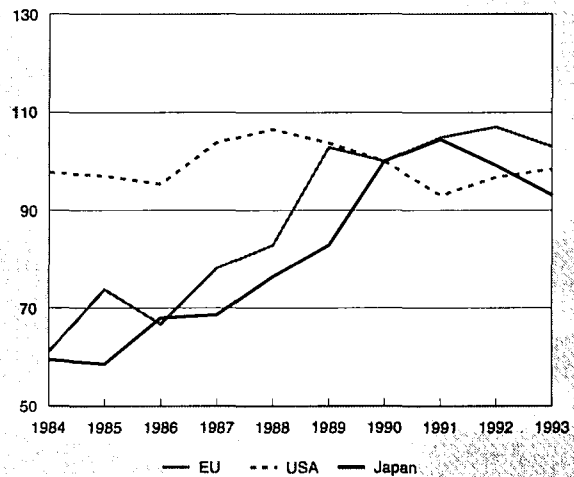
In current prices, extra-EU exports to the USA, India, Israel and EFTA countries increased over the 1988-1993 period. Since these growth rates kept up with the overall export growth, the relative shares of these countries in EU exports did not change dramatically: they remain the most important export markets for end products. Furthermore, exports to the Far East are increasing. The bulk of these exports are semi-finished products, which are exported back to the EU upon completion.

**Figure 4: Jewellery**  
International comparison of production in current prices



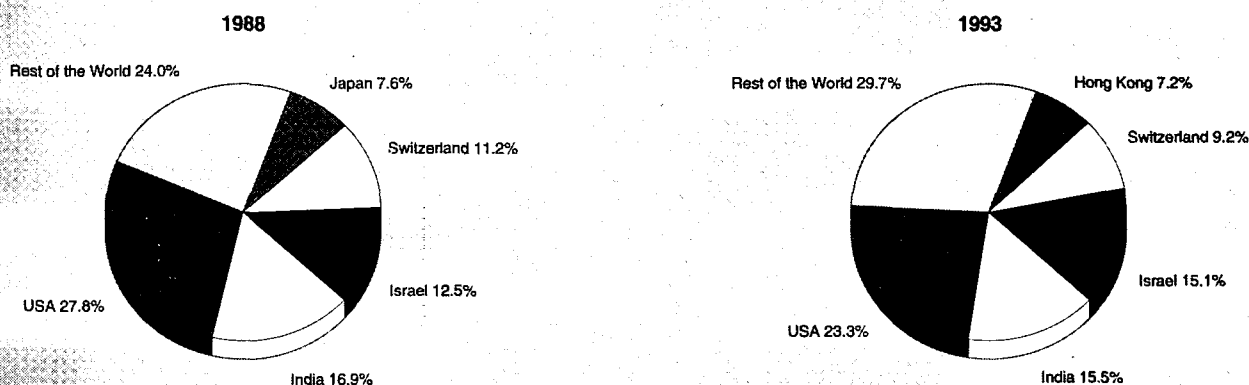
Source: DEBA

**Figure 5: Jewellery**  
International comparison of production in constant prices



Source: DEBA

**Figure 6: Jewellery  
Destination of EU exports**



Source: Eurostat

As a consequence, the Far Eastern countries are registered as importers and exporters of jewellery, but they are not the major foreign suppliers of jewellery on the EU market. The EFTA countries and Switzerland are ahead of India, which is followed closely by the USA.

## MARKET FORCES

### Demand

More than half of the demand for jewellery is constituted of plain gold items, followed by gold with gems (around 25-30 %). Silver and platinum lag far behind, with 7 % and 1 % respectively. Costume jewellery accounts for around 10 % of jewellery sales by metal type.

Regional patterns of demand also can be seen in terms of product line. For example, in the UK earrings, neckwear and rings all account for around 25-30 % of total demand for gold jewellery, followed by wristwear (11 %) and other items (8 %).

The purchase of jewellery is highly seasonal, with one-third of diamond jewellery being bought in December. The rising demand for precious jewellery is a direct result of higher standards of living and personal disposable incomes. It should be noted, however, that national differences can be quite large, depending on the amount of disposable income people are prepared to pay for luxury items. For instance, the World Gold Council has estimated that in Italy, 38 % of all adults buy gold jewellery, compared to 33 % in the UK, 15 % in France and 14 % in Japan.

Most jewellery purchasers are women. However, the percentage of men buying jewellery is rising, not only for gifts, but

also for the increasing portion of men wearing jewellery. Male or female, it is the younger generation that purchases the most jewellery overall, although the older generation purchases the higher end products.

Thus, an ageing population is one of the factors likely to stimulate demand for more costly jewellery in the EU. The demand for unusual pieces and natural materials is the other. Among the discernible trends for more ornate and luxurious fashion items, some interesting developments can be distinguished. There is increased consumer interest in Far Eastern, Indian and African styles; folklore, heraldic and Art Deco themes; floral and animal motifs; and the use of raw materials. The last two trends emerge out of a general concern for ecology and nature.

The results of a recent survey concerning trends in demand for jewellery not containing diamonds were published in a report of the British National Association of Goldsmiths. Not surprisingly, responses from 26 000 adults showed that the effects of the recession limited consumer expenditure over the 1990-1993 period. Also, while the ownership of jewellery is heavily biased towards women, the proportion of men who have their own jewellery has increased marginally. In terms of age, the highest level of penetration is found among the 25-34 year olds. Purchase for self is higher than gift purchase and is biased towards the young. Furthermore, men are more likely to buy jewellery without diamonds for someone else, as are younger people and those who are working.

Customers are increasingly looking to buy one-of-a-kind, high-quality jewellery pieces, rather than discounted, run-of-the-mill items. This fact has been recognised by more and more retailers, who have had to adjust their buying and marketing strategies accordingly.

**Table 4: Jewellery  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	9 655	9 397	8 740	8 757	10 054	11 855	10 716	10 733	10 744	12 938	13 918
Extra-EU imports	6 717	5 837	5 949	4 389	6 015	7 256	6 698	6 439	6 369	10 393	11 036
Trade balance	2 938	3 560	2 791	4 368	4 039	4 599	4 018	4 294	4 374	2 545	2 882
Ratio exports / imports	1.44	1.61	1.47	2.00	1.67	1.63	1.60	1.67	1.69	1.24	1.26
Terms of trade index	81.9	114.3	109.0	126.2	89.1	104.7	100.0	118.1	140.0	174.3	N/A

Source: DEBA

**Table 5: Jewellery**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	68.3	83.6	76.6	89.8	91.9	107.1	100.0	106.5	112.0	115.0
Unit labour costs index (3)	106.0	93.6	109.4	96.1	97.7	88.5	100.0	100.7	99.6	96.8
Total unit costs index (4)	102.0	102.9	102.3	90.9	98.7	96.0	100.0	101.3	101.7	99.3
Gross operating rate (%) (5)	7.6	6.8	7.3	18.8	13.2	16.7	14.1	14.6	14.4	15.1

(1) Some country data has been estimated.

(2) Based on index of production / Index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

## Supply and competition

There is little or no brand marketing in the precious jewellery sector, which makes analysing competition at an industry level irrelevant. It is more significant to determine competition at the retail level. Manufacturing for costume jewellery as well as precious jewellery is highly fragmented, with many small companies made up of highly-skilled artisans. At the retail level there is also fragmentation. Precious jewellery is sold mainly through specialty jewellers, whereas costume jewellery is sold at a variety of outlets: department stores, clothing shops, etc.

In the 1980s, some retail chains became important jewellery vendors, including Ratners (parent company of Ratners and H. Samuel) in the United Kingdom, and Magic Moment and Gold Market in Italy. A major shake-up of the retail jewellers involving consolidation and rationalisation is expected throughout the EU. The Ratners Group, for instance, has changed its name to Signet Group, while at the same time undergoing a major reorganisation. In 1992 the Group announced the closure of 330 stores, and in July 1993 a further 54 stores were closed.

Independent jewellers have been hit hard by rising overhead costs, and are expected to give up more of their market share to the multiple specialists and catalogue showrooms. The latter made gains during the downturn in consumer spending and are expected to increase their share in total jewellery sales because of their discounting policy.

Competition in the costume jewellery industry comes mainly from East Asian countries, especially Hong Kong, South Korea, Taiwan and Thailand. Usually these countries operate at the lower end of the market, but product quality is improving. Competition from East Asia takes place mainly through price.

## Production process

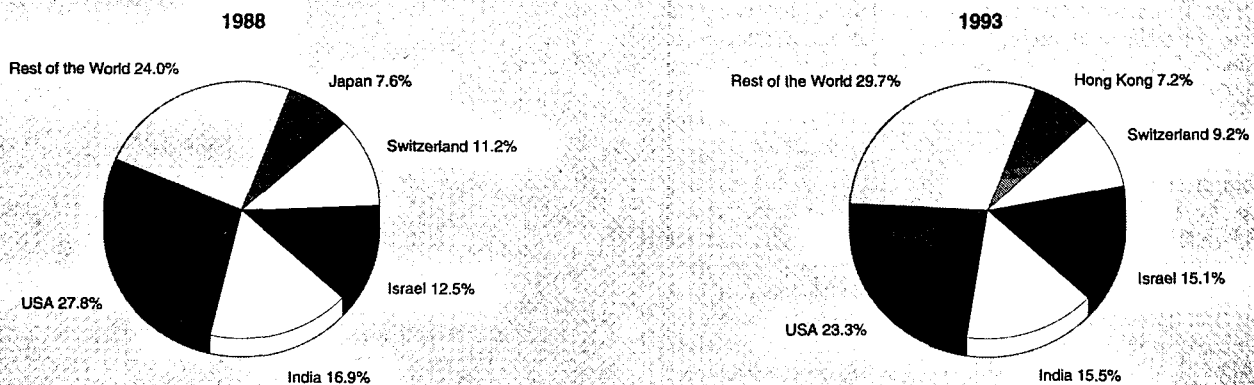
Following trends in demand, manufacturers of fashion jewellery are urged to produce up-to-date designs. In theory, new collections are introduced two to four times per year, but in practice new series appear much more frequently. This makes short distribution lines necessary, giving local EU producers an advantage over overseas manufacturers. Much costume jewellery is shipped by air because of the need for quick delivery. In view of the rapid turnover of new collections, high mark-ups (of up to triple keystone) are necessary to compensate for the risk of goods becoming un-sellable. The manufacture of jewellery includes a broad variety of products: brooches, earrings, necklaces, bracelets, rings, hair ornaments, hat ornaments, shoe ornaments, cuff-links, tie-clips, etc.

## INDUSTRY STRUCTURE

### Companies

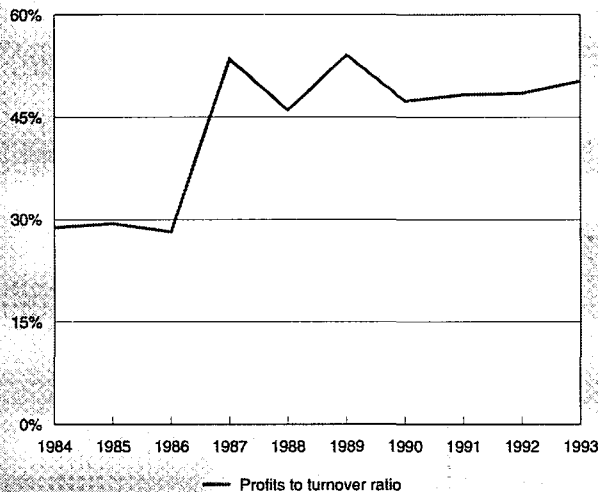
Most of the enterprises in the precious jewellery industry are artistic in nature, with much time-consuming detailed work involved in the fabrication of each piece. Therefore, it is sometimes difficult for the industry to keep up with the fast pace of demand, as was the case in the 1980s. Compared to costume

**Figure 7: Jewellery**  
**Origin of EU imports**



Source: Eurostat

**Figure 8: Jewellery**  
Pre-tax profits to turnover ratio (1)



(1) Estimated as a percentage of non-labour income in value-added.  
Source: NEI

jewellery, however, the precious jewellery industry has the advantage of not being influenced by fashion trends, and therefore designs last much longer.

Jewellery manufacture, for both precious and costume jewellery, is highly fragmented. For example, Italy's industry has 6 500 businesses, employing 40 000 people (estimated). Generally, the largest companies are private, family-owned and operated businesses.

The primary European precious jewellery firms include: Lyon Alemand Louyet (F), Engelhard (F), Trattamento Ceneri Auroargentari (I), Uno a Erre Italia (I), Rosy Blue (B), Lens Diamond (B), Franz Golz (D) and Guthmann & Wittenauer (D). Among the costume jewellery companies with the highest sales are Bijoux GL (France), Moranduzzo Dario (Italy), Modern Creation München Reisegepack (Germany), and Rudolf Zenner (Germany).

### Strategies

The use of brand marketing is rare in the jewellery industry, with the few existing brands being active in the costume jewellery sector, mainly originating from enterprises with well-known brand names in other industries such as cosmetics or clothing (e.g. Kenzo, Moschino, Fiorucci) which branch out into jewellery. Distribution, therefore, plays an important role in competition and strategy.

Precious jewellery is mainly sold through speciality jewellers, but there is a growing number of multiple and non-specialist outlets. The share of multiple jewellers is increasing, as is the share of catalogue showrooms. The latter operate a discount policy which has enabled them to gain share during the economic recession. Department store and mail order retailers account for minor market shares.

Within the EU, independent jewellers have been losing share since the 1980s, due to the affects of falling demand and rising overhead costs. However, independents still account for a substantial part of all jewellery sales, even higher than in other retail sectors. This is mainly due to the fact that these traditionally family-run jewellers are often located at the middle to upper end of the market and are distinguished from the large collectives by their level of service. They are able to retain their position as jewellery goods are still viewed as luxury items, which means that price does not play a dominant role in consumer buying decisions. In order to reduce

costs, most independent jewellers organise themselves into buying groups in order to gain preferential buying terms.

Most of the enterprises of the industry are too small to activate rigid strategies other than simply following the market. As competition with foreign industries increases, however, more emphasis could be placed on quality.

### Impact of the Single Market

Although mainly indirect, the impact of the Single Market on the jewellery industry has been positive. This industry has indeed benefited from the improvement in the overall economic environment in the Member States, which has been stimulated by the Single Market as it facilitates trade. The jewellery industry is an extremely international industry. To a certain extent the completion of the Single Market has been beneficial to the sector as it has facilitated intra-EU trade. However, EU exports to third countries are also important. Due to the international character of the industry, factors such as the development of the world economy and trends in prices of precious metals and diamonds are also extremely relevant. Within the EU, an important internal barrier still exists. The removal of this barrier, the harmonisation of the marking of precious metals, is considered to be highest priority.

### REGIONAL DISTRIBUTION

The industry has a great need for specialists and therefore remains concentrated in places where the infrastructure has been built over many years. Some locations lend themselves to higher-quality jewellery, some to mass production, and some to the production of larger silver articles.

The main manufacturing centres in Italy are Arezzo, Vicenza and Piedmont. In Germany about 75 % of the trade is based in Pforzheim, with Idar-Oberstein being an important centre of the gemstone industry. Other centres are Schwabisch Gmund, Hanau and Kaufbeuren. In France, Paris and Lyon account for a major part of the industry, as does St. Amand. In the United Kingdom the main centres are London, Hatton Garden, Birmingham and Sheffield (the centre for cutlery and a large portion of the silverware industry). In Belgium, Antwerp is the centre of the jewellery industry. Belgium ranks among the major diamond cutting centres in the world, along with India, Israel and the United States.

**Table 6: Jewellery**  
Production specialisation (1)

(ratio)	1984	1993
Belgique/België	3.61	5.96
Danmark	0.33	0.11
BR Deutschland	0.59	0.45
Hellas	N/A	N/A
España	0.69	1.26
France	0.91	0.73
Irøland	1.14	0.43
Italia	2.32	2.37
Luxembourg	N/A	N/A
Nederland	0.10	0.11
Portugal	N/A	0.50
United Kingdom	0.63	0.47

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA



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## REGULATIONS

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An important matter for the EU jewellery industry is the progress towards proposed EU Directive (93/C 318/06 amended by 94/C 209/04) for the harmonisation and free movement of precious metal articles. The Directive addresses harmonisation of standards which would replace existing national provisions and would require Member States to comply with "fineness" conformity attestation procedures beginning 1 January 1997.

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## OUTLOOK

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The nature of jewellery is changing and the future is likely to see a bigger emphasis on service and quality, as an ageing population and improved standards of living contribute to a growing demand for higher end products. Thus, an intensifying competition in the lower-price market segments is anticipated. However, as the costume jewellery segment remains very sensitive to developments in the world economy, demand is expected to increase in the medium term.

Furthermore, industry demand depends on the price of gold, especially in periods of economic recession, when the gold price might have a particularly negative impact on jewellery demand. In times of economic upswings, this link is much looser. The price of gold showed a relative stability in the course of 1994. Thanks to the economic recovery, demand for gold jewellery is expected to outweigh gold price increases in the medium term.

Competition is expected to intensify further as a result of the Single European Market and production in East Asia. Another threat to domestic EU manufacturers is the assembly of imported pieces into final products by importers. At the same time, subcontracting to manufacturers in the Far East is also growing. These developments put pressure on prices.

After the downturn in 1992 and 1993, the current signs of recovery in the Western European markets will stimulate the production and consumption of jewellery. In 1994 an overall growth of 1.5 % took place. In the medium term an annual average growth of 2 % until 1998 is forecast.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: International Confederation of Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Address: 78A Luke Street, London, EC2A 4PY United Kingdom; tel: (44 171) 613 4243; fax: (44 171) 613 4450.

# Musical instruments

## NACE 492

The European musical instruments industry specialises in the manufacture of high-quality, high-end, traditional instruments. The industrial performance varies strongly per market segment. Due to the fact that the Eurostat statistics only include data of companies with 20 or more employees, the figures in this monograph are strongly influenced by the performance of the piano segment. After a period of declining sales, total sales have increased slightly in 1994. In the medium term, the slow growth rates are expected to persist, but it is not likely that EU production will be able to reach a higher level than its peak in 1988.

### INDUSTRY PROFILE

#### Description of the sector

Musical instruments include both traditional instruments, whether early or modern, and electronic instruments. The market for musical instruments is highly diversified and can be categorised into the following groups:

- pianos (upright and grand pianos);
- pedal organs and electric organs;
- woodwind/reed instruments (saxophones, oboes, flutes and clarinets);
- brass wind instruments (trumpets, trombones);
- stringed instruments (violins, cellos, violas and double-basses);
- fretted instruments (acoustic guitars, mandolins and banjos);
- percussion instruments (drums, cymbals);
- electric pianos, electric keyboards, portable keyboards;
- synthesisers;
- other instruments (accordions, rhythm machines, harmonicas, harpsichords, pipe organs); and
- accessories and parts (bows, strings, bridges, reeds and components for electronic music).

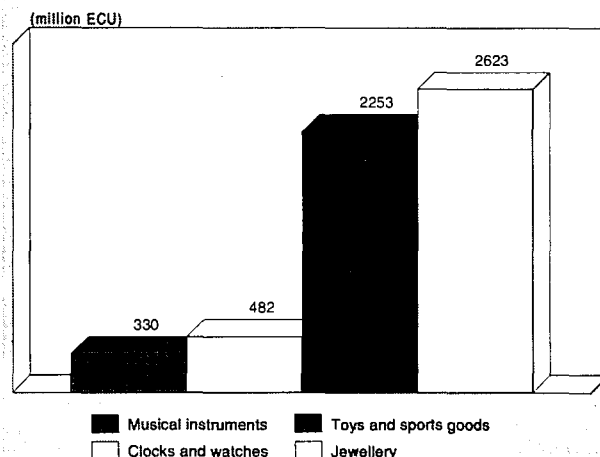
Within the EU, the production of musical instruments is mainly concentrated in Germany and Italy with respective shares of 47 % and 27 % of total production. Together with France and the United Kingdom, these countries account for more than 94 % of total EU production. Whilst Germany mainly produces traditional instruments, Italian production is primarily in electronic instruments.

#### Recent trends

Over the period 1984-93, the EU production of musical instruments recorded a decline per annum in real terms of 3.3 %. The statistics, however, do not include the production of companies with 20 employees or less. Consequently, these figures mainly reflect the poor performing producers of pianos with more than 20 employees, and do not give a complete picture of the development in all market segments.

According to the available figures - which mainly concern the piano market - it is clear that the musical instruments industry has been performing at relatively low levels. Whilst the total manufacturing industry has been able to maintain or even to increase its production (in constant prices) during the 1980s, the production of musical instruments has demonstrated a structural decline since 1984.

Figure 1: Musical instruments  
Value added in comparison with other industries, 1993

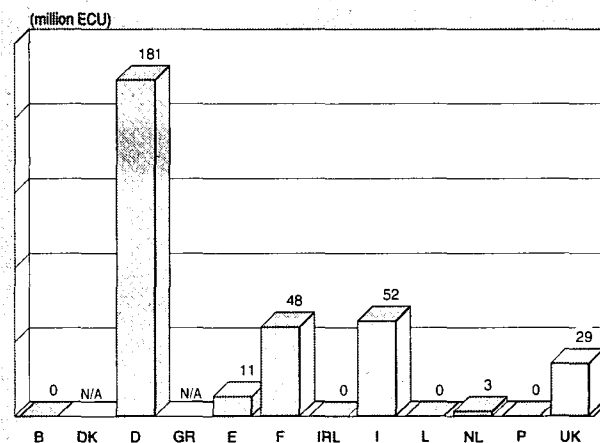


Source: DEBA

Due to the decreasing production, the number of people working in the musical instruments industry has been declining rapidly. Despite a slow down of job losses in 1989, employment has declined structurally by an average of 4.7 % per annum. Again, it should be taken into account that many countries only report employment for firms with 20 employees or more. In Germany alone, 30 % of the workforce is employed by firms with less than 20 employees. When one considers that labour force reduction is more difficult in small companies than in large ones, the decline in employment in recent years is likely to be less significant.

In contrast with production, consumption has demonstrated higher growth rates in current prices, offering non-EU suppliers the opportunity to increase sales within the EU over the period. Between 1984 and 1990, demand grew by an average 5 % per annum. From 1991 on, the economic recession caused a drop in demand, such that EU consumption declined by more than 13 % in only two years. Some recovery of demand was expected for 1994.

Figure 2: Musical instruments  
Value added by Member State, 1993



Source: DEBA

**Table 1: Musical instruments**  
**Breakdown by major product line, 1991**

(thousand units)	Pianos	Stringed instruments	Wind instruments
EU	23	187	1 188
Asia	565	1 554	246
North America	281	82	5 138

Source: UNIDO

**Table 2: Musical Instruments**  
**Main indicators in current prices (1)**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	860	1 177	1 074	1 151	1 134	1 092	983	989	953	1 070	1 114
Production	682.5	790.7	681.2	782.6	761.2	737.9	667.0	679.6	603.0	710.0	724.0
Extra-EU exports	222.0	231.0	269.1	281.6	288.4	286.9	300.8	341.7	350.0	360.0	370.0
Trade balance	-177.3	-386.2	-393.0	-368.5	-373.2	-353.7	-315.6	-309.6	-350.0	-360.0	-390.0
Employment (thousands)	16.8	13.8	13.9	13.6	13.1	11.9	11.1	10.6	10.5	10.4	10.3

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) DEBA estimates.

(3) Rounded DRI forecasts.

Source: DEBA

**Table 3: Musical instruments**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	0.42	-5.39	-2.20	-16.65
Production	-3.78	-2.78	-3.34	-8.96
Extra-EU exports	5.18	3.96	4.64	3.11
Extra-EU imports	10.01	-4.04	3.53	-16.09

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

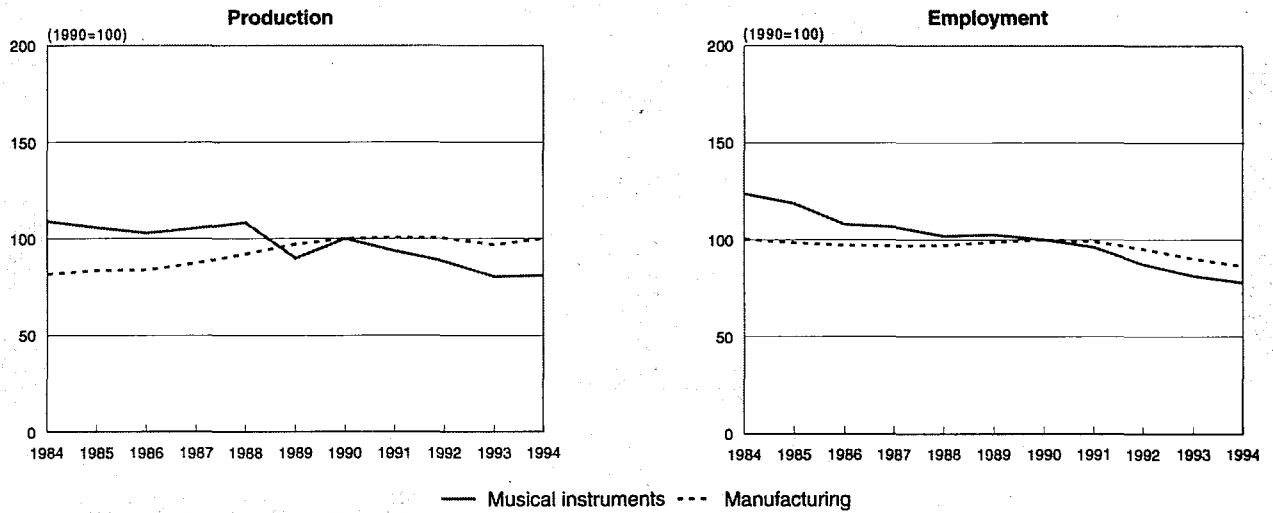
**Table 4: Musical Instruments**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	222	255	234	231	231	269	282	288	287	301	342
Extra-EU imports	399	427	464	564	617	662	650	662	641	616	651
Trade balance	-177	-171	-230	-333	-386	-393	-369	-373	-354	-316	-310
Ratio exports / imports	0.56	0.60	0.50	0.41	0.37	0.41	0.43	0.44	0.45	0.49	0.52
Terms of trade index	105.5	99.2	102.3	101.9	97.8	96.6	100.0	93.8	94.9	84.1	N/A

Source: DEBA



**Figure 3: Musical instruments**  
**Production at constant prices and employment compared to EU manufacturing**



1994 are NEI estimates for the musical instruments industry, Eurostat estimates for manufacturing industry.  
 Source: DEBA

**International comparison**

The production of musical instruments is mainly concentrated in the Far East and more specifically in Japan. The Japanese production exceeded 3 100 million ECU in 1993, far ahead of US production (795 million ECU) and EU production (667 million ECU). In the nine years between 1984 and 1993, Japan increased its production in ECU by 17 %. The production of musical instruments is also increasing in other countries of the Far East, namely China and South Korea (which, by the way, accounts for 11 % of extra-EU imports of musical instruments; see below).

**Foreign trade**

The EU is a net importer of musical instruments. During the 1980s, demand shifted towards electronic and digital instruments, which are primarily manufactured in the Far East. This growing demand for foreign instruments has resulted in the increase of imports into the EU at a rate faster than that of extra-EU exports, thereby causing the trade deficit to grow.

In 1989 this deficit reached its highest value equalling nearly 400 million ECU. From 1990 on imports slowed down, whilst exports recorded slight increases. Consequently, the trade deficit dropped by nearly 20 % over the 1989-1993 period.

The USA and Japan are major importers of European musical instruments. Both countries together accounted for 46 % of extra-EU exports in 1993. Other major destinations are Switzerland, Austria and South Korea.

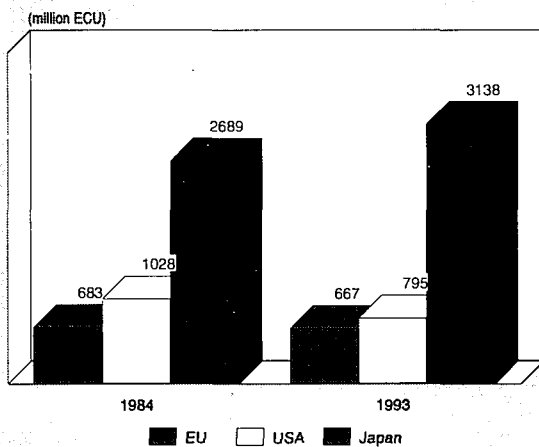
Japan is by far the largest supplier of musical instruments for the EU market, constituting nearly 47 % of total extra-EU imports and far ahead of the USA (14.5 %), South Korea (11 %), Taiwan (8.8 %) and China (6 %).

**MARKET FORCES**

**Demand**

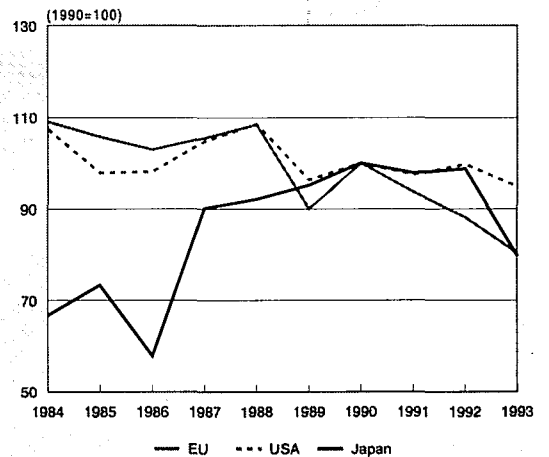
Demand for EU-manufactured musical instruments has been negatively affected by the economic recession of the early

**Figure 4: Musical Instruments**  
**International comparison of production at current prices**



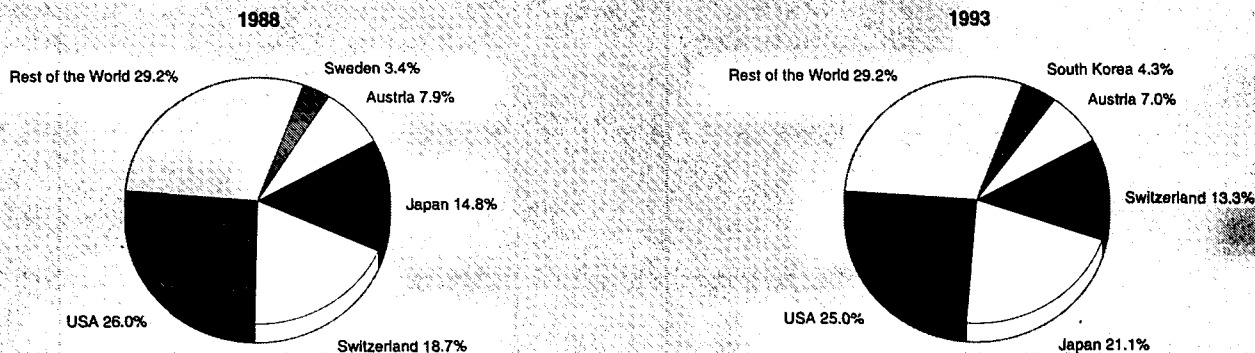
Source: DEBA, Census of Manufacturers, Nikkei

**Figure 5: Musical Instruments**  
**International comparison of production at constant prices**



Source: DEBA, Census of Manufacturers, Nikkei

**Figure 6 : Musical Instruments  
Destination of EU exports**



Source: Eurostat

1990s. Total piano sales worldwide fell from a peak of 1.1 million in the mid-1980s to about 600 000 in the early 1990s. Despite an expected slight recovery of demand, the consumption of musical instruments in the EU remains low compared to the United States.

The development of electronic musical instruments has led to a wider range of products, thus enlarging the total market. These electronic instruments have an advantage over traditional instruments in that they offer new ways of making music which are easier for and more accessible to non-professional musicians. During the 1980s, demand for electronic instruments grew faster than demand for traditional instruments. From 1990 on, however, demand for electronic instruments began to decline.

Demographic developments have opposing effects on the musical instruments market. Decreasing birth rates will lower total demand for musical instruments in the longer term, while in the shorter term the growth of demand for easy electronic instruments (e.g. portable keyboards) will decline. The increasing number of 30 to 40 year olds, however, means more purchasing power and more interest in acoustic instruments in the future.

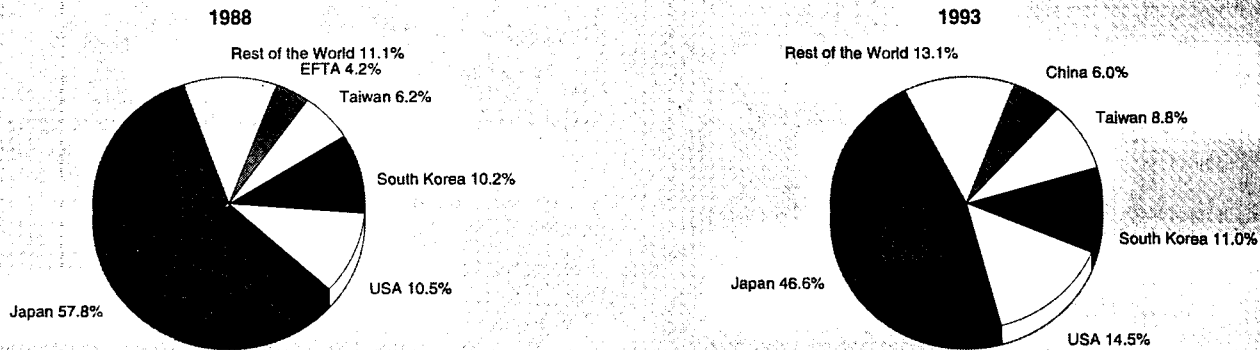
According to market reports from Germany and the UK, there is a trend to use more traditional, acoustic instruments. The renewed interest in jazz in some countries also leads to more demand for traditional instruments like stringed and fretted instruments and wind instruments.

### Supply and competition

Despite a large domestic market and an increasing level of productivity, the EU musical instruments industry lost ground during the 1980s in the competition with instrument makers abroad. Above all, increasing labour costs had a negative impact on EU competitiveness. Moreover, the depreciation of the yen during the second half of the 1980s made Japanese products relatively cheaper in the EU. As mentioned above, the EU production of musical instruments is mainly concentrated on traditional instruments. Japan, in contrast, has benefited from the growing demand for electronic and digital instruments during this period (e.g. keyboards). Since 1990, however, the demand for electronic instruments has started to decline.

In terms of the quality of acoustic instruments, European manufacturers are far ahead of their main competitors. As these manufacturers are highly specialised, trends in demand determine the market performance of the different segments. Recently, for in-

**Figure 7: Musical instruments  
Origin of EU imports**



Source: Eurostat



**Table 5: Musical instruments**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	88.0	89.1	95.3	98.9	106.3	87.8	100.0	97.3	101.1	98.7
Unit labour costs index (3)	78.5	81.5	83.7	83.4	83.7	101.6	100.0	108.7	111.6	118.7
Total unit costs index (4)	80.0	83.7	86.6	89.8	93.6	95.7	100.0	103.8	106.0	108.4
Gross operating rate (%) (5)	7.96	9.22	9.58	10.83	9.46	7.69	6.59	7.58	8.16	6.08

(1) Some country data have been estimated.

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

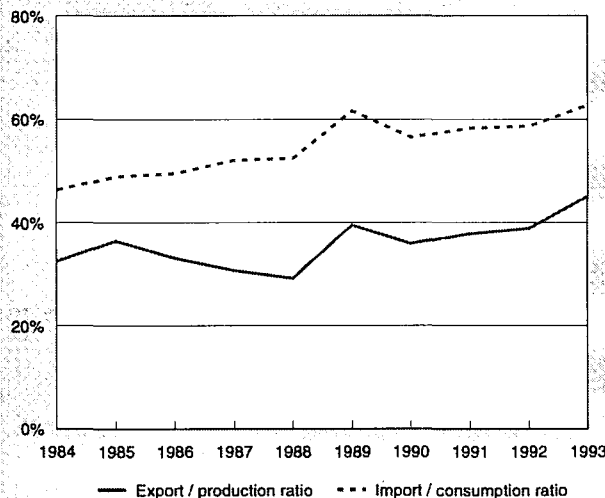
stance, saxophones, other wind instruments and percussion instruments all have been selling quite well.

Competition in the market is intense. EU demand in real terms has shown only a modest growth, while supply and competition from Asia, Eastern Europe and the USA has increased. Moreover, due to the differing composition of EU demand and supply, competition between European suppliers is also high.

Only until 1988 was the industry able to record higher growth rates of labour productivity than unit labour growth rates. From 1989 to 1993, unit labour costs increased by nearly 17 %, whilst the labour productivity grew by 12 % over the same period.

European firms concentrate on high-end products. The high-quality production implies smaller production runs or even custom-made, one-of-a-kind instruments. The EU musical instruments industry, with its specific national features, also plays an important role in transferring European music culture through the instruments it manufactures: all kinds of instruments in Germany, with emphasis on pianos, wind instruments, violins, accordions and harmonicas; a variety of other instruments, including electronic ones in Italy; some woodwind instruments in France; guitars in Spain; and finally, brass wind instruments and some piano manufacture in the United Kingdom.

**Figure 8: Musical instruments**  
**Trade Intensities**



Source: DEBA

## INDUSTRY STRUCTURE

### Companies

The EU musical instruments industry is fragmented, with many small and medium-sized firms which are highly specialised. In contrast with the United States and Japan, the EU lacks multinational firms. The small production scale has led to restructuring and mergers in all EU countries.

There are only a few large companies in the EU musical instruments industry. They include: Hohner, Steinway and Sons, Schreiber & Söhne, VMI/IMM-Gruppe and Schimmel in Germany; Bontempi, GEM and Roland Europe in Italy; Selmer and Buffet-Crampon in France; and Boosey & Hawkes in the UK. Steinway Hamburg in Germany is a subsidiary of the American multinational company.

The world's leading company, Yamaha, faces stiff competition from its Asian rivals, and has been losing market share in recent years, a situation which has pressed down on operating margins. Yamaha has tried to strengthen its presence in the EU by acquiring stock in Kemble (UK) and Schimmel (D) and by setting up large subsidiaries throughout Europe. In 1993, however, European sales of Yamaha were negatively affected by the appreciation of the yen against the ECU. Other Asian producers are also trying to enter the European market.

The shift in demand and the development of new markets has led a number of companies to enter the musical instruments industry. An increasing use of computers (in synthesisers and Public Address (PA) systems) has facilitated the entry of a few computer manufacturers into the market.

The development of new electronic instruments has hit the lower quality market the hardest, as EU companies still have an outstanding reputation for the higher quality products. Steinway pianos and Selmer saxophones are still regarded as absolutely the best, as well as Buffet-Crampon clarinets and Hohner accordions and harmonicas.

### Strategies

Owing to large investments in the Italian industry during the early 1980s, productivity improved considerably, causing a serious drop in employment, while the production value in constant prices increased. On the other hand, productivity figures for Germany and the UK have slightly deteriorated since 1987. Nonetheless, overall the EU countries have shown a more or less steady rise in productivity.

Several structural factors influence the industry's operations. First, the EU's most important competitors (Japan, Korea, Taiwan and other Far Eastern countries) have lower labour costs. However, within the EU the value added per employee increased in real terms from about 23 886 ECU in 1984 to 27 256 ECU in 1993, as a result of its increasing production and decreasing workforce. Second, with the small size of the European firms and a tendency toward national specialisation,

**Table 6: Musical instruments  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.00	0.00
Danmark	0.40	N/A
BR Deutschland	1.50	1.46
Hellas	N/A	N/A
España	0.26	0.48
France	0.44	0.63
Irland	0.00	0.00
Italia	2.14	1.91
Luxembourg	0.00	0.00
Nederland	0.46	0.21
Portugal	N/A	0.00
United Kingdom	0.55	0.57

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

manufacturers of musical instruments tend to be individualistic and highly independent. As a result, investments in production and marketing are low for the sector as a whole, except for one or two larger companies which have achieved reasonable profitability levels. Finally, because of poor financial resources and of the predominantly manual production process, production automation has developed only slowly. The EU industry, however, still has a few dynamic firms with good technical and human resources, which are beginning to be utilised to their maximum potential. The concentration of products in the top of the market range exemplifies this.

#### Impact of the Single Market

The overall impact of the creation of the Single Market is positive. However, competition from Far Eastern countries (especially from rather large companies from these countries) has increased and threatens the position of many European SME's. All the Internal Market measures which were aimed at improving the working environment for SMEs, such as financial market liberalisation and support to training, are thus extremely important to this sector. At present, the companies in this sector feel that not enough has been done yet for SMEs, to the point that non-EU suppliers may have benefited more from the Single European Market than the EU-firms. For the future, the priority should be measures to improve the working environment for SMEs.

#### REGIONAL DISTRIBUTION

Some local regions have gained world-wide reputations. These include Bayern, Hessen, Sachsen (Vogtland) and Baden-Württemberg in Germany; Castelfidardo in Italy; Paris and Mirecourt in the Vosges in France; and London in the United Kingdom.

#### OUTLOOK

After a dramatic drop of production in 1993 (according to Eurostat figures for pianos and other instruments with keys) a slight recovery was expected for 1994 due to the economic upturn within the EU. In spite of its advantages, the EU musical instruments industry is likely to face a number of difficulties in the next few years. This is owing to the nature of its professional structure and its lack of flexibility in responding to the latest consumer trends, in addition to the fact that its consumption has reached a stage of saturation.

However, some growth of EU production is expected in the coming years due to changing demand patterns resulting from a gradual return to acoustic music (favouring the EU production) and the economic recovery (favouring sales of the higher quality, more expensive European instruments). This growth, however, is expected to be lower than the overall growth of demand.

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# Toys

## NACE 494.1

During the early 1990s, the toys market grew significantly. The major factor underlying the overall increase was the explosive growth in the video games category. Imports of video games and toys at low prices from Japan, the US, the Far East and most recently the Eastern European countries have increased competition. Meanwhile, the production of traditional toys has not shifted out of the EU. Its high quality and innovative character give the EU toys industry a competitive advantage. However, the structure of the industry is changing in the EU, leaving at one end of the market small, specialised enterprises and at the other end large, international firms (through mergers and acquisitions).

### INDUSTRY PROFILE

#### Description of the sector

The toys industry is a relatively small sector in the EU; total EU toy production amounted to 3 883 million ECU in 1993. Almost one-third of the total EU production originates from Germany. The shares of total EU production (including Austria, Finland and Sweden) of France, Italy, Spain and Denmark amount to 20 %, 18 %, 17 % and 10 % respectively.

The toys market consists of a very diverse range of products, with wide differences between target markets and unit prices. Recently, electronic products (the largest category in terms of production) have made substantial gains in share because of the growth in video and computer games.

The toys market can be divided into ten subsectors: electronic toys (e.g. video and computer games, radio-controlled vehicles), dolls and figures (e.g. dolls and accessories, action figures, plush toys), indoor toys (e.g. games and jigsaw puzzles), pre-school toys (e.g. toys for infants aged 2 to 36 months), outdoor toys (e.g. riding vehicles, play sets), creative toys (e.g. arts and crafts, scientific/educational, musical), construction toys (e.g. construction sets, model kits), model wheeled toys (e.g. non-riding vehicles, car and train sets), adult imitation toys (e.g. play houses, kitchen sets) and other toys (e.g. activity toys).

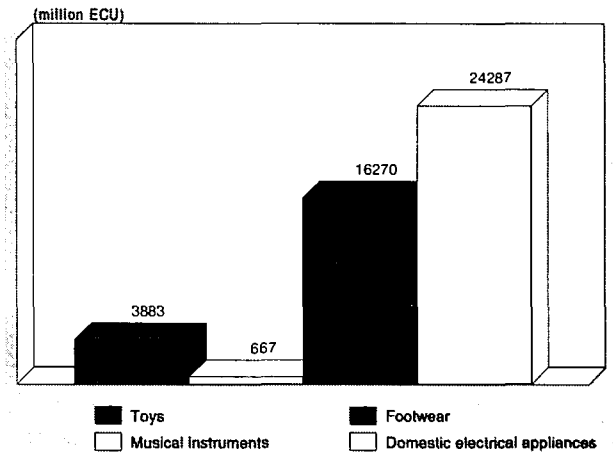
Nearly 2 500 manufacturers, most of them small or medium-sized enterprises, provide direct jobs for 80 000 employees, in addition to the particularly high rate of indirect jobs, especially during the last quarter of the year (i.e. during the Christmas season).

#### Recent trends

There has been a buoyant trend for the toys market throughout the mid-1990s. Besides the expansion of the video games market (although a strong decline was recorded in 1994), business innovation is the main factor behind this growth. Electronic games continue to be the key sector, entirely because of video and computer games. The dynamic expansion of dedicated console systems and software continued in 1993 and then gradually slowed down and declined substantially in 1994.

The growth in video and computer games is likely to further lower the age at which children are "lost" from the toys market to areas such as clothes, recorded music and consumer electronics. As growth in the video game sector slows down, the more traditional areas like indoor games, play sets, model wheeled and adult imitation toys are likely to receive a small boost. Nevertheless, the video games are to be considered more as a complement buying than an alternative buying. However, if the interest in electronic entertainment products

Figure 1: Toys  
Production in comparison with other industries, 1993



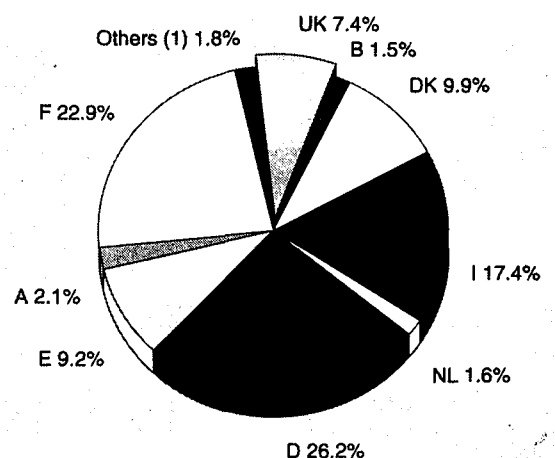
Source: TME, DEBA

persists, it could eventually cause substantial changes in the structure of the market. Alternatively, the development of more sophisticated and more expensive products may push the focus of the video game market onto young adults rather than children. Sectors which are expected to benefit from the growing child population are those targeted at very young children, such as pre-school and plush toys.

Other more general trends include the continued importance of character licensing, which is used in marketing many child-targeted products such as clothing, books, magazines and food. This should prove a more powerful medium with the effective timing of film, television and video promotion of the relevant toys.

Since March 15, 1994, the import of some Chinese toys into the EU has been restricted. Although, final import figures were not available at the time of publication, this is expected to result in a 20 % decrease of EU toy imports from China.

Figure 2: Toys  
Production by country, 1993



(1) Finland, Greece, Sweden, Ireland  
Source: TME



**Table 1: Toys**  
**Main Indicators in current prices**

(million ECU)	1984	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)	1996 (3)	1997 (3)
Apparent consumption	4 879	6 704	7 657	7 897	9 477	10 273	10 012	9 743	11 205	12 000	13 003
Production	4 112	4 897	5 437	5 629	5 787	5 680	5 690	6 057	6 115	6 430	6 763
Extra-EU exports	953	1 127	1 332	1 421	1 469	1 577	1 812	2 081	2 290	2 520	2 750
Trade balance	-766	-1 807	-2 220	-2 269	-3 690	-4 592	-4 321	-3 686	-5 090	-5 570	-6 240
Employment (thousands)	78.9	69.8	73.0	71.4	69.0	65.4	61.6	59.5	57.9	56.9	55.9

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

(3) Rounded NEI forecasts.

Source: DEBA(1) Rounded DRI forecasts.

**Table 2: Toys**  
**Average real annual growth rates**

(%)	1988-93	1992-93
Apparent consumption	6.7	-3.9
Production	0.4	7.7
Extra-EU exports	8.8	3.6
Extra-EU imports	16.1	-11.1

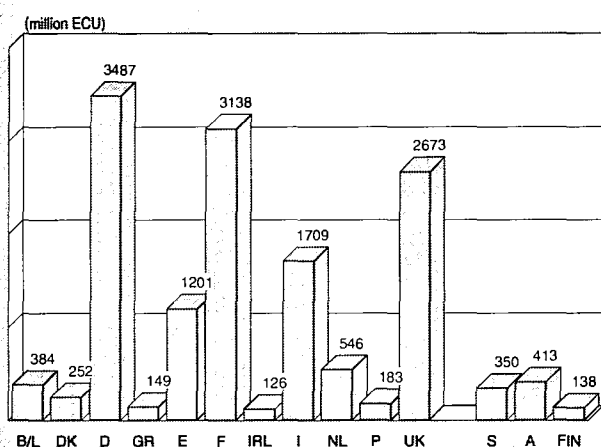
Source: TME, Eurostat

### International comparison

China accounts for 40 % of the world toy production, and the toys industry is the fastest growing export sector of China. Since the early 1980s production lines have undergone a rotation within the Far East, shifting from Hong Kong to China, where labour costs are lower. Although labour costs in countries like Vietnam and Indonesia are nowadays lower than those in China, most toy manufacturers feel that China is still the most economical manufacturer of toys when quality is taken into account. At the time of this writing, there are some production moves from China to other south-east Asian countries as a result of the EU import quota system adopted in March 1994 (see above).

Geographically, the EU toys industry is highly concentrated. More than 90 % of total EU production (including Austria, Finland and Sweden) stems from the following six countries: Germany (26.2 %), France (22.9 %), Italy (17.4 %), Denmark (9.9 %), Spain (9.2 %) and the United Kingdom (7.4 %).

**Figure 3: Toys**  
**National toy markets at retail prices by country, 1993**



Source: TME

### Foreign trade

Many EU countries are net importers of toys (with the exception of Spain and Denmark). The former EFTA countries and the USA were the main destinations of EU exports (almost 49 % of all exports go to these countries), while EU imports mainly originate in China (43.4 %) and Japan (22.7 %).

The EU trade deficit in 1993 amounted to about 3 446 million ECU. The most important EU exporting countries of all toys and video games are Germany (19 %), Italy (16 %) and Denmark (15 %). The situation is slightly different if figures for video games are excluded. Then, the top three exporting countries are Germany (38 %), Italy (14 %) and Spain (13.5 %) (Source: FEJ). The share of exports of video games in total exports was about 5 % in 1993. The exports of video games originate mainly from the United Kingdom (33 % of total EU video games exports), Germany (21 %) and France (20 %).

More than 60 % of total EU imports is destined for three countries: Germany (24 % of total EU toy imports), the United Kingdom (21 %) and France (19 %). Again, if one looks at EU import figures of toys without the video games segment, these three countries still predominate, albeit to a slightly different degree: Germany accounts for 26 %, the UK for 25.5 % and France for 15 %. Almost 20 % of total imports consist of video games. The main destinations for the imports of video games in the EU are the United Kingdom (36 %), France (24 %) and Germany (15 %).

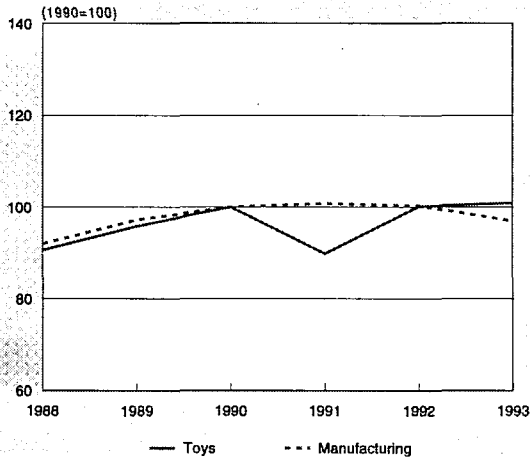
### MARKET FORCES

#### Demand

The toys industry is relatively insensitive to business or trade cycles. In other words, the influence of a recession on this sector is rather small. Despite the decreasing number of children, the size of the toy market has been increasing. This is a result of the higher average age at which parents have their first child, i.e. they have a larger disposable income, thus the number of toys received per child per year and the amount spent on these toys have increased. Furthermore, although the total number of children in the EU has been decreasing since 1985, an expected increase in children aged 0-5 years will moderate this decline. Therefore, the demand for mainly pre-school and plush toys will increase.

The two main factors which influence demand are product development and strong marketing campaigns. Increasingly, fashion and promotional best-sellers play an important role in demand. Demand, however, can switch from one best-seller to another in a short period of time. The toy industry is, above all, an industry which responds to a highly cyclical demand pattern, i.e. seasonality is an important characteristic of the demand for toys. In fact, some 65-70 % of the total volume of toys is sold to consumers in the last three months of the year (around Christmas).

**Figure 4: Toys**  
Production in constant prices compared to EU manufacturing



Source: TME, DEBA

### Supply and competition

Foreign competitors come mainly from the US and the Far East. More and more, the Far East has become a sourcing location for European manufacturers, thus enabling them to better compete on a worldwide basis. However, since March 15, 1994 supply from China is restricted.

The concentration of toy manufacturers is increasing through mergers and acquisitions. The number of toy retailers also decreased significantly between 1984 and 1994, resulting in a concentration on the supply side into the hands of fewer, more professional, internationally operating companies.

Unlike in the United Kingdom, where toy specialists are the leading retail channel followed by mail order/catalogue, in France approximately 48 % of toys is sold in supermarkets and department stores. In the United Kingdom, department stores are responsible for only 5 % of total sales. In Germany on the other hand, most of the sales originate from traditional full-range specialist retailers (34 %), followed by department stores (21 %) and supermarkets (22 %). The distribution of the different channels in Spain is: superstores 35 %, retailers

and specialists 28 %, wholesalers 23 %, department stores 12 % and others 2 %. The French distribution mark-up is lower than the average EU distribution mark-up, implying that the average EU share of department and super stores in its total toy sales is smaller than in France. At the opposite end of the spectrum are the Scandinavian countries, where one finds the highest concentration of specialist retailers, and consequently the highest mark-ups in Europe.

It is worth noting that over the last few years, the presence of the American toy retail chain Toys R' Us in Europe has increased the competition among specialist retailers, supermarkets and department stores. This is a reflection of the fact that it offers a comprehensive assortment of toys all year long.

### Production process

The lower labour costs in the Far East have attracted EU manufacturers. However, some successful companies still manufacture in Europe as well, e.g. LEGO (DK), Playmobil (D), Hasbro (US), Meccano (F), Waddington (UK), Ravensburger (D), Jumbo (NL), Majorette (F), Famosa (E) and Mattel (US). For some of these, the European share in production is sometimes up to 100 %. Although the labour costs in Denmark and Switzerland are especially high, the LEGO group continues to produce in these countries because of the high level of automation and the need for high precision manufacturing.

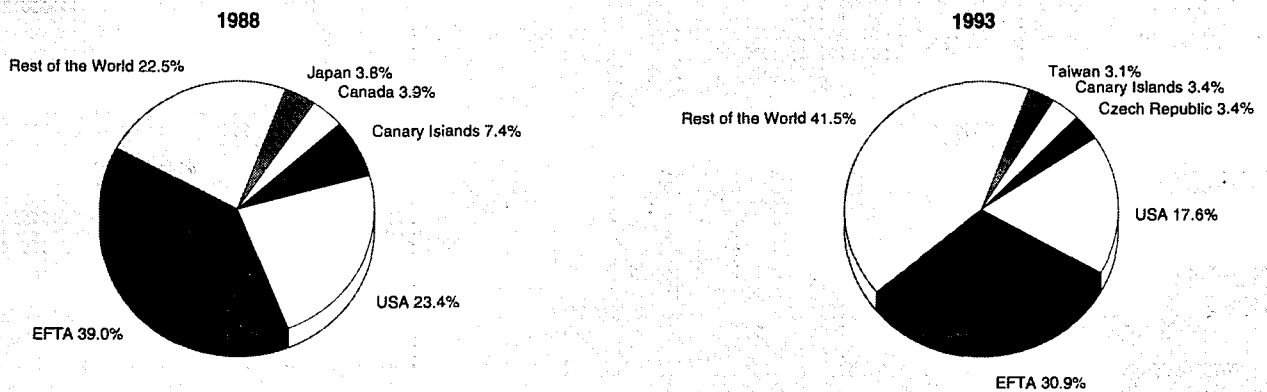
The concession of licensing is, in addition to the development of manufacturing in Europe or the Far East, a key element to the success of EU companies. International companies, armed with appropriate distribution networks, benefit from the licensing system. However, the majority of EU companies lack a proper international distribution system.

## INDUSTRY STRUCTURE

### Companies

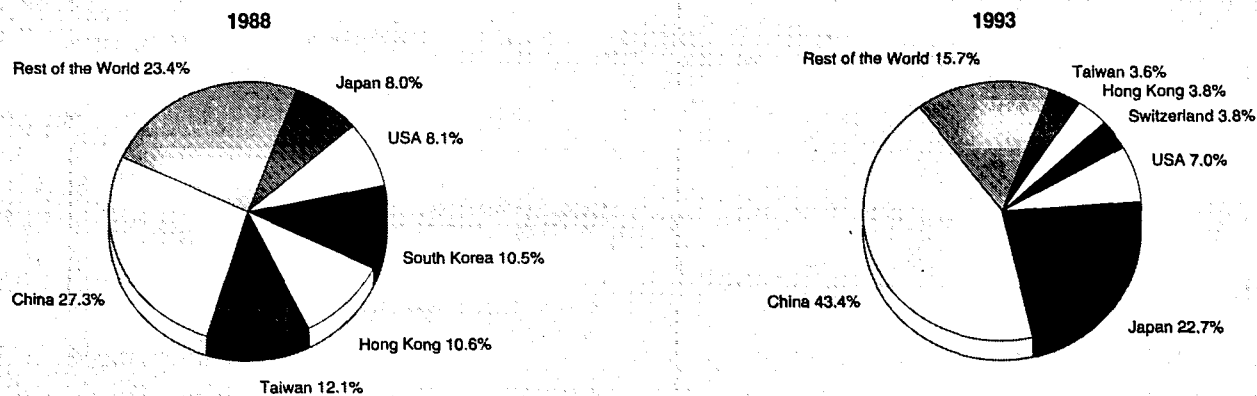
The EU toys industry consists of a wide spectrum of companies of different sizes: from small, privately-owned, domestic manufacturers to large, international toy companies. Multinationals can be found in Japan and the US. In the EU the average firm size is relatively small; 80 % of the toy manufacturers in the EU employ fewer than 20 salaried workers. With the exception of LEGO (DK), Playmobil (D) and Idéal Loisirs (F), multinational firms comparable to American and Japanese groups are absent in the EU.

**Figure 5: Toys**  
Destination of EU exports



Source: Eurostat

**Figure 6 : Toys**  
**Origin of EU imports**



Source: Eurostat

**Table 3: Toys**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	514	569	584	594	617	705	767	831	884	990	N/A
Extra-EU imports	1 146	1 130	1 275	1 655	1 991	2 281	2 482	3 701	4 619	4 436	N/A
Trade balance	-632	-561	-691	-1 062	-1 374	-1 576	-1 715	-2 870	-3 735	-3 446	N/A
Ratio exports / imports	0.45	0.50	0.46	0.36	0.31	0.31	0.31	0.22	0.19	0.22	N/A

Source: Eurostat

**Table 4: Toys**  
**Share of video games in extra-EU trade (1)**

(share in %)	1988	1993
Share in extra-EU exports	1	5
Share in extra-EU imports	3	20

(1) Video games for use with television.  
Source: Eurostat

**Table 5: Toys**  
**Breakdown of EU imports and exports (video games excluded), 1994**

(%)	Imports	Exports
B/L	5.5	2.0
DK	2.5	2.0
D	26.0	38.0
GR	1.0	0.5
E	5.0	13.5
F	15.0	11.0
IRL	0.5	0.5
I	10.0	14.0
NL	8.0	5.0
P	1.0	0.5
UK	25.5	13.5

Source: FEJ

The most important manufacturers in the EU toys market are:

- LEGO (DK): construction sets, e.g. Duplo, LEGO System, LEGO Technics;
- Ravensburger (D): indoor games;
- Playmobil (D): plastic figures and accessories;
- Hasbro (US): indoor games (MB, Waddington, Parker), fashion dolls (Sindy) and pre-school toys (Playskool);
- Mattel (US): fashion dolls (Barbie), pre-school toys (Fisher Price), indoor games (Spear), die-cast vehicles (Corgi);
- Idéal Loisirs (F): dolls, figures and accessories, pre-school toys and die-cast vehicles (Majorette, Solido);
- Superjouet Group (F): plastic toys (Berchet-Favre, Charton, Clairbois);

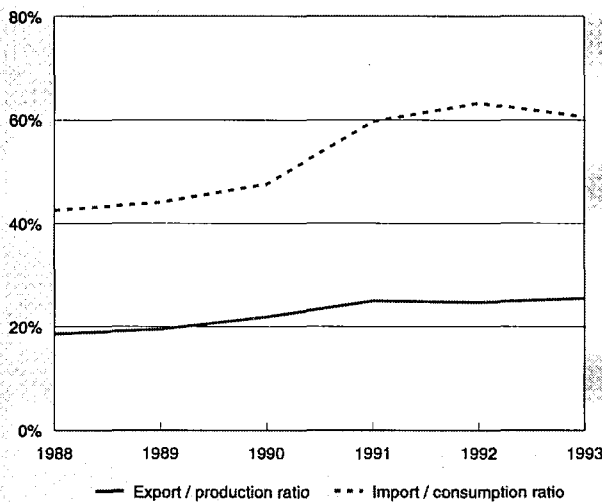
Other important enterprises in the EU toys market are Meccano (F), Hornby (UK), Clementoni (I), Burago (I), Jumbo (NL), Märklin (D), Jeux Nathan (F), Brio (S), Smoby (F), Famosa (E), Chicco (I), Steiff (D) and Schmidt (D)

The EU toy and games industry consists of a wide spectrum of companies of different sizes: from small privately owned domestic manufacturers to large international toy companies. With the exception of LEGO, multinational firms comparable to American groups like Hasbro and Mattel are absent in the EU.

### Strategies

The internationalisation of the industry has led to mergers and acquisitions. The French firm Idéal Loisirs is now one of the biggest international companies in the EU, due to its alliance with the Hong Kong-based Playmates company and its acquisition of the French firm Majorette. Apart from this

**Figure 7: Toys**  
**Trade intensities**



Source: TME, Eurostat

concentration of resources into fewer and larger international companies, a process of polarisation is appearing: at one end large companies increase their market shares by becoming multi-product firms, at the other smaller niche manufacturers acquire strong positions by focusing on a particular segment of the market.

European toy manufacturers specialise in traditional toys. The EU video games market is dominated by the Japanese companies Nintendo and Sega. The two leading toy manufacturers in the US and the world, Mattel Inc. and Hasbro Inc., are multi-product firms, which have condensed several smaller enterprises into one. Playskool, Milton Bradley, Kenner Parker, MB Games, Waddington and Tonka form divisions of Hasbro. Mattel acquired Fisher Price and Spear in 1994. The third toy manufacturer in the US and the world, Tyco Toys Inc., includes Matchbox, View Master and Playtime.

In January 1995, four French toy manufacturers (Berchet, Charton, Clairbois and Favre) merged to form the French Superjouet Group. The group was mainly formed for export purposes and since has become a leader on the French market.

Western know-how and financing have been used to support East European toy manufacturers. Nowadays, the quality of the toys manufactured in Central and Eastern Europe is on par with western standards, and enhance the competition on the EU market.

## Impact of the Single Market

The impact of globalisation on this international industry has been larger than the impact of the Single Market, though the latter has been positive overall. Nevertheless, some internal barriers remain, for example with respect to television advertising and safety requirements for infant care products. A harmonisation of these aspects would be welcomed by the industry. The different interpretation and implementation of certain EU regulations and directives in the various Member States is also a major problem in this sector.

## ENVIRONMENT

The toys industry has proved to be pro-active in the face of the increasing environmental consciousness among consumers. Wooden toys have benefited from the increased public ecological awareness. The "Green Movement" has led national governments, followed by the EU, to prepare rules designed to ensure the reduction of packaging waste. The toys industry has taken an active part in these debates and favours a single EU system aimed at reducing packaging waste.

## REGULATIONS

The EU Toy Safety Directive (adopted on May 3, 1988) contains essential physical, mechanical, chemical, electrical and flammability requirements, which, if fulfilled by toy manufacturers, allow them to affix on their products (or packaging) the CE mark. This sign is an indication to surveillance officers that the product conforms to relevant EU safety regulations and can therefore circulate freely within the Internal Market. The Toy Safety Directive lays out a set of harmonised standards (elaborated by CEN and CENELEC), which are constantly being revised and extended.

Advertising regulations (misleading information) and regulations relating to intellectual property (trademark and design protection) also affect the toys industry. Toy manufacturers in Europe also face unfair competition, which takes the form of: dumping practices on the prices of low-range toys; piracy and imitation of design, trade-marks and models; and manufacturing of products which do not comply with European safety standards.

The Council regulation (EC) 339/93 provides conformity controls on products imported from third countries and on EU rules concerning general product security (which apply especially to toys).

The European toy industry is increasingly affected by trade measures (i.e. GATT rules and specific EU regulations). As a result of the GATT negotiations, customs tariffs on toys will be lowered over the next five years. On the other hand, two regulations with major consequences for the EU toys industry were adopted on March 7, 1994: Council Regulation

**Table 6: Toys**  
**Labour productivity, unit costs and gross operating rate (1)**

(1990 = 100)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Labour productivity index (2)	79.5	80.6	89.1	91.1	95.9	97.7	100.0	102.8	104.2	109.7
Unit labour costs index (3)	89.6	94.5	90.7	93.4	92.4	95.2	100.0	105.1	107.0	105.5
Total unit costs index (4)	83.5	88.7	87.0	88.3	91.1	96.2	100.0	103.6	104.5	103.9
Gross operating rate (%) (5)	12.5	12.2	13.4	13.7	14.3	13.0	12.6	12.4	13.5	13.8

(1) Some country data have been estimated. The figures are based on Nace 494 data (toys and sportinggoods).

(2) Based on index of production / index of employment.

(3) Based on index of labour costs / index of production.

(4) Based on index of total costs (excluding costs of goods bought for resale) / index of production.

(5) Based on (value added - labour costs) / turnover.

Source: DEBA, Eurostat

(EC) 519/94 on common rules for imports from certain third countries and repealing Regulations (EEC) 1765/82, 1766/82 and 3420/83; and Council Regulation (EC) 520/94 establishing a Community procedure for administering quantitative quotas of imports of products covered by regulation 519/94 and originating from 20 countries of Eastern Europe and the Far East (including the People's Republic of China, Vietnam and North Korea). Of particular relevance are the quotas on three categories of toys imported from China organised and set by these two regulations.

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## OUTLOOK

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In the short term, EU production will increase slightly as a result of the rising demand for traditional toys. Two trends in the pattern of demand can be observed. First, the demand for video games, which exploded in the early 1990s and peaked in 1992, is expected to decline slightly in the near future. Second, the child population aged 0-5 years is predicted to increase during the 1993-2000 period. In the medium term, the disposable income will increase as the economy recovers further. Apparent EU consumption is therefore expected to increase as well.

The EU imports originating from China will diminish as a consequence of the recently adopted EU regulation mentioned above. Total EU imports, however, are not expected to decrease, as China's production will shift to other countries in the region which offer cheap labour. The EU toy and game production plants will not be shifted out of the EU, as quality and innovation will continue to be important competitive advantages of the EU products. Therefore, in the medium and long term, total EU toy exports and production are expected to increase.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Toy Manufacturers of Europe (TME). Address: Avenue Tervueren 13a, B-1040 Brussels; tel: (32 2) 732 7040; fax: (32 2) 736 9068;

European Federation of Toy Industries (FEJ). Address: 45 rue de Trèves, B-1040 Brussels; tel: (32 2) 231 0730; fax: (32 2) 231 0838.

# Sporting goods

## NACE 494.2, part of 451, 453

The EU market for sporting goods comprises numerous smaller market segments. Sporting equipment, sports footwear and sports clothing are the three main sub-markets which themselves are highly fragmented. Total demand is increasingly related to overall trends in consumer preference. EU production has been shifted to the lower labour cost countries in the Far East. As a consequence, EU imports from Asian countries have increased, leading to a further growth of the EU trade deficit.

### INDUSTRY PROFILE

#### Description of the sector

The sporting goods industry can be divided into sporting equipment (NACE 494.2), sports footwear (part of NACE 451) and sports clothing (part of NACE 453).

The key problem of analysing the sporting goods market is determining how to differentiate a sport from a general leisure activity, as it is often nearly impossible to distinguish between sports use and leisure usage. Moreover, the diversity of the sporting goods market hinders the survey of every market for sporting goods. Given these complications, most of the tables and figures in this chapter refer to NACE 494, toys and sporting goods.

For sport shops, footwear is the most important source of income (40-50 % of total sales) followed by equipment (25-30 %) and then clothing (20-25 %). The share of the sports clothing market in the market of sporting goods, however, is around 50 %, followed by the footwear market (32 %) and the equipment market (18 %).

Like the sports market as a whole, the sports equipment sector is diverse and fragmented. In the United Kingdom, for example, golf is the largest sector of the sports equipment market (in sales), followed by fitness and fishing.

Six EU countries account for over 95 % of the value added of the toy and sporting goods sector: Germany (33.5 %), France (25 %), the United Kingdom (13 %) and to a lesser extent Denmark (11.7 %), Spain (8.5 %) and Italy (4.7 %). Germany, France, the United Kingdom and Italy are main exporters of sporting goods.

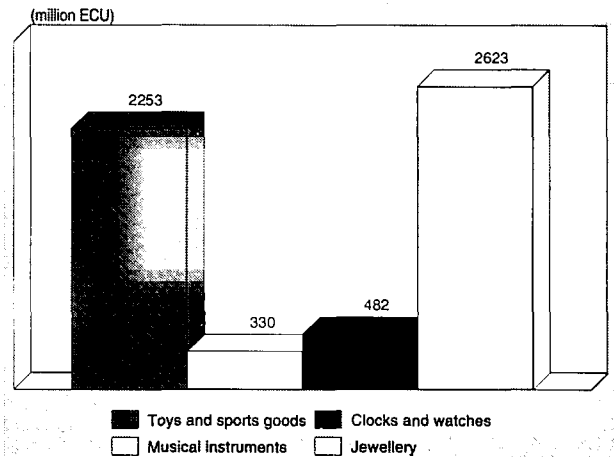
The largest markets in the EU for sporting goods are Germany, France and the United Kingdom. Belgium, the Netherlands and Denmark are characterised by high purchasing power. However, South European countries offer prospects for increasing consumer expenditures on sporting goods.

The EU countries with the largest share in total EU value added are also the major employers. Within the EU the total of the countries' value added/employment ratios amount to about 3 500 ECU/employee. This ratio is relatively low if compared to the corresponding Japanese and US figures: 6 500 and 5 100 ECU per employee respectively. A further decline in the industry's employment is expected as most manufacturers will continue to move their production plants to low-wage countries.

#### Recent trends

Three factors have stimulated and will further stimulate sports activities: the rising income per capita; the increase in leisure time and the increased interest in sports because of health reasons.

Figure 1: Toys and sports goods  
Value added in comparison with related industries, 1993



Source: DEBA

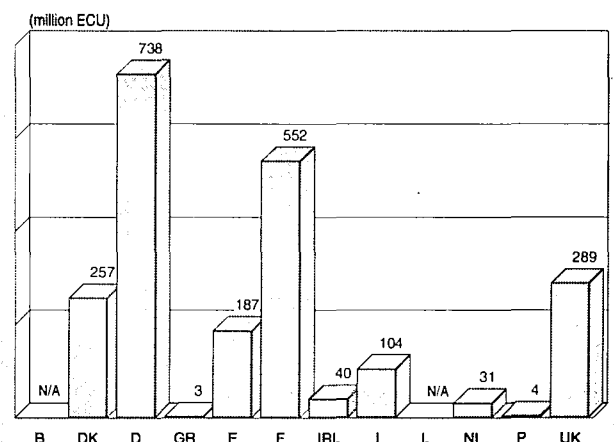
The sporting goods market is characterised by fashion-led demand. Consumption increasingly depends on consumer preference, e.g. popular sports and popular styles. Therefore, sporting goods manufacturers must be flexible to adapt quickly to these changing fads; thus, competition between the large manufacturers increases.

By way of example, in France, sports like walking, cycling and jogging are increasingly popular. Expenses on golf and basketball goods are increasing as well. The sports equipment market has suffered from the growth of sports such as swimming and aerobics which involve minimal equipment purchases by individuals. Currently there is a rapidly developing market in fitness equipment.

#### International comparison

The production capacity in the USA has expanded during the 1987-1990 period. Since 1990 production shifted from the US to countries with lower labour costs (Asia). From 1990 on the EU production in constant prices dropped, while the

Figure 2: Toys and sports goods  
Value added by Member State, 1993



Source: DEBA

**Table 1: Toys and sports goods**  
**Main indicators in current prices (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)
Apparent consumption	4 879	4 875	5 167	5 896	6 704	7 657	7 897	9 477	10 273	10 012	N/A
Production	4 112	4 208	4 360	4 616	4 897	5 437	5 629	5 787	5 680	5 690	6 057
Extra-EU exports	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 577	1 812	N/A
Trade balance	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 690	-4 592	-4 321	N/A
Employment (thousands)	78.9	75.6	70.6	71.5	69.8	73.0	71.4	69.0	65.4	61.6	59.5

(1) Some country data for apparent consumption, production and employment have been estimated.

(2) Eurostat estimates.

Source: DEBA

**Table 2: Toys and sports goods**  
**Average real annual growth rates (1)**

(%)	1984-89	1989-93	1984-93	1992-93
Apparent consumption	6.30	3.12	4.87	-9.50
Production	2.60	-1.34	0.83	-0.92
Extra-EU exports	2.69	4.37	3.43	8.54
Extra-EU imports	12.73	10.03	11.52	-13.10

(1) Some country data for apparent consumption and production have been estimated.

Source: DEBA

**Table 3: Toys and sports goods**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Extra-EU exports	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 577	1 812	2 081
Extra-EU imports	1 719	1 735	1 874	2 355	2 934	3 552	3 690	5 160	6 169	6 133	5 767
Trade balance	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 690	-4 592	-4 321	-3 686
Ratio exports / imports	0.55	0.62	0.57	0.46	0.38	0.38	0.39	0.28	0.26	0.30	0.36
Terms of trade index	86.4	86.4	94.6	98.4	95.6	93.2	100.0	94.4	98.0	90.7	N/A

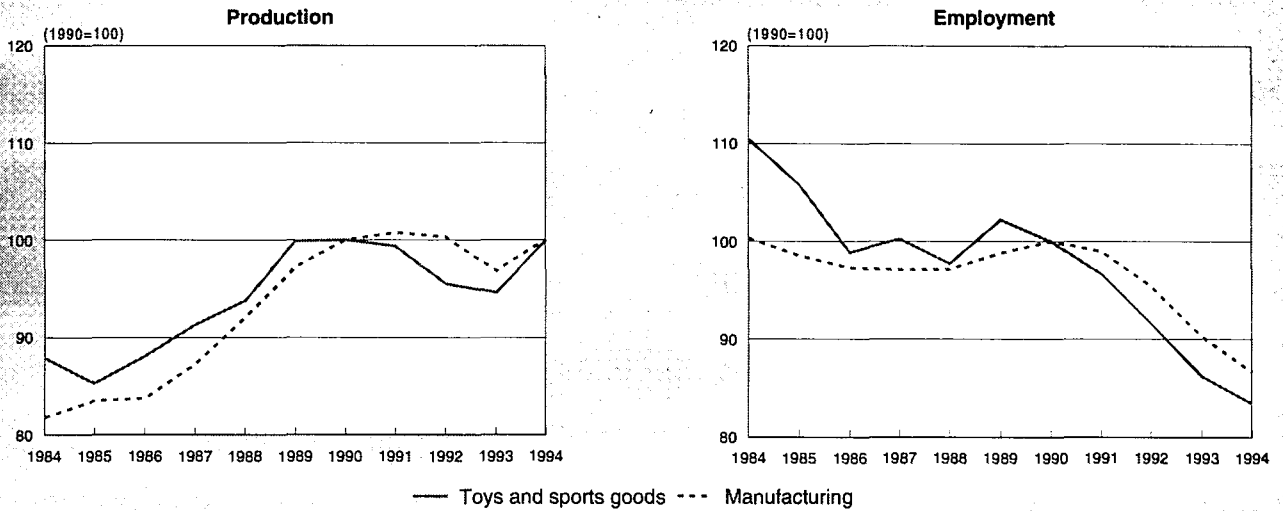
Source: DEBA

**Table 4: Sports goods**  
**External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	606.1	695.3	655.8	631.1	619.7	691.0	717.6	715.6	748.2	884.0
Extra-EU imports	654.2	674.4	701.0	816.0	1 001.6	1 142.6	1 083.4	1 268.1	1 330.2	1 400.2
Trade balance	-48.1	20.9	-45.2	-184.8	-381.9	-451.6	-365.7	-552.5	-582.1	-516.1
Ratio exports / imports	0.93	1.03	0.94	0.77	0.62	0.60	0.66	0.56	0.56	0.63

Source: Eurostat

**Figure 3: Toys and sports goods**  
Production and employment compared to EU total manufacturing industry



1994 are Eurostat estimates.  
Source: DEBA

Japanese and US production in constant prices continued to increase until 1992. The Japanese growth rate amounted to approximately 8-9 % per year during the 1984-1993 period.

While the EU production of toys and sporting goods (in current prices) increased by around 38 % during the 1984-1993 period, the Japanese production almost doubled. This significant difference in Japanese production, however, is partly a consequence of the change in the value of the yen.

**Foreign trade**

The EU countries are all net importers of sporting goods. The shift of production to lower labour cost countries, has led to the growth of imports from East and Southeast Asia and a decline in imports from the USA. In 1993, the six most important countries from which EU imports of sporting goods originate were Taiwan, Austria, USA, South Korea and Japan.

Taiwan is a net exporter. The Taiwanese production of sporting goods declined in 1993 as a result of the global recession.

Taiwanese imports of bicycles, bowling and golf equipment, however, are increasing. These imports originate mainly in the USA, Japan and Germany.

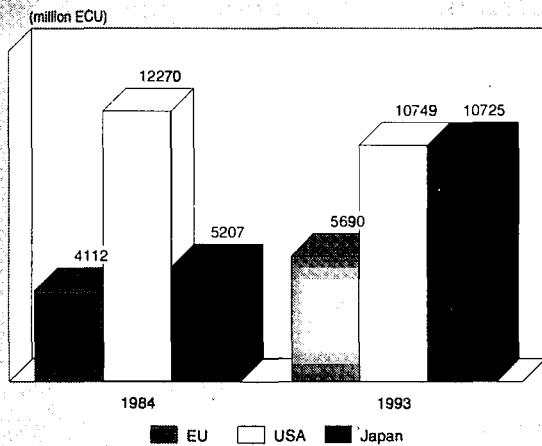
The most important EU export destinations for sporting goods were the EFTA countries, the USA, Japan and, to a much smaller extent, Canada and Bulgaria. Destinations for the EU sports footwear industry were Japan and the USA as well as Switzerland, Austria and Russia. There is a rapid growth in demand from Eastern Europe, which has proven to be a booming market for the running shoe suppliers.

**MARKET FORCES**

**Demand**

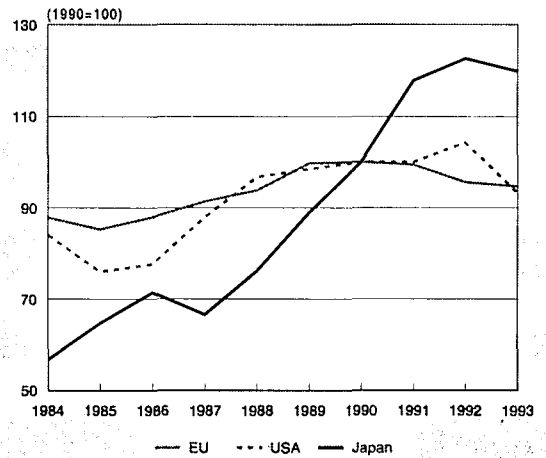
The public sector is responsible for most of the demand for sports equipment. A case in point is France, where the public sector's share of total demand for sports equipment was 50 %. The share of the public sector in overall EU demand for sport-

**Figure 4: Toys and sports goods**  
International comparison of production in current prices



Source: DEBA

**Figure 5: Toys and sports goods**  
International comparison of production in constant prices

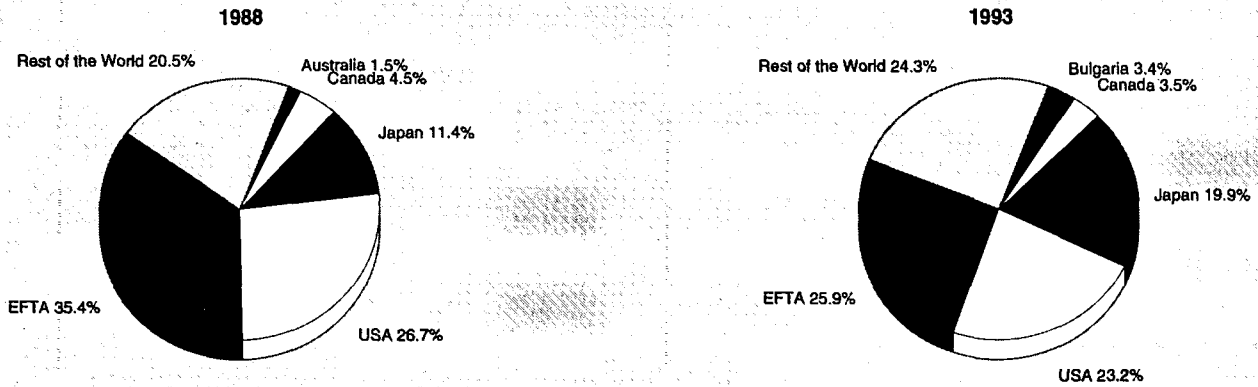


Source: DEBA





**Figure 6: Sporting goods  
Destination of EU exports**



Source: Eurostat

ing goods, however, is much smaller than 50 %. And, while household demand for sports equipment is fairly constant, the demand of the public sector is decreasing.

Outdoor sports like walking and cycling, year-round recreational activities, higher quality products and more individualistic sports are all becoming more attractive. Demographic changes with a growing proportion of the population over 25 years old also have contributed to the changing pattern in demand.

In the late 1980s and early 1990s the sports equipment market lost out to the rise in individual sports like jogging and aerobics, which required little or no equipment. Against this trend, however, has come the rise in popularity of golf and the boom in health and fitness. Even the aerobics market is being opened to equipment, with the growth of step and slide aerobics.

Europe still has great potential for the sports footwear industry. In the US, sales of sports shoes per capita are much higher, although the "sneaker boom" is over. 80 % of sports shoes are purchased for casual wear and 20 % for performance. This will continue as sports shoe suppliers move into the outdoor style of casual footwear typified by the US Timberland brand.

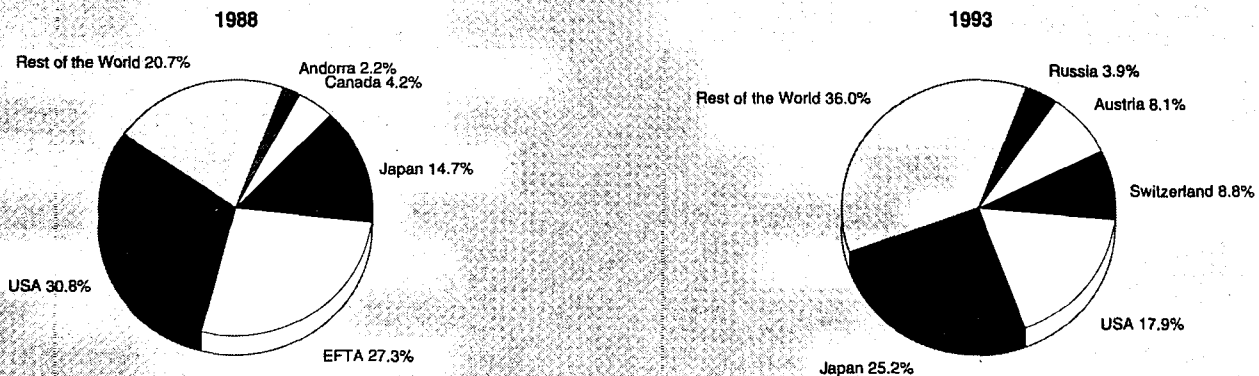
### Supply and competition

The sports footwear industry has become a very specialised industry. The presence of niches and specific requirements for each of the different sports together involve market segmentation. The market segmentation means that Adidas, Nike and Reebok each have their own area of specialisation; soccer cleats, running shoes and women's' aerobics shoes, respectively. These three suppliers dominate the European sports shoe market, but there are local brands competing for the business as well.

Unlike the sports footwear and sports clothing markets, the sports equipment sector always has been less influenced by fashion and branding, with technical factors being of more importance. Over the next five years the sports equipment market could see relatively good growth. As in other sectors of the sports market, however, the price competition will intensify as a consequence of the internationalisation of the retail industry across Europe. This internationalisation is putting increasing pressure on consumer goods firms (and thus on sporting goods manufacturers) to align their prices.

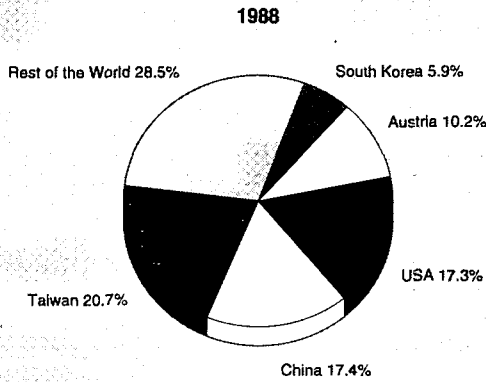
There is a particularly strong competition coming from manufacturers in the Far East. The size of their production capacity and new production technologies allow them to deliver large

**Figure 7: Sports footwear  
Destination of EU exports**

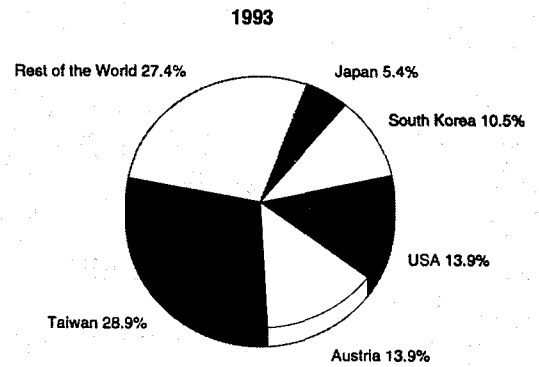


Source: Eurostat

**Figure 8: Sporting goods  
Origin of EU imports**



Source: Eurostat



orders of relatively good quality at low prices because of the low labour cost in this region.

### Production process

Most of the companies in the sporting goods industry have moved their factories to the low-wage countries in the Far East and Eastern Europe. The manufacturing is usually carried out by independent companies while design, quality, control, distribution and marketing functions are controlled and carried out by the respective brand companies. For example, Adidas no longer owns the factories that produce its shoes. Rather, the only Adidas production line within the EU - in Scheinfeld (Germany) - concentrates on development work.

## INDUSTRY STRUCTURE

### Companies

The market share of the European branded sports footwear market is held as follows: Nike (20 %), Reebok (17 %) and Adidas (16 %). Adidas dominates Germany, Europe's biggest market. Nike, however, is probably the overall European market leader. Puma is a contender for fourth place. Smaller shoe suppliers in Europe include High Tech, which is sold mainly in the UK, and Kelme and Diadora, sold primarily in Italy.

The Japanese are also making inroads into the European market, with the Mizuno and Asics brands.

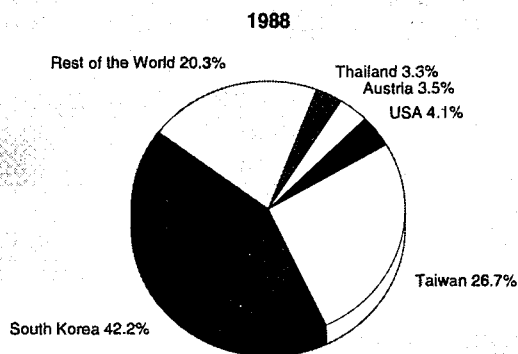
The UK has around 400-500 sporting goods manufacturers. The number of factories and the level of employment in the UK have been declining. The largest number of suppliers are found in markets where consumers tend to replace products on a regular basis, such as soccer balls, rackets, cricket balls and darts. Major suppliers in the United Kingdom are the following: BRT (leader in the UK racket markets, with the brands Dunlop, Slazenger, Carlton, Maxfli); Mitre Sports International (multi-product organisation); Pro Kennex (the world's largest manufacturer of rackets) and E.J. Riley (the leader in the snooker and billiard table market).

Other important manufacturers in the EU sporting goods market are: Rossignol (F), Salomon (F), Fisher (D), Lacoste (F), Bogner (D), Kettler (D) and Donnay (B).

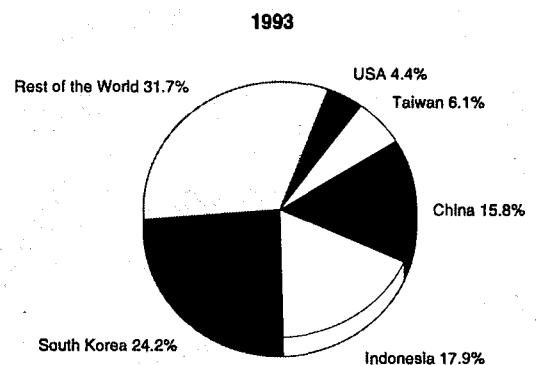
### Strategies

The sporting goods industry benefits directly from the promotion of specific products and indirectly from the promotion of sports in general. In order to attract the younger generation, sporting goods manufacturers moved away from print media and are concentrating their advertising in television.

**Figure 9: Sports footwear  
Origin of EU imports**



Source: Eurostat



**Table 5: Sports footwear  
External trade in current prices**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Extra-EU exports	417.2	485.7	489.7	439.9	453.9	575.3	551.4	520.1	532.3	565.9
Extra-EU imports	529.4	603.8	605.6	708.4	739.7	782.4	845.3	1130.8	998.9	877.0
Trade balance	-112.3	-118.1	-115.9	-268.5	-285.8	-207.2	-293.9	-610.7	-466.6	-311.1
Ratio exports / imports	0.8	0.8	0.8	0.6	0.6	0.7	0.7	0.5	0.5	0.6

Source: Eurostat

Although the sporting goods industry consists of a large number of small and medium-sized enterprises, there is a growing concentration of large companies within the EU. To protect themselves from this phenomenon, smaller firms are finding ways to cooperate more and more. A well-developed distribution network is a crucial factor in such a highly competitive sector. Reebok's newly adopted distribution approach entailed the selling of its products (footwear, clothing and accessories) together in theme collections. This merchandising strategy resulted in improved sales resulting from more impulse purchases.

Important strategies in the Taiwanese sporting goods sector are innovation and creativity. The following examples illustrate these strategies: the application of electronics in fitness equipment and the usage of certain high-tech materials in tennis or golf equipment. In order to enhance the technological level and quality of the products while simultaneously keeping the costs as low as possible, sporting goods manufacturers cooperate with specialised firms in other industries (e.g. machinery).

#### Impact of the Single Market

The creation of the Single Market has positively influenced the sector of sport goods as the removal of the internal barriers and the harmonisation of regulations have stimulated intra-EU trade and paved the way for a more perfect competition. Furthermore, the creation of the Single Market has given incentives for companies to think more internationally and to operate in more than one Member State. Important remaining internal barriers are differences in indirect tax rates (VAT) and the still cumbersome bureaucracy. Next priorities should be (in order of importance): an easing of the access to finance by

SME's, a better harmonisation of environmental regulations, and improvements in the availability of statistics. Finally, the EU should continue to work on the removal of external barriers (following-up the outcomes of the Uruguay-round).

#### REGIONAL DISTRIBUTION

Figures about the number of sporting goods manufacturers in the EU can only be indicative. This is not only because the sporting goods industry is very heterogeneous, but also because it depends on subtle differences in interpretation to determine whether or not a company is considered to be a part of it. The largest number of firms are found in the sports clothing sector, the smallest number in the highly concentrated sports footwear sector.

The geographical pattern within the EU is very different. In countries like Italy and Spain production is concentrated in certain regions, while the companies in Germany and France are spread throughout the country.

#### REGULATIONS

Of importance for sporting goods manufacturers are the harmonisation of standards, intellectual property rights and competition policy.

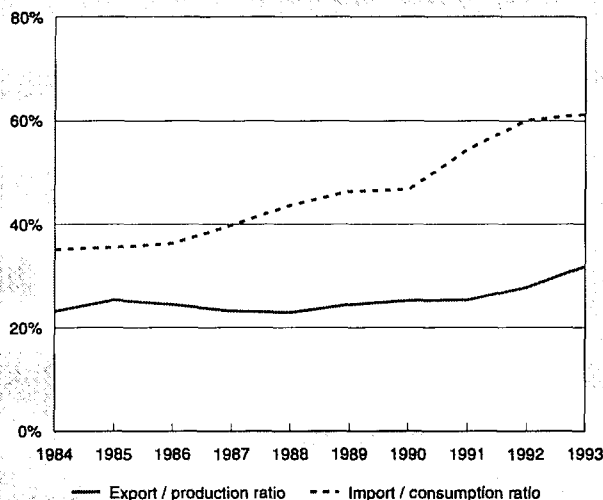
Imports of sporting goods from a number of developing countries are admitted duty-free or granted preferential access under the Generalised System of Preferences (GSP). A revised four year scheme begins in 1995 which will replace the quotas and ceilings of the previous system by a modulation of tariffs

**Table 6: Toys and sports goods  
Production specialisation (1)**

(ratio)	1984	1993
Belgique/België	0.48	N/A
Danmark	3.76	6.03
BR Deutschland	0.82	0.90
Hellas	0.99	0.28
España	1.51	1.27
France	1.42	1.51
Irland	1.89	1.36
Italia	0.72	0.46
Luxembourg	0.00	0.00
Nederland	0.23	0.33
Portugal	0.03	0.13
United Kingdom	0.99	0.89

(1) Ratio of production in the sector compared to manufacturing industry for each country, divided by the same ratio for the EU. Estimates.  
Source: DEBA

**Figure 10: Toys and sports goods  
Trade intensities**



Source: DEBA



and preferences for the various country/product group combinations.

Product liability laws increase the responsibility of producers and importers in the EU markets. These laws concern aspects like design and construction standards, production or assembly defects, false advertising and misleading or inadequate user instructions.

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## OUTLOOK

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In the short term, the most important influence on the sporting goods market will be the performance of the economy, which shows a slow and patchy recovery from the recession since 1993. In the medium and long term this economic recovery will result in an increasing demand for sporting goods in the EU.

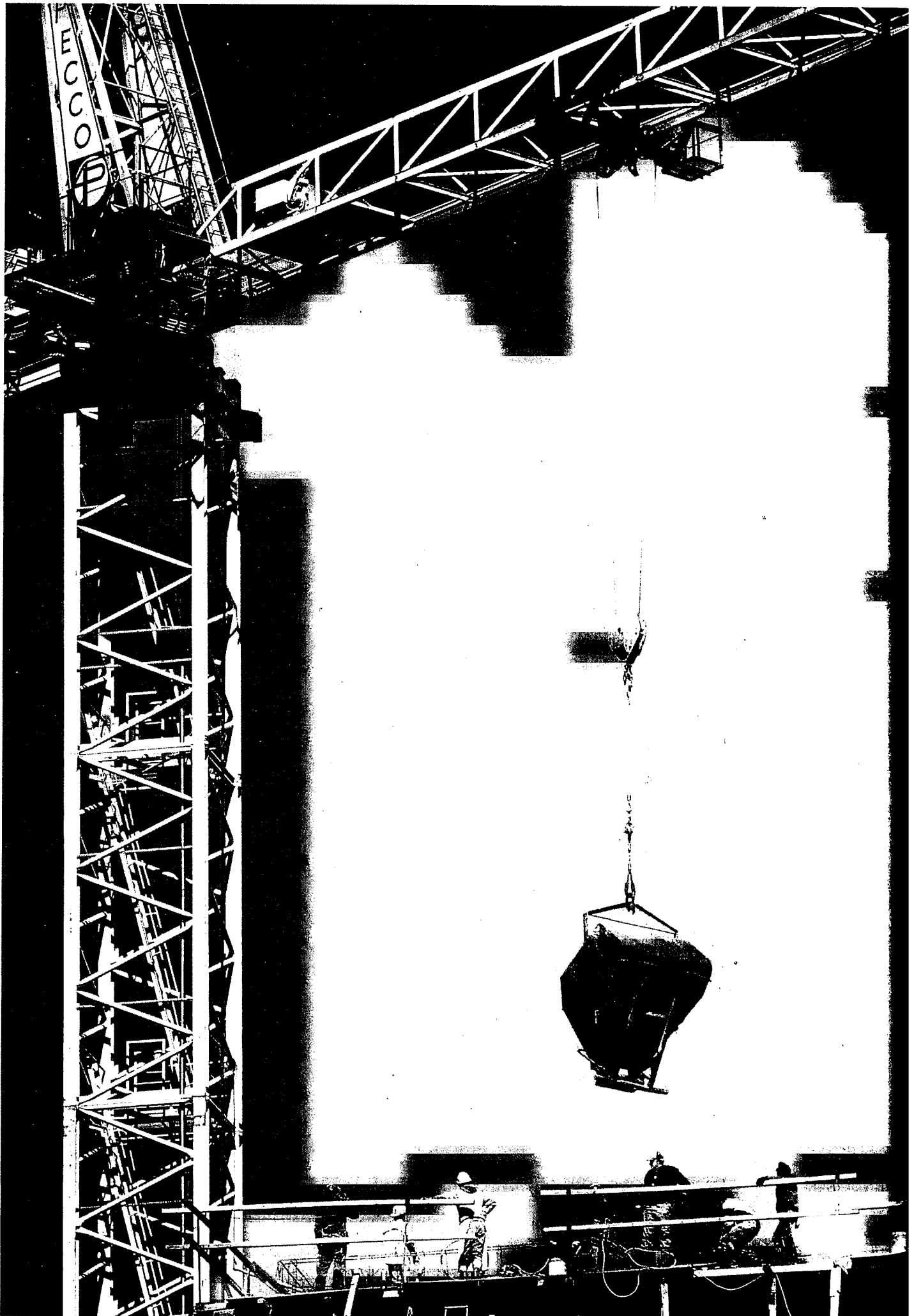
EU production will not grow at the same rate as EU consumption because an increasing part of production will be done by outsourcing production to countries with cheaper labour. Moreover, the fierce competition from foreign suppliers will not allow for a significant increase in production and exports.

The sports market will face another major challenge. Its core market of 15-34 year olds will decrease by around 11 % by the end of the 1990s. The demographic changes point towards a growth in sports like walking and golf. The equipment sector could benefit from a rise in spending on golf, although a decline in demand of health and fitness equipment would offset this positive trend.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: Federation of the European Sporting Goods Industry (FESI). Address: 5 Avenue de Janvier, B-1200 Brussels; tel: (32 2) 762 8648; fax: (32 2) 762 7506.





## Overview

### NACE 50

Construction is one of the biggest sectors of European industry with gross output accounting for 10-12 % of GDP in the EU; value added is about half that. Construction also represents about 60 % of gross fixed capital formation. The sector is a major employer with around 9 million employed by contractors. It also generates direct employment for 3 to 4 million in construction products. This is around 10 % of civilian employment. It probably generates as much again in indirect employment.

Construction is mainly a local activity, with few large firms and little export activity. However, EU firms are successful in world markets. Intra-EU cross-border activity is increasing on large projects and there is extensive migrant labour.

Future markets are highly uncertain because they depend on economic growth rates and levels of public expenditure. EU infrastructure needs are expected to boost demand. Privatisation is generally reducing the share of public sector financing, which is approximately half of total demand.

Technology and the use of materials is rapidly changing. Research and development, training and quality management are key factors for future developments in the sector.

tirely separate, however, as some major construction groups have invested in quarrying and the production of basic construction products. More recently, a growing part has been played by specialists who manufacture and install major components and sub-assemblies (e.g. structural steelwork, curtain walling, heating and ventilation systems).

Mention should also be made of the contribution of independent practices of construction professionals responsible for design, measurement, etc., including architects and construction economists (described in Chapter 24). The contribution of these construction professionals, in terms of economic significance, is relatively small, accounting for only 6-10 % of total construction output. However, the quality of work of European architects and consulting engineers is a major factor raising the competitiveness of the European construction industry.

Classification of construction activities differs between countries. Most construction activity is recorded under NACE 50. However, some construction, involving a substantial input of metal components or process plant (e.g. steelworks, petrochemical plants, power stations, hydroelectric plants, pipelines) or carried out by enterprises also engaged in the manufacture of construction materials, may be included in the output of other industries.

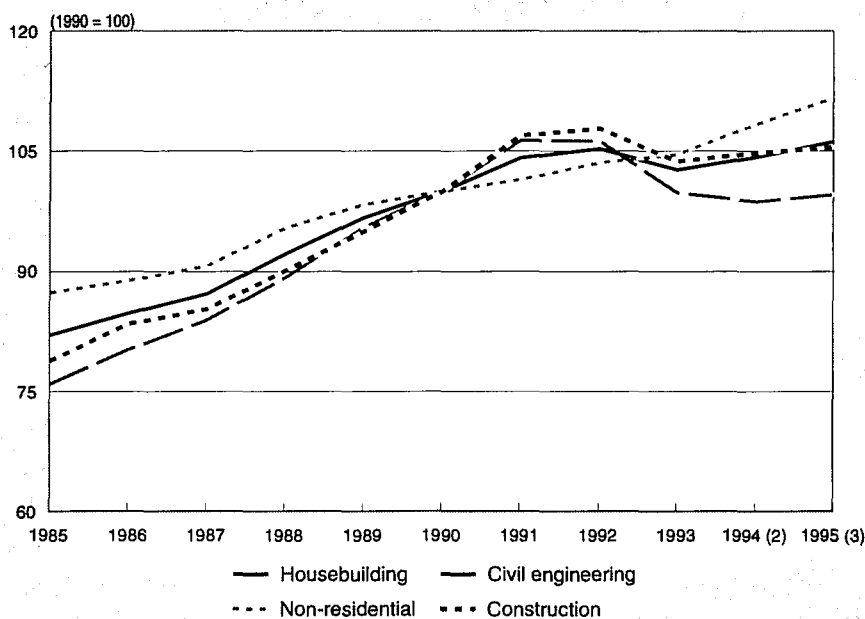
Manufacturers of construction products are mainly classified under NACE 24 (Non-metallic mineral products), NACE 31 (Metal products), NACE 462 (Semi-finished wood products) and NACE 47 (Pulp, paper, printing and publishing). Construction professionals are mainly classified under NACE 837 (Professional services). Construction is traditionally divided by statistics and regulations into NACE 501 (Building) and NACE 502 (Civil engineering). Some countries further subdivide building into structural works and finishing works. Other commonly used sub-divisions for building and civil

### INDUSTRY PROFILE

#### Description of the sector

At the simplest level, the construction sector has two main constituents: constructors of works and suppliers and manufacturers of construction materials. These groups are not en-

**Figure 1: Construction**  
Index of investment in construction in the EU (1)



(1) Excluding Greece and Luxembourg.

(2) Estimates.

(3) Forecasts.

Source: FIEC (12/94)



**Table 1: Construction**  
Annual production growth in real terms by country

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
EU (3) (4)	-2.0	3.4	3.0	5.9	5.2	4.3	5.5	1.9	-1.6	2.1	2.5
Belgique/België	-0.6	3.0	3.0	14.9	6.5	8.4	3.3	5.1	-1.6	-1.1	1.5
Danmark	N/A	16.5	1.7	-4.3	-6.1	-3.2	-10.4	0.9	-3.5	3.4	7.9
BR Deutschland (4)	-6.5	2.7	0.0	4.4	5.2	6.0	16.2	8.8	3.5	7.0	4.0
España	N/A	4.9	7.1	9.7	13.1	9.1	3.8	-5.9	-7.4	0.6	3.7
France	-0.1	2.4	3.6	5.8	4.2	2.5	1.3	-2.8	-5.1	-2.2	0.0
Ireland	-9.5	-6.0	-3.5	-4.3	7.4	16.8	-0.3	-2.1	-2.3	4.2	N/A
Italia	-0.5	1.9	-0.7	2.3	3.6	3.5	1.4	-2.1	-10.0	-9.5	-2.2
Nederland	1.8	6.2	2.8	10.2	2.8	0.5	0.6	1.4	-3.4	1.5	3.7
Portugal	-6.1	8.8	9.7	10.4	3.7	5.3	4.5	2.5	0.0	-0.8	6.5
United Kingdom	1.2	3.5	11.4	9.7	5.4	1.0	-6.8	-4.0	-2.0	2.2	1.5
Austria	1.6	2.6	3.3	2.5	0.7	4.8	7.5	4.5	-0.9	2.2	2.9
Finland	N/A	-3.0	1.0	10.3	15.4	-1.1	-14.4	-17.2	-17.1	-2.6	6.7
Norway	12.4	11.6	6.1	-0.8	-13.2	-10.1	-5.1	-0.9	-1.9	3.3	6.2
Sweden	0.1	3.1	6.8	5.7	8.2	1.7	-0.5	-6.5	-13.0	-13.2	3.1
Switzerland	1.0	2.0	3.0	6.9	5.7	-0.2	-5.6	-2.4	-1.9	3.7	1.2

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

engineering include: housing and non-residential building; work for public and private sector clients; and, new construction and repair, maintenance and improvement. However, these distinctions are not clear-cut and do not necessarily correspond to distinct types of firms.

Many large enterprises are active in several of these activities and may have specialised subsidiaries for each market segment. The great majority of construction enterprises, however, are small and medium-sized firms, including a large number of micro-businesses. As shown in Table 7, about 97 % of the firms have less than 20 employees.

#### Distinct technologies

Modern buildings and structures make use of a multitude of specialised technologies. In recent years, there has been rapid technological progress in the industry with respect to better construction methods and the manufacture of construction products. However, the need to repair, maintain and alter the existing built environment means that the industry needs to retain a competence in older technologies as well. Consequently, the construction industry's technologies range from traditional, labour intensive, site-based crafts to sophisticated, industrialised technologies in, for example, control systems in intelligent buildings.

Many construction firms specialise in one technology or in a small group of related technologies. Because clients frequently require heavily one-off designs, many projects bring specialised firms together to form a unique project team. Therefore, in addition to individual specialised technologies, the industry uses general contractors, with or without independent design consultants, to create an overall design and management framework for individual projects.

Specific technology trends are affecting the construction industry: for example, computer-aided design (CAD) systems are gradually integrating traditionally fragmented processes. Prefabrication is moving work away from construction sites into factories; at present, this is mainly 'light prefabrication' of sub-components, such as building frame members and modules like toilet pods. However, discredited large scale building systems may again become viable using CAD and flexible manufacturing technology. Electronic control and communi-

cation systems are providing a basis for intelligent buildings and infrastructures that are linking the industry's products with its processes in ways that were previously impossible. The industry is also developing answers to the challenges of new environmental criteria and providing solutions for repair of environmental damage and constructions that respect the environment.

#### Types of clients

The sector is also fragmented because of the requirements of different types of clients.

- Most clients are small firms or individuals who have a problem that can be solved by simple construction work; e.g. repairs, maintenance or alterations. This creates an industry with many small firms serving local markets.
- Firms or public bodies, another type of client, need more substantial construction work. They are not expert in construction matters and require professional advice that they can trust. They also want to be involved in determining the design, price and schedule. This type of client tends to use medium or large construction firms working with independent architects or consulting engineers.
- A third type of client needs construction work but is experienced in employing an appropriate mix of consultants and contractors. These clients tend to determine contract conditions to suit their own way of working and buy specific services to suit the needs of the project. This category includes many clients in the public sector and utilities who are required, by the Public Procurement Directives, to organise competition among suppliers.

Market developments also show a tendency towards more integrated services, combining design and construction and, sometimes, maintenance, operating, etc. in varying degrees.

#### Recent trends

Construction activity in the EU fell by 1.6 % between 1992 and 1993 compared to an increase of 1.9 % between 1991 and 1992. In 1993, activity in Germany grew with investment in the new Länder, but was static or fell in all other EU countries. This was also the case in the EFTA countries. In 1994, however, total EU output was expected to increase by



**Table 2: Construction**  
**Annual production growth in real terms by sector (1)**

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (2)	1995 (3)
Construction	-2.0	3.4	3.0	5.9	5.2	4.3	5.5	1.9	-1.6	2.1	2.5
Building	-2.4	2.7	3.1	5.7	4.8	3.7	4.8	2.1	-1.1	2.5	2.8
-Housebuilding	-4.5	1.3	1.8	5.1	2.7	2.5	2.9	3.3	2.2	5.2	3.8
-New	-9.8	-2.6	-2.1	6.3	2.3	2.7	4.2	4.3	2.4	5.1	3.4
-Rehabilitation and maintenance	3.7	6.7	6.5	4.0	3.6	2.6	1.9	2.4	2.0	5.0	4.1
-Non-residential	1.0	4.8	5.1	6.5	8.2	5.6	7.4	0.8	-5.0	-1.0	1.5
-Private	2.9	6.4	7.1	7.7	10.0	6.2	7.9	0.3	-5.6	-1.5	2.0
-Public	-2.6	0.4	0.4	3.6	3.6	4.4	6.3	3.5	-2.7	1.0	0.4
Civil engineering	0.2	7.1	2.3	7.4	7.5	7.4	9.7	1.0	-3.6	0.1	1.1

(1) Excluding Greece and Luxembourg.

(2) Estimates.

(3) Forecasts.

Source: FIEC (12/94)

a little over 2 %. Continued growth in Germany and recovery in most other Member States will offset continued reduction in construction output; particularly in Italy. FIEC expects that in 1995 the recovery will spread with a return to growth in activity in all countries except France and Italy (Table 1).

In 1993, total building output fell by 1.1 % and civil engineering fell by 3.6 % (see Table 1 and 2). There was growth in housebuilding and repair and maintenance of housing stock, but reductions in public and private non-residential building. For 1994 and 1995, FIEC expects stronger growth in the entire housing sector, recovery in public non-residential building, and a slight recovery in civil engineering. Private non-residential building is not expected to recover until 1995, when there should be growth in all sectors.

### International comparison

The EU, USA and Japan are presently the largest construction markets in the world. However, future construction growth may become more rapid in China and, somewhat later, in the former Soviet Union and Central Europe. Construction output in Japan is about the same value as the EU, but prices are generally believed to be higher, indicating a lower physical volume of output. Deliberate government policies have increased Japanese gross construction output from 15 % (1985) to 19 % (1993) of GDP, and average output per head to 4 500 ECU, twice as high as the EU average.

There are more than ten Japanese construction companies with a substantial presence in Europe. Six key groups in the EU are: Kajima, Obayashi, Shimizu, Taisei, Takenaka and Kumagai-Gumi. Japanese construction companies also compete with EU firms in: Africa, the Middle East and mainly South East Asia, where they have a strong presence. In Japan, they operate through a pyramid of subcontractors, specialists, suppliers and designers. It is an industry which is dependent on an interlocking system of patronage and non-contractual relationships.

Specialised construction contractors, who have been pioneers in the field of industrial manufactured products for construction, might compete with these general construction companies but, even here, the construction industry is characterised by complex inter-relationships between these actors.

The US market is the third in size, slightly smaller than those of Japan and of the EU. The Japanese and the US markets have the benefit of a common language, currency, economic policy, culture and education system. The US market also benefits from a significant number of highly competitive manufacturers of materials and components based on common stand-

ards. It is also true, however, that regulations and market conditions differ in the 50 states, creating distinct local construction industries. US firms are particularly renowned for their construction management expertise. For European contractors, the main competitors are those overseas contractors with special engineering experience that are present in the EU, as well as, in the Middle East and South East Africa.

### Employment

Table 4 shows the total number of persons employed in construction. In 1993, employment was a little over 9 million in the EU, which corresponds to 1989 levels. This is the result of reduced employment in general and the addition of East Germany in 1992. Employment has naturally followed construction activity levels, which have been cyclical, but with an underlying downward trend linked to rising productivity and increased off-site assembly of components.

While there is no single definition of "self-employment," FIEC estimates that there are approximately 2.1 million self-employed workers in construction in the EU (Table 6). This represents 23 % of total employment. The UK has the largest proportion of self-employed persons with around 600 000.

## MARKET FORCES

### Demand

The construction industry serves a highly cyclical market, suffering from the normal 4 to 5 year business cycle. But, its own demand variability is greater than that of most sectors because private sector demand is dependent on investment by other sectors and is highly sensitive to interest rates. In addition, there are long period fluctuations in demand which have an obvious effect on output levels. In Europe, a peak of activity was reached in 1974, after which, the oil crisis caused a slump in European construction for a period of 10 years (and a corresponding boom in OPEC countries). Recovery accelerated in 1987, coinciding with the signing of the Single European Act and the accession of Spain and Portugal. However, a downturn followed in 1991. This was partly a cyclical reaction to the inflationary pressures of the boom and to the stock of new empty properties in the EU. It also coincided with major structural changes in world trade, caused by the end of the cold war, the break-up of COMECON and the collapse of the centrally planned economies.

As always, the future for construction is uncertain. Within the EU, future growth will depend on, among other things, the success of policies to increase growth, employment and competitiveness. The speed of convergence towards monetary

integration and the constraints that this convergence may impose on public spending for construction will also effect growth.

The cyclical nature of construction demand has a tendency to depress the profitability of construction enterprises as they compete to win orders when demand shows signs of falling. There is also pressure on profitability from procurement practices of public and private sector customers, who award contracts solely on the basis of the lowest price. The industry is seeking to raise its profitability by promoting measures designed to stabilise demand and procurement systems, which give weight to quality criteria and total lifetime costs of the projects.

## INDUSTRY STRUCTURE

### Companies

The structure of the contractors' sector is similar, under certain aspects, in most countries. As a general rule, markets are local or regional, with few national firms, and even fewer operating on a European or international scale. There are a small number (usually 5 to 10) of large firms in each country, a relatively less significant band of medium-sized firms, and then a mass of small firms which are either specialists or work in extremely local markets. Although each country has a number of well-known names, there are no dominant firms. The largest have less than 5 % of their home market.

Some large firms are expanding by acquisition of medium-sized specialists or by taking interests in firms in other EU countries. Some medium-sized firms are disappearing, either as a result of acquisition by larger firms or by bankruptcy or break-up; in which case, they may spawn a larger number of small specialist firms set up by individuals. The number of small firms and self-employed increased in the late 1980s, but fluctuates with the cycle. There is also a high turnover of entrants and wind-ups. Within the EU industry, there is a growing trend of larger construction enterprises forming joint ventures and consortia, to bid for individual major contracts or a succession of similar projects. This trend is a response to the completion of the Single Market and, particularly, the opening of public markets in Europe.

#### Small firms

In the EU, construction is characterised by a large number of SMEs, with a large group of very small businesses. The number of firms and employees in construction indicates that 97 % of enterprise units have less than 20 employees, and 93 % have less than 10. The data also include some self-employed persons, but not all, depending upon whether they are considered to be one-person enterprises or casual employment. However, it is difficult to record the true number of self-employed persons. Many workers may in fact be temporarily employed and then move on or become self-employed. Thus, their employment pattern has the characteristic of self-employment. It is also probable that the number of self-employed

varies with the business cycle. Workers made redundant in a recession may change to self-employment or set up a small firm to carry out repair and maintenance, or short term contract work. Such enterprises may then be wound up when employment conditions are better.

Statistics on the number of SMEs among contractors disguise the fact that there are a number of distinct types of small firms:

- small contractors, active in building or civil engineering (or both) working in a local market or a specific market sector, e.g. housebuilding. They may work as a main contractor using a network of subcontractors and self-employed craftsmen. Many of these are family firms and have a limited life based on the life of their proprietors;
- specialist contractors, ranging from piling contractors to painters and decorators, mainly in the finishing trades, who may operate over a wide geographical market. These, if successful, will grow and may become quite large, or be taken over by larger groups; in which case, they may continue to trade as independent companies;
- self-employed craftsmen who may be registered as small firms and work with family members or casual help;
- opportunistic start-ups by individuals, or partnerships, who are made redundant or seek more independence than working for a larger firm, or craftsmen expanding their range of activities. In some countries, these firms have been strongly favoured by advantageous social security and other wage related costs for independent workers; and
- one-off companies, set up for financial or fiscal reasons by larger firms to develop a single project. There may be a very large number of these in existence which cease to have any life after the end of a project. These are not in any real sense SMEs, yet appear as such in statistics on the number of firms.

The fragmented nature of the industry is somewhat reduced by long-term networks of firms or quasi-firms. This is a well developed feature in Japan and becoming increasingly significant in the USA and Europe. Many firms work regularly with the same subcontractors, while some small firms collaborate to share common administration and sales services.

It is also increasingly common for major clients to develop groups of consultants and contractors that undertake all their work on a more or less regular basis. Franchising is also relevant in this context, especially in repairs and maintenance. The parent franchising firm ensures the competence of the small firms who buy into the franchise.

#### Large contractors

Europe has some very successful large contractors. As reported by "Le Moniteur des Travaux Publics", Table 8 shows Europe's top 20 in 1994. These are mainly based in the larger EU countries: France (8), the UK (4), and Germany (4). However, lists of top contractors in other publications show some dif-

**Table 3: Construction**  
**Construction markets in the EU, USA and Japan, 1992**

	Size (billion ECU)	Average output per head (1000 ECU)	Share of GDP (%)	Recent trends
EU	550	1.6	10	Declining after +3% 1985-89
USA	510	2.0	11	-1% p.a. since 1986
Japan	520	4.2	18	Recent decline, +10% p.a. since 1985

Source: Atkins Management Consultants

**Table 4: Construction  
Total employment**

(thousands)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
EU (3) (4)	8 571.9	8 543.6	8 645.7	8 971.7	9 252.8	9 484.0	9 505.1	9 724.6	9 297.2	N/A	N/A
Belgique/België	197.0	198.0	198.0	208.0	219.0	229.0	235.0	237.0	234.0	230.0	232.0
Danmark	168.9	185.8	190.6	186.0	174.8	167.8	158.9	158.8	155.3	161.0	164.0
BR Deutschland (4)	1 886.0	1 812.0	1 739.0	1 843.0	1 849.0	1 913.0	1 984.0	2 512.0	2 545.0	2 579.0	2 600.0
España	776.0	831.3	925.9	1 020.3	1 133.8	1 220.4	1 273.5	1 196.3	1 088.5	1 033.2	N/A
France	1 579.4	1 577.2	1 588.0	1 612.3	1 649.5	1 662.2	1 651.3	1 606.9	1 519.2	N/A	N/A
Ireland	76.0	72.0	71.0	70.0	70.0	76.0	78.0	74.0	71.0	76.0	N/A
Italia	1 651.5	1 632.2	1 615.0	1 610.0	1 598.3	1 633.5	1 673.8	1 688.4	1 556.0	1 418.0	1 418.0
Nederland	350.0	365.0	372.0	383.0	387.0	389.0	389.0	385.0	378.0	379.0	386.0
Portugal	331.1	332.1	354.2	362.1	365.4	361.1	363.6	346.2	340.2	333.4	340.1
United Kingdom	1 556.0	1 538.0	1 592.0	1 677.0	1 806.0	1 832.0	1 698.0	1 520.0	1 410.0	1 390.0	1 400.0
Austria	128.0	124.0	124.0	122.0	124.0	130.0	134.0	136.0	135.0	136.0	138.0
Finland	178.0	185.0	184.0	188.0	201.0	205.0	179.0	149.0	125.0	117.0	125.0
Norway	149.6	162.9	172.1	171.7	154.8	146.4	136.2	126.2	119.2	120.9	125.9
Sweden	260.0	257.0	278.0	279.0	289.0	314.0	312.0	273.0	236.0	210.0	200.0
Switzerland	161.7	157.5	167.6	175.8	170.8	166.4	158.0	143.2	135.4	132.0	N/A

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

ferences. Nevertheless, despite contractors appearing in different positions on various lists, and some large contractors not appearing at all, the general picture is consistent. The EU has about 45 large contractors, or firms with an annual turnover in excess of 1000 million ECU (1992 prices). None of the large EU contractors has a turnover (which includes payment to subcontractors and suppliers, often 80 % of their turnover) which reaches 5 % of their national market.

Many of the EU's largest contractors are part of groups of companies that work in several industries of which construction is just one. In many cases, these groups engage in work in several construction subsectors; e.g. manufacturing materials and components, providing various services (such as transport, water, waste treatment) and owning property-related businesses.

The EU does not have any contractors as large as the largest US and Japanese contractors, such as Fluor Daniel (turnover 17 380 million ECU), Bechtel (14 900 million ECU) and Shimizu (25 535 million ECU). However, it should be noted that the very large US contractors are specialists in engineering construction and infrastructure work and operate as turnkey contractors. They mainly provide design, procurement, finance and project management services in-house, while subcontracting nearly all site and manufacturing work. In comparison, the largest Japanese and EU firms tend to be more directly involved in actual construction work on site.

It is felt in some quarters that Europe would benefit from having larger contractors, better equipped to compete with US and Japanese firms. They could also play a leading role in shaping the image of the industry, and take the lead in R&D. However, this would not change the overall structure of the sector which will always reflect the structure of demand.

Within the EU, it is increasingly common for several contractors to join in bids for major construction projects in close cooperation with financial institutions. For example, the construction and financing of the Channel Tunnel involved some 10 contractors and over 200 banks and other financial institutions. Many contractors believe that new opportunities are to be found through joint-ventures, strategic alliances, mergers, acquisitions and cooperation. These strategies generally spread risk, provide access to a range of technical knowledge and

experience not possessed by any one contractor, and may well provide access to a wide range of sources of finance.

Some contractors in EU countries such as Germany, Spain and France, have formal links with industrial banks. This can provide important advantages in access to finance and allow contractors to take a long-term view in developing their business.

In general, it can be observed that large contractors come from large countries. This leads to the conclusion that as soon as the single EU construction market becomes a reality, some of the leading European contractors will increase their size. This has already happened to a large extent in anticipation of the forthcoming Single European Market. Growth in size has mainly been achieved through cross-border mergers and acquisitions. In 1993, the French construction industry continued to hold the largest number of foreign interests (with 227 active holdings), followed by Germany (111) and the UK (68). The highest level of foreign participation in domestic companies is to be found in Germany (142) (Source: EIC: "Mergers and Acquisitions in the European Construction Industry", Nov. 1994).

### Impact of the Single Market

The overall effect of the creation of the Single European Market, rather than the actual legislative measures implementing it, continues to have a generally positive impact on the construction sector. This overall effect is evidenced through the gradual approximation of construction procedures and the regulatory framework in which the sector operates, as well as in regional economic development. Owing to the nature of construction, this impact has not yet extended to the entire sector. Construction is by nature a local or regional activity, in which a majority of firms do not usually move far from their local geographical base. Consequently, transnational activities do not usually result in exports of goods as such, but rather take the form of exports of capital or services through international mergers, acquisitions and joint ventures. European legislation in the areas of the opening up of public procurement markets, the free movement of goods and the free movement of persons has facilitated transnational activities. This is, however, only relevant to the fairly small number of enterprises that engage in such operations. The practical im-

**Table 5: Construction  
Employed workers**

(thousands)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
EU (3) (4)	6 654.3	6 621.9	6 643.2	6 900.7	7 074.8	7 265.7	7 289.0	7 529.3	7 196.9	N/A	N/A
Belgique/België	156.0	157.0	156.0	165.0	176.0	185.0	190.0	192.0	189.0	185.0	187.0
Danmark	138.9	155.4	159.7	155.8	146.1	141.1	133.9	133.1	129.8	135.5	138.5
BR Deutschland (4)	1 679.0	1 618.0	1 546.0	1 644.0	1 649.0	1 707.0	1 771.0	2 276.0	2 303.0	2 335.0	2 355.0
España	551.5	614.2	694.3	774.2	889.7	963.1	994.7	906.6	809.5	761.6	N/A
France	1 261.1	1 261.9	1 272.5	1 296.4	1 335.2	1 351.9	1 348.0	1 312.1	1 243.0	N/A	N/A
Ireland	67.0	61.0	60.0	59.0	58.0	63.0	66.0	62.0	59.0	64.0	N/A
Italia	1 140.8	1 120.1	1 089.1	1 092.0	1 080.1	1 109.9	1 123.4	1 132.5	1 044.0	N/A	N/A
Nederland	308.0	322.0	328.0	338.0	342.0	344.0	344.0	340.0	332.0	333.0	340.0
Portugal	266.0	262.3	280.6	291.3	290.7	283.7	277.0	252.0	248.6	243.4	246.4
United Kingdom	1 086.0	1 050.0	1 057.0	1 085.0	1 108.0	1 117.0	1 041.0	923.0	839.0	785.0	785.0
Austria	126.0	122.0	122.0	120.0	122.0	128.0	132.0	134.0	133.0	134.0	136.0
Finland	159.0	164.0	159.0	160.0	169.0	171.0	149.0	121.0	99.0	92.0	100.0
Norway	120.4	132.2	142.1	142.8	128.7	122.6	115.4	105.6	98.8	100.3	105.1
Sweden	232.0	232.0	233.0	234.0	242.0	266.0	266.0	225.0	186.0	160.0	150.0
Switzerland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

plementation of the Single Market has only just started and therefore is still far from being accomplished. The sector considers as main priorities for the future the timely realisation of the Trans-European Networks, and a further simplification of the regulatory framework.

## REGIONAL DISTRIBUTION

The EU Structural Funds will continue to be a main determinant of future regional patterns of growth and construction demand. Without regional policy, however, it is likely that disparities would increase. As long as the Structural Funds increase, they should assist construction growth in Objective 1 regions. However, the outcome heavily depends on individual national infrastructure policies.

The total volume of financing from EU funds is significant. For 1994-99, 141 billion ECU have been allocated to the Structural Funds, of which 96 billion ECU will go to Objective 1, less advantaged, regions. However, not more than one-third will be for infrastructure projects. The Edinburgh growth initiative provides a further 8 billion ECU. The Cohesion Fund, agreed to by Member States as part of the Maastricht Treaty, adds a further facility. EIB loans within the EU, which are largely related to infrastructure, run at about 12 billion ECU/year. It can be assumed that around 100 billion ECU of EU funds will be available for infrastructure, or 20 billion ECU/year. If it is assumed that the average EU component is 50 % of total project funding, the EU funds will, in effect, influence about 40 billion ECU per year, or about 30 % of the 125 billion ECU/year of civil engineering expenditure.

The accession of Austria, Sweden and Finland to the EU in 1995, brings in countries which, under existing rules, will make a net contribution to EU funds and hence help increase regional development. These countries, however, have construction markets which have been in decline for several years. In addition, they have powerful contractors who are strong competitors for the existing EU industry.

The European Commission's White Paper on Competitiveness, Employment and Growth emphasised the importance of infrastructure, and reaffirms Community priorities for trans-European networks and support for infrastructure investment.

The allocation of funds to the Growth Initiative may be increased.

These trans-European networks should be extended to include the new democracies of Central and Eastern Europe, several of which may join the EU in the future. The new political and economic freedoms in these countries have exposed the need for infrastructure investment, including transport links with Western and Northern Europe. Other principal construction needs, which will require substantial financial assistance from outside, include housing and the treatment of pollution. These countries have a large capacity to carry out construction work, with ample experience in managing large projects, but their technology is not fully up to date by Western standards. Likewise, productivity of the labour force is relatively low, as are wages. In the short to medium term, they may provide an additional market for western enterprises competing on quality or technology, however, they will be powerful competitors in low-cost building and basic infrastructure.

Despite efforts to reduce disparities in regional development, the main construction markets will continue to be in the backbone of Europe (the banana-shaped region from SE England, through western and southern Germany, to northern Italy) and the growing sunbelt region from the northern Adriatic along the Mediterranean coast of France and Catalonia. There is some evidence of convergence of per capita incomes in EU regions, but recent evidence shows that overall disparities have not changed much.

The regional development and cohesion effects of the Maastricht process and the growth initiative should have a positive impact on construction demand. However, monetary integration, if followed according to the Maastricht programme, is likely to severely constrain demand. The convergence process, by which Member States must bring budgetary deficits, debt and inflation levels within strict limits, is restricting the ability of States to increase public spending on building and infrastructure programmes. It may also restrict the freedom of governments to carry out an economic recovery policy, since social security payments are higher in a recession and tend to squeeze infrastructure spending. The White Paper on "Growth, Competitiveness and Employment" sets out policies to try to remove these constraints, including the introduction of private capital in public-private partnerships.

## ENVIRONMENT

The construction sector faces enormous challenges and market opportunities from the emphasis on protecting and improving the environment. In response, the industry is providing solutions to environmental problems by developing new services and products, something which has provided positive contributions to the environment.

The internal environment of buildings is an emerging area of concern, which requires more research and development of standards relating to air quality, microbiology of buildings, allergenic and toxic effects of materials, and emissions from land and buildings.

Energy conservation remains a priority issue, as about half of Europe's energy consumption is related to buildings. Designers and contractors are responding to the need for more energy efficient buildings, including the use of passive thermal principles, which in some countries are requested by law. The existing stock of buildings has potential for refurbishment to conserve energy. There is also likely to be increased use of less energy-intensive materials. These changes will be accelerated if energy prices rise through a carbon tax or other macro-economic energy conservation measures.

Energy and eco-labelling of buildings and products is beginning to be promoted and will create a market mechanism favouring these changes. The analysis of the environmental impact of specific projects is also increasing through development of techniques and enforcement of impact assessment requirements.

In some parts of the EU, there is growing concern over the availability of natural resources for construction and the consequences of meeting future demand. This focuses attention on making more effective use of materials. Waste management and the recycling of construction materials are subjects of extensive research and development. This is leading to changes in site practices and design principles, in order to minimise the use of materials which are damaging or not recyclable, and to facilitate ultimate demolition and recycling.

The built environment is to a large extent synonymous with our cultural heritage. It is difficult to exaggerate the importance of this heritage, and conservation is a major task for the con-

struction industry. It is also worth emphasising the importance of local building practice in creating the diversity which is such an attractive feature of Europe's towns and villages. Small firms of designers and craftsmen continue to have a valuable role in maintaining this cultural dimension.

## REGULATIONS

In many respects, the construction sector is subject to different policies and legislative treatment from other sectors of the economy. At national levels these include: land use plans and planning controls (which affect land prices), building regulations and standards, planning permits, building inspection, registration of contractors and professions, regulated fee rates, and so on. Governments also directly control a large share of construction work and provide research, training and information services.

Some major EU regulations affecting the industry are:

- Public procurement directives. There are a full set of directives covering supply (93/36), works (93/37) and services (92/50) contracts awarded by public sector clients and the utilities, including the Works Directive (93/37) and the Utilities Directive (93/38), which set out procedures for procurement of construction work for projects over 5 million ECU. The directives require advertising of calls for tender, use of specified selection procedures, and the use of European Technical Standards. In addition, the "Remedies" Directives (92/13 and 89/665) establish a system of judicial review of procurement procedure.
- Construction products directive (89/836). Interpretative documents enabling the Construction Products Directive to be implemented were adopted at the end of 1993. CEN and CENELEC (the European Standards bodies) are drawing up new harmonised EU Standards for construction products and new procedures for technical approval of innovative products.
- Liability and guarantees. There have been changes in legislation on liability and insurance requirements in some countries over the past decade. In the last three years, experts from various segments of the construction sector have been discussing proposals for possible harmonisation of liability

**Table 6: Construction  
Self-employed workers**

(thousands)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
EU (3) (4)	1 917.6	1 921.7	2 002.5	2 071.0	2 178.0	2 218.3	2 216.1	2 195.3	2 100.3	N/A	N/A
Belgique/België	41.0	41.0	42.0	43.0	43.0	44.0	45.0	45.0	45.0	45.0	45.0
Danmark	30.0	30.4	30.9	30.2	28.7	26.7	25.0	25.7	25.5	25.5	25.5
BR Deutschland (4)	207.0	194.0	193.0	199.0	200.0	206.0	213.0	236.0	242.0	244.0	245.0
España	224.5	217.1	231.6	246.1	244.1	257.3	278.8	289.7	279.0	271.6	N/A
France	318.3	315.3	315.5	315.9	314.3	310.3	303.3	294.8	276.2	N/A	N/A
Ireland	9.0	11.0	11.0	11.0	12.0	13.0	12.0	12.0	12.0	12.0	N/A
Italia	510.7	512.1	525.9	518.0	518.2	523.6	550.4	555.9	512.0	N/A	N/A
Nederland	42.0	43.0	44.0	45.0	45.0	45.0	45.0	45.0	46.0	46.0	46.0
Portugal	65.1	69.8	73.6	70.8	74.7	77.4	86.6	94.2	91.6	90.0	93.7
United Kingdom	470.0	488.0	535.0	592.0	698.0	715.0	657.0	597.0	571.0	605.0	615.0
Austria	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Finland	19.0	21.0	25.0	28.0	32.0	34.0	30.0	28.0	26.0	25.0	25.0
Norway	29.2	30.7	30.0	28.9	26.1	23.8	20.8	20.6	20.4	20.6	20.8
Sweden	28.0	25.0	45.0	45.0	47.0	48.0	46.0	48.0	50.0	50.0	50.0
Switzerland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

**Table 7: Construction**  
**Breakdown by size of enterprise, 1990**

	Number of enterprises (units)	Share of number of enterprises	Employees	Share of employment	Share of turnover
Less than 10 employees	1 759 141	92.6	3 877 085	43.7	33.5
10-19 employees	80 945	4.3	1 094 939	12.3	11.9
20-49 employees	42 865	2.3	1 265 534	14.3	15.2
50-99 employees	10 185	0.5	701 607	7.9	9.1
100-499 employees	5 384	0.3	1 009 311	11.4	15.4
500 or more employees	639	0.03	921 099	10.4	14.9
All enterprises	1 899 159	100.0	8 869 575	100.0	100.0

Source: Eurostat "Enterprises in Europe", 1994

law and arrangements for guarantees and insurance ("GAIPEC").

- Health and safety. A variety of health and safety measures affect the construction sector. The Temporary and Mobile Construction Sites Directive (92/57), which is currently being implemented, defines new responsibilities for designers and contractors and requires a safety plan to be produced for each construction site.
- Posted workers. The proposal of a directive currently under discussion requires all workers to be employed under the labour legislation and collective agreement terms of the host country. This would have an important impact on the construction sector, which, in some EU countries, uses a lot of foreign labour.
- Pre-qualification. The possibility of a system of proof for pre-qualification of construction firms has been studied by CEN. Currently, the Commission is elaborating mandates for CEN/CENELEC to develop standards in this area. These rules are intended to provide a basis for the mutual rec-

ognition of nationally acquired proof of qualification, in particular, pre-qualification procedures for public procurement. If adopted, it might also have an important impact on marketing by contractors and on selection procedures by private sector clients.

## OUTLOOK

Because construction demand is closely linked to total demand for investment, the industry's future depends upon the success of the EU and national governments in stimulating economic growth. European integration and socio-economic changes are generating increasing needs, but demand is constrained by public expenditure constraints and the financial capacity of the private sector and households.

There has been fear in some countries that there might be a long-term or a once-and-for-all drop in construction demand as population stabilises or declines, and as major infrastructure and housing needs are satisfied. However, the EU's construction sector strategy study ("SECTEUR"), carried out for the

**Table 8: Construction**  
**Europe's top 20 construction firms, 1993**

Contractor	Country of origin	Turnover (million ECU)	Change in turnover 1992/93 (%)	Share of exports in turnover (%)	Profit (million ECU)	Employees (thousands)
Bouygues	France	9 223	-2.5	30.0	70.7	90.1
SGE (Generale des Eaux)	France	6 523	-2.6	42.6	46.1	64.0
Philipp Holzmann	BR Deutschland	6 437	-0.1	34.4	133.1	43.8
BICC	United Kingdom	5 023	7.4	31.0	0.1	39.2
Eiffage	France	5 003	-10.7	16.4	45.6	47.8
Trafalgar House	United Kingdom	4 973	-0.5	60.0	-445.1	35.9
GTM-Entrepose (Lyonnaise des Eaux)	France	4 338	2.6	38.6	25.7	46.1
Hochtief	BR Deutschland	4 136	6.2	26.2	131.1	31.8
Intecna (IRI)	Italia	3 585	-13.8	N/A	-590.8	N/A
Bilfinger & Berger	BR Deutschland	3 475	11.9	40.6	106.4	45.8
Tarmac	United Kingdom	3 422	-9.1	17.0	-55.3	24.8
Skanska	Sweden	3 171	-9.0	23.0	122.5	27.4
AMEC	United Kingdom	2 800	3.0	20.0	26.9	25.7
SPIE Batignolles (Schneider)	France	2 751	-15.9	31.4	-32.5	29.8
Strabag	BR Deutschland	2 598	7.1	15.7	43.7	21.3
Colas (Bouygues)	France	2 492	25.9	27.3	43.6	28.3
FCC	España	2 471	-3.6	5.0	138.3	30.6
CEGELEC (Alcatel Alsthom)	France	2 413	-0.3	41.7	52.2	26.2
HBG	Nederland	2 404	2.6	41.0	36.9	18.4
Dumez (Lyonnaise des Eaux)	France	2 342	N/A	45.9	N/A	25.9

Source: Le Moniteur, Special Mille Entreprises - November 1994

European Commission in 1992/93 and published in 1994, argues against that view. Social and economic changes, as well as the upgrading of environmental standards, are generating increasing construction needs. The problem will be to satisfy these needs. The share of GDP for construction needs to increase. However, this will be difficult to achieve, because it implies increasing macro-economic savings rates, at the same time as public expenditure is constrained by tax and public deficit restrictions and more expenditure is needed to meet the needs of an ageing population and long-term structural unemployment.

Overall, there are enormous needs for infrastructure investment in Europe. In most areas, there is a problem of housing quality or housing stock. These must be growth areas for the industry. For commercial property, the needs are weaker. Needs in these sectors are dealt with in the chapters on Building and Civil Engineering.

### Demand scenarios

The "SECTEUR" study suggested three future scenarios:

- An optimistic, but attainable, high growth scenario shows construction output doubling by the year 2005, with employment rising rapidly at first and then more steadily, creating 5 million new jobs in construction and 15 million throughout the EU by the year 2000. This scenario promises continual improvements in housing, cities, and infrastructure enabling Europe's industry to restructure and become increasingly competitive.
- A more conservative scenario, with GDP growth and construction's share of GDP returning to historic levels of the 1980s, shows a return, after about 4 years' growth, to the output levels attained in the boom of 1990/1, and then steady growth in construction output, averaging 3 % per year. This scenario would create 2 million jobs in construction by the year 2000 and 6 million in total throughout the EU, reversing the decline in employment which took place over the 1980s.
- A pessimistic scenario, with low growth, a lower share of construction in GDP, and low innovation and productivity growth, shows construction output continuing to fall for several years, followed by slow growth, but never returning to the levels of 1992, let alone the boom levels of 1990/1. Here, 2 million construction workers and 6 million workers in total would become unemployed, despite continuing labour intensive technology. In this scenario, the living and working environment will deteriorate, European industry will become increasingly uncompetitive, and the standards of construction would be likely to decline.

Continuous rationalisation of industries is leading to plant closures, re-investment, and relocation which will be accelerated by EU integration. The EU is also becoming a more attractive target for inward investment by global firms; particularly Japanese. Changes in economic structure and consequent migration will stimulate new construction needs. In the future, more sophisticated EU regional policies and free market industrial policies should permit more rapid and efficient responses to such changes and help to convert construction needs into construction demand.

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# Building

## NACE 501

The building sector is influenced by the overall economic situation in terms of current trends in economic activity and expectations of future trends. Government policies play a direct role in terms of economic policy, and credit and fiscal policies, as well as an indirect role in terms of regulations for the sector. Competition has increased markedly in both housing and non-residential building. A fall in prices and the level of demand has been followed, in some countries, by a reduction in capacity.

Certain key factors affecting the building sector have already been discussed in a previous chapter entitled 'Construction'.

### INDUSTRY PROFILE

#### Description of the sector

There are two principal divisions of total building construction: housebuilding and non-residential building. The latter includes factories, warehouses, shops and offices, mainly for private sector clients, and various public buildings including schools, hospitals and prisons.

#### Housebuilding

Total housing stock may be broadly divided into three categories: social housing, the construction of which benefits from the support of public authorities; private rental sector; and, owner-occupied housing. The relative importance of these sectors varies from country to country, depending on a variety of factors. For example, the owner-occupied sector is influenced by: income levels; the availability of house purchase loans with varying percentages (4.5 % - 22 %) of the purchase price; differing levels of transfer costs when buying and selling houses; and, different government policies with regard to home

ownership, including tax treatment (e.g. VAT between 0 % and 20.5 % on new housing construction), the best example of this being the UK, where during the 1980s the proportion of population owning its own house rose to 60 %.

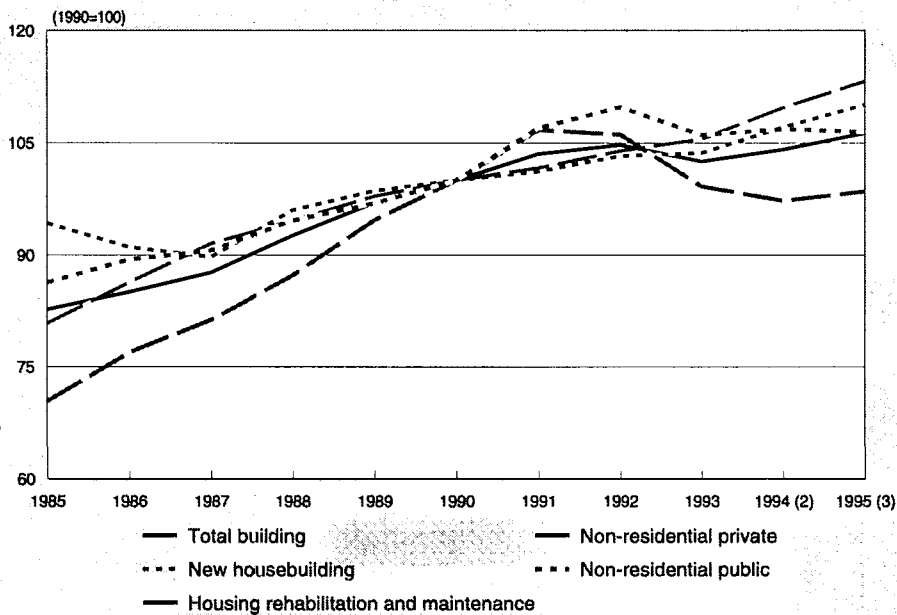
For Europe as a whole, and for most Member States, statistics show a small excess in the number of dwellings over the number of households. Yet, in practical terms, there is a shortage of housing across Europe, which has become a pressing political problem. There are large numbers of households suffering poor housing conditions, who wish to be re-housed in new or refurbished dwellings and others whose housing expectations have been raised by increases in their incomes. In addition, changes in the structure of the economy and completion of the Single Market, are causing considerable shifts in population in Europe. Thus, there are growing regional imbalances between demand and supply of suitable housing.

Meanwhile, trends in the construction of new housing and in repair and maintenance of existing housing stock, varies between sectors. However, all are affected to a considerable degree by the overall state of the economy and by shifts in governments' economic and financial policies. In both the owner-occupied and private rental sectors, demand for new housing is influenced strongly by movements in interest rates. Demand for new social housing varies with expansion or contraction of levels of public spending.

Generally, demand for and construction of new housing reflects the overall trend in economic activity. Table 4 shows significant declines in new housing construction coinciding with the recent recession in most EU and EFTA countries. Although, for the EU as whole, growth in new housing output remained positive in 1991, 1992 and 1993 on account of massive investment in Germany's new Länder, and the relatively early recovery from recession in the UK.

Equally as important as new housing, in terms of value of construction output, is the repair, maintenance and improvement of existing housing stock. However, fluctuations here tend to be less pronounced than in new housebuilding, as

**Figure 1: Building Index of investment in building in the EU (1)**



(1) Excluding Greece and Luxembourg.  
 (2) Estimates.  
 (3) Forecasts.  
 Source: FIEC (12/94)





**Table 1: Building**  
Annual production growth in real terms by country

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995(2)
EU (3) (4)	-2.4	2.7	3.1	5.7	4.8	3.7	4.8	2.1	-1.1	2.5	2.8
Belgique/België	2.7	4.6	5.5	17.5	9.8	9.0	2.1	4.3	-5.4	-2.4	0.7
Danmark	N/A	17.0	3.6	-5.6	-9.8	-6.5	-8.5	-1.8	-2.2	2.6	9.5
BR Deutschland (4)	-7.5	1.9	0.2	4.5	5.6	6.7	16.1	8.5	4.3	7.2	4.4
España	N/A	5.4	7.9	7.0	8.3	5.2	1.7	-3.2	-5.6	1.2	3.2
France	-1.2	0.8	2.5	4.7	3.5	2.5	0.4	-2.3	-4.5	-2.0	0.0
Ireland	-7.0	-5.8	-1.0	-5.0	10.2	19.5	-1.0	-3.0	-6.5	7.8	N/A
Italia	-0.8	0.6	-1.3	3.2	3.5	3.6	2.3	-1.4	-9.3	-9.2	-1.8
Nederland	1.5	6.4	4.1	10.9	3.2	-0.1	0.7	1.0	-4.3	0.6	3.8
Portugal	-5.8	9.2	10.7	8.4	0.7	3.4	0.1	1.6	-2.2	-1.3	4.2
United Kingdom	1.9	3.5	11.9	9.0	5.5	-1.3	-11.9	-6.0	-3.2	4.3	2.8
Austria	-1.5	6.1	4.5	7.8	-0.5	5.2	10.1	9.9	-2.1	1.1	3.7
Finland	N/A	-5.1	1.7	13.8	17.8	-1.9	-16.6	-20.8	-19.7	-0.3	9.3
Norway	19.4	14.9	3.6	-0.9	-13.4	-13.0	-7.2	-2.7	0.1	4.2	8.3
Sweden	0.7	3.9	8.3	6.2	8.5	1.5	-0.1	-7.4	-15.2	-17.1	1.6
Switzerland	2.1	2.4	3.0	7.1	6.6	-0.9	-7.7	-3.9	-2.2	4.6	0.9

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

**Table 2: Non-residential private building**  
Annual production growth in real terms by country

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995(2)
EU (3) (4)	2.9	6.4	7.1	7.7	10.0	6.2	7.9	0.3	-5.6	-1.5	2.0
Belgique/België	8.1	12.4	10.7	18.5	11.1	7.2	0.8	-5.6	-7.4	-7.0	0.0
Danmark	N/A	N/A	17.9	-11.3	-14.8	0.4	-12.8	-9.6	-21.8	-11.5	11.8
BR Deutschland (4)	-2.4	5.4	2.8	5.3	7.5	6.3	23.2	9.1	1.4	3.0	3.0
España	N/A	5.0	15.6	11.8	12.6	4.5	6.0	-5.9	-14.0	-9.6	-4.2
France	-0.6	3.2	4.8	8.0	6.3	5.6	3.0	-3.0	-9.2	-8.7	-4.5
Ireland	-23.8	-22.0	13.9	18.3	23.6	60.3	0.5	-20.3	-28.2	-0.4	N/A
Italia	8.3	13.0	1.6	3.8	5.5	5.7	2.6	-3.0	-14.9	-11.0	1.5
Nederland	6.8	11.4	8.1	10.5	6.2	2.5	7.9	-1.6	-12.1	-5.0	2.4
Portugal	-2.6	12.0	12.4	11.6	6.1	7.4	0.3	2.0	-6.0	-7.2	7.0
United Kingdom	10.3	3.0	17.1	12.1	20.3	6.3	-15.0	-17.0	-13.6	3.8	6.0
Austria	8.0	12.5	12.8	12.6	1.9	6.8	13.3	7.9	-14.6	-8.3	0.5
Finland	N/A	-0.5	2.7	5.3	23.2	2.9	-17.5	-26.6	-35.5	-5.1	22.6
Norway	21.0	23.5	-6.5	-2.4	-17.8	-17.3	-15.2	-1.0	12.9	4.1	9.5
Sweden	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0
Switzerland	8.5	8.1	6.2	12.5	9.8	2.3	-9.3	-9.8	-12.2	-1.0	-5.7

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)



**Table 3: Non-residential public building**  
Annual production growth in real terms by country

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995(2)
EU (3) (4)	-2.6	0.4	0.4	3.6	3.6	4.4	6.3	3.5	-2.7	1.0	0.4
Belgique/België	-12.1	-7.5	-6.9	-6.5	-28.3	9.9	27.2	9.4	-11.6	4.1	3.6
Danmark	N/A	N/A	4.0	7.9	-16.6	-7.1	-5.5	7.8	-0.2	20.8	22.6
BR Deutschland (4)	-2.2	6.0	0.8	2.4	1.4	-1.3	16.7	5.0	-1.9	0.5	-0.5
España	N/A	9.0	-10.0	0.0	28.0	30.0	6.0	-5.9	-14.0	8.5	0.0
France	3.0	4.0	4.1	2.7	2.2	3.2	1.6	3.6	0.0	1.5	0.5
Ireland	-7.3	-10.0	-1.4	-16.1	-14.8	16.3	-12.4	7.9	11.3	15.1	N/A
Italia	-8.4	-13.6	-3.4	14.6	4.2	2.4	-3.5	-6.5	-14.4	-12.0	-5.0
Nederland	-5.2	0.9	5.1	11.9	7.3	4.6	0.8	-2.9	1.5	0.7	3.4
Portugal	-7.3	26.2	16.5	12.9	11.2	8.9	3.9	3.0	-0.9	0.0	2.1
United Kingdom	-1.2	-3.1	-0.3	-3.0	4.9	5.6	-0.2	12.4	2.9	2.7	0.0
Austria	-10.4	-1.3	-7.3	-6.0	-6.1	5.1	17.4	-4.9	-0.4	2.5	1.0
Finland	N/A	0.0	3.6	20.7	-10.0	-3.2	8.2	-19.7	-20.8	-21.4	-18.2
Norway	-10.7	6.6	25.3	9.5	-4.2	-4.4	14.8	1.3	-5.3	1.4	4.2
Sweden	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Switzerland	-3.6	6.0	0.8	6.4	7.0	3.6	3.3	3.6	-2.5	3.5	0.4

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

**Table 4: New housebuilding**  
Annual production growth in real terms by country

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995(2)
EU (3) (4)	-9.8	-2.6	-2.1	6.3	2.3	2.7	4.2	4.3	2.4	5.1	3.4
Belgique/België	5.2	3.7	2.9	29.2	21.0	11.1	-0.9	13.7	-2.7	-0.2	0.6
Danmark	N/A	23.6	-3.2	-9.3	-9.5	-12.9	-13.1	-5.5	-1.3	-0.8	15.8
BR Deutschland (4)	-20.3	-10.4	-8.8	4.5	6.5	11.6	17.6	10.9	9.0	13.0	6.0
España	N/A	4.5	4.5	5.0	4.8	1.0	-6.0	-8.0	-4.0	0.0	4.0
France	-7.3	-3.1	1.7	5.1	3.0	-1.8	-4.2	-7.0	-7.3	-1.3	2.1
Ireland	-4.7	-15.7	-15.8	-4.0	27.1	3.9	2.9	7.1	1.4	11.8	N/A
Italia	-3.7	-5.7	-9.3	4.2	3.3	4.0	1.5	0.6	-8.1	-9.4	-6.2
Nederland	-10.3	7.7	2.2	13.3	-1.9	-3.3	-7.5	2.6	2.2	9.2	9.2
Portugal	-6.6	4.2	10.2	6.0	-4.8	0.1	-2.0	0.8	-1.2	0.5	3.5
United Kingdom	-10.1	8.5	15.8	11.0	-18.1	-23.0	-12.8	9.7	10.9	7.3	3.3
Austria	-3.7	2.3	3.2	9.1	-2.1	-0.5	6.6	15.9	17.4	10.2	7.8
Finland	N/A	-11.7	0.9	19.2	25.1	-6.0	-24.3	-22.0	-18.1	3.4	8.0
Norway	1.0	12.1	3.7	-4.4	-16.3	-16.0	-23.6	-12.7	-5.1	8.9	15.0
Sweden	-11.1	-11.9	25.3	43.5	13.5	11.6	3.2	-16.0	-30.1	-70.1	0.0
Switzerland	-0.5	-3.4	0.7	2.8	3.4	-6.0	-13.0	-3.2	5.3	9.6	3.2

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

**Table 5: Housing rehabilitation and maintenance  
Annual production growth in real terms by country**

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995(2)
EU (3) (4)	3.7	6.7	6.5	4.0	3.6	2.6	1.9	2.4	2.0	5.0	4.1
Belgique/België	6.0	-6.4	16.6	2.1	3.1	7.8	1.2	9.1	-0.7	1.8	1.6
Danmark	N/A	9.7	2.1	-0.7	-4.4	-4.1	-2.3	3.3	6.9	5.8	1.0
BR Deutschland (4)	5.5	12.3	6.6	4.5	4.4	5.6	6.0	6.5	5.4	8.7	6.0
España	N/A	6.0	10.9	7.0	5.5	5.0	5.0	4.0	1.0	7.0	7.0
France	3.2	1.2	0.5	2.0	1.7	3.0	1.5	0.0	0.7	2.3	2.1
Ireland	7.4	36.6	12.0	-18.5	-7.5	5.2	-3.6	2.1	-1.7	8.3	N/A
Italia	-1.0	4.8	9.5	-2.8	1.0	0.9	5.5	-0.2	-2.0	-6.0	2.0
Nederland	15.8	1.5	0.6	8.2	3.4	-2.5	-0.3	5.9	-2.5	-1.5	-1.0
Portugal	-5.0	16.5	2.4	10.1	6.4	3.7	4.7	2.4	0.0	0.5	4.9
United Kingdom	4.5	4.2	9.6	9.4	6.3	-1.9	-12.0	-6.7	-1.2	4.1	0.9
Austria	-6.1	9.4	-1.5	5.8	2.0	15.3	-2.8	22.8	-5.0	4.0	2.4
Finland	N/A	0.0	0.0	14.3	7.3	0.0	-6.8	-6.3	4.4	8.5	7.8
Norway	2.5	10.5	4.4	-3.8	-8.9	-10.3	11.9	4.7	-2.6	3.0	3.0
Sweden	5.4	6.6	4.6	-4.5	4.0	-1.9	4.0	1.3	-5.6	-1.2	0.0
Switzerland	7.2	5.7	6.7	9.0	7.4	-0.5	-1.7	-0.9	4.6	5.0	10.4

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

people may decide to improve their existing dwellings when they cannot afford to move to a new house.

Housing repair and maintenance offers many opportunities for small construction enterprises and individual craftsmen. There are also SMEs specialising in new housebuilding, but many large construction firms also have housebuilding divisions engaged in the construction of large estates and, in some cases, maintenance of existing estates.

#### Non-residential building

The non-residential building sector is also sensitive to the overall state of the economy. As a result, manufacturing enterprises and those engaged in distribution and other services vary their demand for construction in response to their assessment of prospects for demand for their own products. However, in the commercial sector (shops, offices) there may be speculative building on the part of developers or of construction companies themselves. If economic conditions deteriorate, this can exacerbate cyclical fluctuations in construction as demand for office or retail space weakens and newly constructed buildings are left unsold or unlet. If this happens, demand for non-residential buildings may be slow to recover when general economic conditions begin to improve. Large short-term fluctuations in new non-residential building are clearly evident in many countries (Table 2).

Public sector non-residential building also experiences large variations in output from year to year as governments change their spending plans in response to changing economic conditions (Table 3).

Of growing importance in non-residential building is investment in refurbishment of existing buildings; for example, improving energy efficiency or accommodating modern information technologies for communications.

#### OUTLOOK

The population of the EU has been growing slowly and is projected to increase by 2 % per year to 2000 and then begin to decline. The future level of migration, however, is unknown. It is expected that there will be increasing pressure for immigration from the third world (including ex-colonies

and North Africa), the former Soviet Union and Eastern Europe. Immigration policy may well be conditioned by the ability of the housing and social infrastructure to absorb immigrants. Conversely, the level of immigration will influence the pattern of demand for housing and infrastructure.

Average household size is likely to continue to fall, thus increasing demand for multi-dwelling buildings and complexes for singles and childless households. More significant, however, is the changing age structure. The number of older people will increase rapidly after the year 2000. This will create increasing demand for sheltered accommodation and for communities which are designed around an urban structure with minimal transport needs and a small nuclei of social infrastructure (shops, medical, recreation). In particular, in amenable locations, possibly far from the main urban and industrial centres.

This type of development is also being encouraged by those who are concerned that urban areas are being developed without sufficient regard to the need to protect the environment; e.g., construction on the edge-of-town industrial estates or, particularly, shopping centres. In some European countries land use policies have already been revised to discourage such development and to stimulate the regeneration of run-down inner city areas. Urban regeneration is also capable of creating many opportunities for the building industry.

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# Civil engineering

## NACE 502

*Civil engineering principally involves public infrastructure in sectors including transport, communications, energy and public health. The level of activity depends primarily on demand from government bodies, so the sector is highly dependent on the budgetary policies of governments and public institutions. Pressures on public finances have resulted in lower investment and demand for civil engineering. In some projects, particularly roads, communications and energy, private sector finance is providing an alternative to government financing, or a source of additional investment.*

*Certain key factors affecting the civil engineering sector have already been discussed in an earlier chapter entitled 'Construction'.*

### INDUSTRY PROFILE

#### Description of the sector

Civil engineering provides the basic infrastructure for transport systems and the utilities. Its traditional market has, in the past, been mainly public sector, but this is changing because of the privatisation policies being pursued throughout the EU. Privatisation means that contractors will increasingly face a new style of procurement. Clients are placing increasing demands on contractors with respect to quality of construction, control of costs, completion date, and joint responsibility for design. Public sector clients also are joining in this movement which alters the balance of risk between client and contractor.

Although plans for trans-European networks (for all forms of transport) are being drawn with increasing precision, problems of public sector deficits and attempts to comply with the convergence criteria for economic and monetary union are severely limiting the availability of public finance for infrastructure investment. As a result, methods are being sought by which to mobilise private capital to help fund construction

of these networks. Generally, the financing of infrastructure projects has become more complex and contractors are increasingly expected to help find the financing for new construction. This increases the range of the risks faced by contractors, but can also provide significant additional demand for construction.

These developments have been taken further by some large contractors and represent a major change in their approach. They are taking the initiative in setting up new construction projects. Various combinations of owning, leasing from government, designing, constructing, operating, and transferring back to governments are being planned and put into practice throughout the EU. Proposals are being worked on by contractors for a wide variety of schemes and types of construction. A common feature, however, is the central importance of finance. Today, large contractors need a sophisticated understanding of finance or, at least, joint venture partners with this expertise.

Another significant change in the market for civil engineering includes a growth in demand for works to protect and improve the environment. Although some civil engineering contractors see environmental issues more as a threat to their work, e.g. because of the success of environmental pressure groups in some European countries in delaying major road building projects, others see environmental concerns as offering a major opportunity to expand their activities. Within the construction industry the civil engineering sector has a special responsibility to find solutions to environmental problems, particularly with regard to preventing pollution of land and groundwater. Civil engineers are also exploring ways of making more use of recycled materials, e.g. in road construction.

While there is increasing emphasis on major projects, where the work is organised and executed by larger civil engineering contractors acting individually or forming joint ventures or consortia, there is also an extensive range of smaller works and maintenance requirements providing employment for smaller contractors.

**Table 1: Civil engineering**  
**Annual production growth in real terms by country**

(%)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 (1)	1995 (2)
EU (3) (4)	0.2	7.1	2.3	7.4	7.5	7.4	9.7	1.0	-3.6	0.1	1.1
Belgique/België	-11.9	-3.1	-7.6	2.2	-12.2	3.9	12.0	10.1	22.1	5.4	5.2
Danmark	N/A	15.2	-3.4	-0.4	4.3	4.6	-14.4	7.3	-6.3	5.1	4.4
BR Deutschland (4)	-0.4	7.3	-1.3	3.4	2.5	1.8	17.0	10.1	-1.1	5.5	1.1
España	N/A	3.0	4.0	20.0	29.0	20.0	9.0	-12.0	-12.0	-1.0	5.0
France	4.4	8.3	7.4	9.8	6.6	2.5	4.0	-4.2	-7.0	-3.0	0.0
Ireland	-16.7	-6.6	-11.2	-2.0	-2.1	6.2	3.0	1.8	14.1	-7.4	N/A
Italia	1.5	10.3	2.5	-2.3	4.3	2.4	-3.5	-6.5	-14.4	-12.0	-5.0
Nederland	3.2	5.5	-2.4	6.9	1.1	3.4	-0.2	3.2	0.8	5.4	3.3
Portugal	-6.7	8.0	7.5	14.8	9.9	8.9	12.5	4.0	3.4	0.0	10.0
United Kingdom	-3.8	3.5	7.4	15.5	3.8	19.8	27.4	5.5	3.1	-6.3	-4.5
Austria	5.2	-1.2	2.0	-3.8	2.3	4.4	4.1	-2.8	1.0	3.9	1.7
Finland	N/A	3.9	-1.1	0.0	7.6	2.0	-6.4	-5.8	-10.1	-8.1	0.0
Norway	-0.7	4.3	12.4	-0.4	-12.6	-3.7	-0.9	2.7	-5.4	1.7	2.0
Sweden	-4.2	-2.4	-3.7	1.7	5.5	3.6	-3.9	1.6	4.0	12.2	10.2
Switzerland	-3.2	0.1	3.1	5.7	2.1	2.7	2.8	3.4	-0.8	0.7	2.2

(1) Estimates.

(2) Forecasts.

(3) Excluding Greece and Luxembourg.

(4) From 1990 onwards including former East Germany.

Source: FIEC (12/94)

## OUTLOOK

- **Transport infrastructure:** There is an increasing need for investment in transport infrastructure to: cope with increasing trade and movement of people in the single market; reduce the cost of transport to European markets from the peripheral regions; promote development and cohesion in the less developed regions; and, reduce the increasing problems of congestion and air pollution in cities. All modes of transport have urgent needs. However, the emphasis in the near future will be on completion of European rail networks and the development of a high speed railway network. Nevertheless, the largest volume of expenditure has to be on upgrading and maintaining the road systems. There are still important missing road links, particularly across the Pyrenees and Alps, and links to Portugal, Ireland and Greece. Major new road corridors are also needed to link up Central and Eastern European centres. In addition, the whole of Eastern Europe has huge road building needs. There will also be increased air traffic, requiring development of the single European system of air traffic control and new airport developments. Furthermore, investment in ports and inland waterways is also being planned. The European Commission is taking an active role in the strategic planning of major EU transport infrastructure projects and in planning links with Eastern Europe. There will be EU financing from the Structural Funds, EIB and, for Eastern Europe, from aid funds such as PHARE and TACIS. Car ownership continues to grow rapidly in the richer EU states; except Denmark. Poorer states will, however, continue to catch up. Consequently, there is growing recognition of and concern over the impact on the environment of road transport. In particular, air pollution caused by growth in the use of cars which has prompted reconsideration of transport and land use planning policies. For the longer term, there will have to be massive investment in improved public transport and people movers requiring separate infrastructure. This may be supported by increased taxation on fuel and cars and increased application of road user charges which will help finance infrastructure and public transport systems.
- **Telecommunications:** It is expected that there will be a rapid increase in telecommunications investment in the next two decades to bring the peripheral regions up to the level of the centre and to cope with the demand for new value-added services, mobile communications and ever increasing electronic data interchange. Currently, most direct investment is in equipment, but it will also generate construction work in towers, cable networks, and in building upgrades.
- **Energy:** The emphasis of energy-related investment for the next two decades will be on energy conservation and reduction of pollution from existing energy sources. There has not been much investment in new power stations in Europe in the past, but investment should continue at a low, increasing level, particularly for replacement of older stations by cleaner energy efficient stations (including gas fired stations). The main energy investment will be in extending the networks of gas pipelines and power transmission networks and their interconnection. A major source of new construction industry demand will come from the rebuilding or decommissioning of nuclear power stations. In Western Europe many nuclear stations are now reaching the end of their useful life and will need replacement in the next decade. More importantly, there is an urgent threat to public safety caused by the nuclear stations in the newly emerging democracies of Eastern and Central Europe. This situation will require a major focus of western aid resources. In many respects, the technology for dismantling and disposing of the materials from these stations does not exist. The size of the civil engineering problem for nuclear waste recycling and radioactive waste repositories, likely to in-

volve deep underground construction, is enormous. In the long term, new alternative energy sources will become important. Wind, wave, tidal and solar power have not been viable up to now because they have very high capital costs (largely construction) and because R&D, which would bring down costs, has not been funded on as large a scale as, for example, nuclear power. However, these energy sources have low or zero fuel and manpower costs.

- **Water:** Total water use is likely to grow, but more slowly than in the past as irrigation and industrial uses are conserved. Nevertheless, average household consumption varies enormously between regions and is likely to continue to increase as living and housing standards rise. Recent problems of drought, flood, and past lack of investment in several member states will lead to increasing investment in water collection, transport and storage. Enforcement of EU water quality directives will require increasing construction for water treatment. Environmental legislation and municipal waste water directives will require continuing increases in waste and effluent treatment for at least the next 20 years.
- **Other environmental needs:** Waste disposal and contaminated land are developing rapidly as sources of future construction work.

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# Industrial plant construction

The European industrial plant construction sector emerged relatively unscathed from the deep recession of the years 1991-93. In 1993, European plant manufacturers, with a world market share of over 50 %, are reported to have won orders to the value of around 70 billion ECU.

The industry's high export ratio makes it very sensitive to all forms of protectionist tendencies. The entry into force (in 1995) of the GATT agreement concluded in the spring of 1994 is therefore essential for this technically forward-looking branch of industry, with its 250 000 employees and the impulses which it imparts to employment in the supplying industries. In view of the already strong international competition, the industry hopes that there will be no further worsening of the accompanying political conditions. Basically, the European industrial plant construction sector is cautiously optimistic with regard to medium-term prospects.

## INDUSTRY PROFILE

### Description of the sector

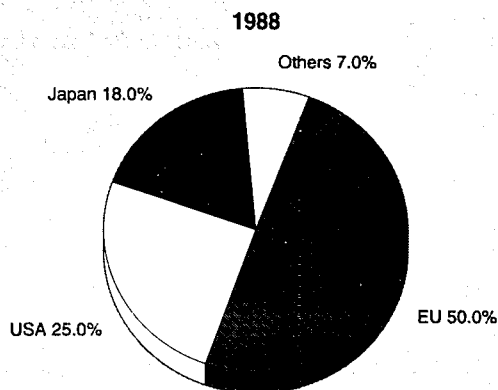
The picture presented by the industrial plant construction industry has two salient features: the large scope of its activities and its international structure.

Depending on the form of the plant contract, what is offered is a combination of constituent parts which are often independent in the function which they perform, such as machinery, appliances, electrical drive units, controls, connecting elements (steel scaffolding/staging, piping, electrical connecting lines) and plant-related building construction and civil engineering. These constituent parts together, on the basis of technical production or operating processes, are used to extract and process basic materials, to perform further processing of primary products, to manufacture end products, to produce and convey goods and to generate and transform industrial energy. The manufacturing of industrial plant is based on extensive know-how concerning production and operating processes, planning and design, manufacture, procurement and supply of equipment, installation and commissioning and also project management.

In addition there are important services which are displaying a tendency for strong growth. Mention may be made, for instance, of financial engineering and the training of the customer's operating personnel. This increasingly involves, in addition to staff training, operation of the plant itself, although this is not the actual field of activity of these firms. Apart from that, plant operation by engineering companies would be quite contrary to their intention to return to the engineer's core functions.

From this point of view, important types of plant are, for instance, power stations, equipment for the chemical industry, plant for the electrical engineering, iron and steel and rolling-mill industries, facilities for environmental protection and plant for the construction and construction materials industry. The international nature of the sector emerges from the fact that the European plant construction industry exports its products to over 100 countries. Although industrial plant construction plays an important part as a standard for measuring a country's state of technical development, there is no uniform way of recording it statistically. The European industrial nations which operate in this field all define plant construction in different ways; in particular, it is difficult to draw the line between it and mechanical engineering. The same applies to the competitors in Japan and the United States. Nevertheless,

Figure 1: Industrial plant construction  
World market for plant-makers, 1994



Source: Europlant

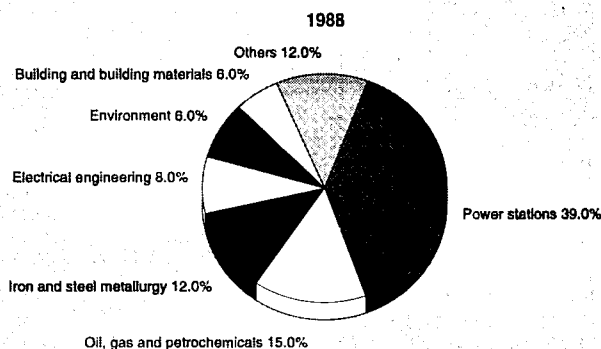
a regular exchange of experience taking place within the framework of the European Plantmakers' Committee (Europlant) makes it possible to gain an overview of the worldwide development of the business.

### Recent trends

At the beginning of the 1980s plant manufacturers were still benefiting from an investment wave based primarily on the abundant supply of oil revenues of a few developing countries. The subsequent collapse to an all-time low was followed again in the mid-1980s by a uniform rise in the volume of orders of about 10 % per year.

The European industrial plant construction sector has emerged comparatively unscathed from the 1991-93 slump. The distribution of orders is not uniform, however, among the industries represented, 39 % of them being in fact accounted for by the building of power stations. Furthermore, the volume is achieved in the case of many projects by means of price concessions which are justifiable only from the point of view of employment in production locations and engineering design offices.

Figure 2: Industrial plant construction  
Breakdown of contracts by industrial sector



Source: Europlant

## International comparison

On the basis of various estimates, the annual volume of contracts awarded for major industrial plants should be in the region of 125 to 150 billion ECU. In view of the lack of statistics, assessment of world market shares in industrial plant construction is chiefly based on estimates. The reliable data which exist for mechanical engineering provide a firm point of reference for this. On the other hand, an industrial nation will be better able to win a world market position in general mechanical engineering rather than in plant construction. Therefore, the number of firms to be taken into account worldwide as suppliers of industrial plant is basically limited to three groups: those in the European Union, the United States and Japan. While newly industrialised countries such as South Korea, India and Mexico are already appearing as serious competitors in individual cases, they still fall short with regard to the range and consistency of what they have to offer. European plant manufacturers probably account for about half of the world market. The United States, based on its immense internal market, takes over a quarter and Japan's share is 17 %.

## MARKET FORCES

### Demand

The overall distribution of orders by sectors is influenced by the fact that the various European suppliers concentrate on different fields of activity. Generally speaking it can, however, be said that the largest proportion of orders, 39 %, is accounted for by power stations, while 15 % of the volume consists of plant in the fields of oil, gas and petrochemicals. On the other hand, the shares of manufacturing of iron and steel metallurgy, electrical engineering and environmental protection equipment have been declining markedly in 1994.

Foreign buyers are prepared to pay for advanced technology only if it is of immediate benefit to customers; there is a latent danger of over-engineering. The share of exports in the volume of orders is 45 %; one fifth of foreign orders come from the European Union. The Asia-Pacific area has developed into the most important market; its relative importance as a customer region has more than doubled over the last five years. Important customer countries have proved to be, during the last decade, those of the CIS, the People's Republic of China, the United States, Iran and India.

From the technical point of view, fewer industrial complexes are now required to be supplied on a turnkey basis. Customers are, on the contrary, more interested in modernisation and rationalisation measures, with a greater emphasis on energy-saving and protection of the environment. The latter cannot be statistically recorded when it relates to integrated environmental protection.

### Supply and competition

International competition is marked by aggressive pricing. This is forcing suppliers, especially those in the European Union with high costs at national level, to look around for more favourably-located customers for their procurement. While this trend has been confined to hardware during the last few years, European plant manufacturers, giving in to cost pressures, have also recently begun to offer engineering services from subsidiaries located in lower-cost countries. The resultant loss of employment for the European Union is considerable.

In addition to price competition, the appreciable deterioration of contract terms is another factor of weakness. The need to maintain order levels, motivated by reasons of employment policy, is prompting many competitors to give unreasonable promises with regard to guarantee periods, performance undertakings, penalties or additional services. A further cost aspect is the shifting of the operator risks to the plant

manufacturer. Furthermore, the patterns of activity of plant operators are often contrary to the optimum division of labour from the economic point of view.

## INDUSTRY STRUCTURE

### Companies

The stringent requests made in industrial plant construction have led to an appreciable thinning-out of suppliers during the last twenty years. Taking part on a sustained basis in lengthy and cost-intensive tendering procedures is now possible only for larger firms, which endeavour, by means of strategic alliances and under international cooperation arrangements, to lower their costs and reduce risks. This can have adverse consequences for mobility and creativity. A number of firms are therefore already adopting restructuring measures aimed at setting up independently operating companies under the umbrella of a coordinating holding company. On the other hand, the European industrial plant construction sector still has a high technical standard and only by maintaining such standards will it be allowed to continue to play a leading international role.

## ENVIRONMENT

Environmental protection aspects are playing an increasingly important role in plant business. Unfortunately, however, many customers have still not realised that the necessary investment in plant may considerably increase the price. Customers are prepared to pay this additional price only if there is obvious benefit to them, because they believe that additional expenditure on environmentally friendly plant does not make any direct contribution to productivity.

A further important problem is the different level of environmental protection in the countries of the European Union, which distorts costs. Suppliers from countries with a proclivity (albeit concealed) towards environmental dumping obtain unjustified competitive advantages in this field.

## REGULATIONS

The European plant construction is co-operating with the European Commission services in order to ensure that European regulations do not harm the activity of the sector.

The Commission is working on the harmonisation of export credit insurance schemes and the seconding of workers of EU-based companies for the provision of services in other EU countries. If these plans come to fruition, they will greatly increase costs. The draft EU construction legislation, too, unfortunately still does not make it clear enough that it is not intended to apply to industrial plant construction. The specific concerns of the industry ought to be taken into account when drafting new legislation, in order to avoid a worsening of the competitive situation.

As a matter of principle, the European plant construction industry is following all the Commission's moves on the trade front. An industry which operates worldwide is dependent on free world trade. From this point of view this branch of industry welcomes the conclusion of the GATT talks. These have created the basis for an unprecedented liberalisation process and a transparent world trade system.

## OUTLOOK

The course of the European plant construction industry's business in 1994-1995 will depend on how well investors in the major branches of industry have been able to cope with the latest recession. The currently favourable worldwide economic conditions ought to boost industrial plant construction too, albeit with a time-lag. Nevertheless, prevailing trends in the

European chemical industry, steel industry and automotive industry are forcing European competitors out into the international markets, where, as in the past, they have to contend with Japanese and American competition.

The hopes of market opportunities in Eastern Europe following the collapse of the traditional political systems have not been fulfilled. There is undoubtedly immense demand here, but it cannot be financed in the foreseeable future without great joint efforts. High expectations are at present directed towards the Asia-Pacific area, especially the People's Republic of China, which, after the political opening-up, offers opportunities particularly to manufacturers of large plant who are willing to commit themselves with cooperation structures and joint ventures. Further potential major markets for the future are South America, the countries of the Middle East and, in principle, all raw-material-producing countries.

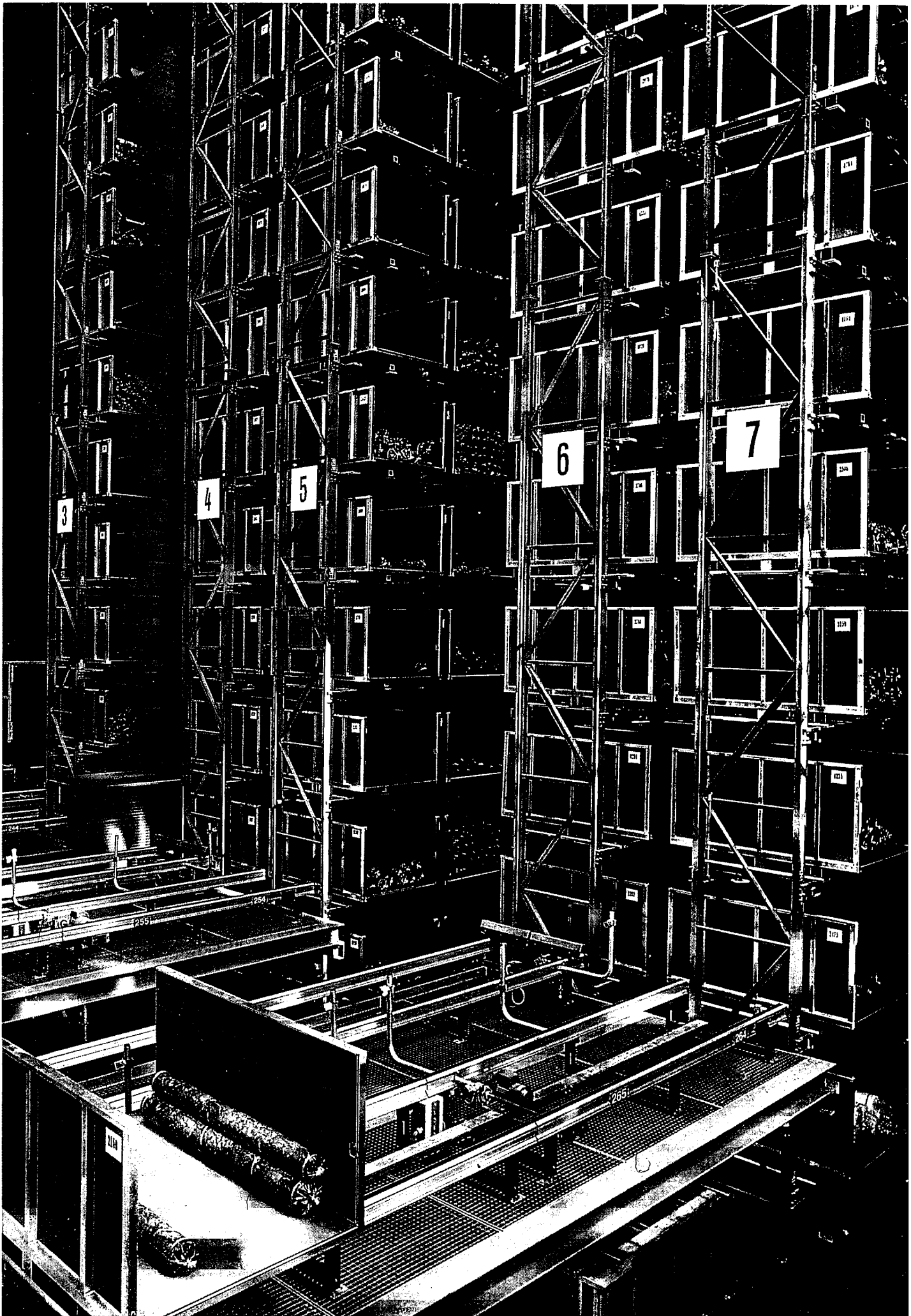
The European industrial plant construction sector is viewing the medium and long term with cautious optimism. It will continue to rank among the European Union's forward-looking industries.

**Written by: Europlant**

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## Overview

### NACE 61-65, 67

*The EU distribution sector is undergoing considerable restructuring. Changes include concentration, reduction in the number of traditional wholesalers, transformations in the retail sector and a tendency towards diversification and internationalisation. Moreover, the future of the distributive trade sector will be influenced by the increasing integration of the internal market and the EEA, the accession of Austria, Finland and Sweden, and the opening-up of Eastern Europe. The sector represents about 14% of output and employment in the European Union. These figures have remained relatively constant over the last ten years, showing that the distribution sector has grown in line with economy.*

### INDUSTRY PROFILE

#### Description of the sector

The industry is divided into two subsectors: wholesale distribution and retail trade.

Wholesale distribution (NACE 61) is defined as "units exclusively or primarily engaged in the resale of goods in their own name to retailers or other wholesalers, to manufacturers and others for further processing, to professional users, including craftsmen, or to other major users".

Retail distribution (NACE 64 and 65) is defined as the distribution to final consumers of:

- food, drink and tobacco;
- dispensing chemicals;
- medical goods, cosmetics and cleaning materials;
- clothing;
- footwear and leather goods;
- furnishing fabrics and other household textiles;
- household equipment, fittings, appliances, hardware and ironmongery;
- motor vehicles and cycles;
- motor fuels and lubricating oils;
- books, newspapers, stationery and office supplies;
- photographic, optical, jewellery and other retail distribution.

These definitions describe the function and product areas characterising wholesalers and retailers. They do not cover the fact that many organisations perform both functions, or that the ownership of wholesalers and/or retailers may reside in operators from another subsector of the supply chain (such as manufacturers), or that manufacturers in some areas carry out their own wholesaling and retailing and are not thus covered by the statistics for the latter sector.

A further important point is that the definition of wholesalers ignores the increasingly wider role that many operators within the sector are playing. For example, the change in manufacturing to tightly-managed production techniques (such as Just-In-Time) means that the whole distribution chain is becoming more sophisticated, and that wholesalers are also taking on functions such as packaging, quality control and administration. None of these is included in the NACE definition, but

they nevertheless affect the contribution to the economy of the sector as well as the profile of the wholesaler.

### INDUSTRY STRUCTURE

There is great change occurring within and between the subsectors of the distribution industry. This change can be summarised as:

- concentration, expressed in terms of a reduced number of larger operators, and closer vertical and horizontal links between manufacturers, wholesalers and retailers, in particular through the creation of networks;
- a general reduction in the number of traditional wholesalers, bearing in mind the fact that the concept of wholesaling seems to have different meanings within different Member States;
- a series of transformations in the retail sector, with significant differences between Member States. Overall a slower increase than before in hypermarkets, a rise in franchising, an increase in cooperation, especially where there already exists a high degree of concentration or further concentration is expected, and a proliferation of forms of distance selling are prominent features;
- a tendency towards diversification of activities into other service areas and some specific moves towards internationalisation.

The concentration phenomenon - the reduction of the number of enterprises - is more evident among both large and small enterprises in northern Member States, including the three new ones, with not only a rationalisation - a reduction in costs - in the direct retail sector, but also the emergence of purchasing groups and voluntary chains to benefit from economies of scale.

There remains a higher number of independent enterprises in the southern Member States although a reduction in their number is almost certain. Also, modernisation strategies continue to bring enterprises together in the form of chains and larger logistical structures in order to make them more competitive.

Wholesaling is often thought of as an activity of the past, in that traditional operators now often find themselves squeezed out either through manufacturers' wish to control distribution themselves or through the large retailer's practice of upstream extension.

However, some forms of wholesaling are on the increase, such as wholesaler-owned voluntary chains and specialist operators who focus on specific end-users (such as schools and hospitals). An increasing number of wholesalers are supplying not only goods and services but in the areas of technical wholesaling and high-value consumer goods, such as home furnishings, are offering complete packages (translated from "Problemlösungen"). In combination with a further expansion of out-sourcing by producers, such complete packages could provide one of the most important long-term opportunities for the survival of wholesaling. "Traditional" wholesaling does survive in raw materials and bulk products because of the logistics involved.

Geographic variance remains of great importance in the structure of the distribution industry. The structure of retailing continues to evolve, with marked differences between the north and the south of the Union. In the north, concentration and larger outlets are the new trends. In the south, smaller shops remain very prominent, although purchasing groups are be-

**Table 1: Distribution  
Main indicators, 1991**

	Wholesale distribution	Dealing in scrap and waste	Agents	Retail trade
<b>Number of enterprises</b>				
Belgique/België	50 043	2 035	20 864	123 848
Danmark	18 704	489	1 141	30 116
BR Deutschland (4)	113 192	4 219	72 269	422 629
Hellas (1, 2)	30 623	303	1 424	185 712
España (2)	46 281	1 850	N/A	454 860
France	84 898	4 480	21 903	399 606
Ireland	3 016	N/A	344	20 901
Italia (3)	114 056	3 955	130 842	536 846
Luxembourg	1 575	34	209	3 544
Nederland	47 553	1 434	N/A	98 154
Portugal (4, 6)	7 252	N/A	816	10 869
United Kingdom	120 412	3 776	1 675	265 828
<b>Turnover (million ECU)</b>				
Belgique/België	110 866	671	5 264	39 530
Danmark	53 643	354	2 128	23 450
BR Deutschland	474 135	5 547	7 505	259 455
Hellas	N/A	N/A	N/A	N/A
España (2)	62 854	N/A	N/A	76 612
France	302 701	3 292	23 965	264 105
Ireland	13 179	N/A	N/A	10 734
Italia (3)	270 456	3 083	22 848	236 957
Luxembourg	4 788	41	460	3 553
Nederland	136 788	2 068	N/A	65 765
Portugal (4, 6)	21 011	N/A	1 537	12 621
United Kingdom	322 139	3 556	1 803	268 421
<b>Number of persons employed</b>				
Belgique/België (9)	184 579	4 322	3 986	181 111
Danmark	170 784	2 296	5 752	199 406
BR Deutschland	1 077 232	16 442	74 713	2 194 285
Hellas (2)	115 422	577	4 038	337 133
España (2)	361 808	6 754	N/A	1 006 867
France	926 559	23 726	69 311	1 873 405
Ireland	41 394	N/A	2 124	109 102
Italia (3)	718 347	13 452	257 146	1 903 632
Luxembourg	10 339	330	633	18 475
Nederland	394 726	7 033	N/A	664 000
Portugal (4, 6)	147 693	N/A	11 940	149 426
United Kingdom	N/A	N/A	N/A	2 335 000

(1) Number of local units

(2) 1988

(3) 1989

(4) 1990

(5) 1992

(6) Covers only enterprises with at least 5 employees.

(7) Excluding pharmacies, including also repair of motor vehicles and bicycles.

(8) Excluding retailing of medical goods, cosmetics and cleaning materials.

(9) Number of employees

(10) Excluding retailing of medical goods, cosmetics, cleaning materials, motor vehicles and fuels.

Source: Eurostat: Mercure

coming increasingly important as independent enterprises re-group in order to survive.

An interesting trend is emerging within the retail sector, whereby,

- networks of multi-function distribution centres (reseaux de centrales distributeurs) are the typical operators in food retailing. In northern Member States, such as Germany, Finland, Sweden and France independent organised commerce is particularly important;
- purchasing groups feature in non-food retailing; and,
- franchises are moving into services (travel, financial services etc.) as well as goods.

Diversification of activities is occurring, whereby producers (typically non-food) set up retail operations, or where retailers offer services such as travel, financial services, restaurants, etc. In several Member States, such as France, the United Kingdom and Germany, discounters continue to grow in importance.

Internationalisation tends to occur towards neighbouring Member States at first because of cultural similarities. Non-food retailers are the operators most prone to internationalisation. The Euro-consumer does not yet exist, even if consumption patterns are moving closer together.

**Table 2: Distribution  
Employment structure, 1992**

(%)	Share of female workers	Share of employees	Share of part-time workers
Belgique/België	47.2	60.8	16.9
Danmark	42.3	85.5	26.8
BR Deutschland	53.7	85.4	21.8
Hellas	34.2	39.5	3.1
España	39.5	56.9	5.2
France	45.4	79.0	12.7
Ireland	38.6	75.0	12.6
Italia	35.6	37.9	6.4
Luxembourg	50.0	86.9	9.4
Nederland	42.1	86.5	35.8
Portugal	37.8	59.6	5.6
United Kingdom	50.0	84.3	34.1
EU	45.2	70.6	18.1

Source: Eurostat: Labour force survey

**Table 3: Distribution  
Volume index of gross value added at market prices**

(Index, 1985=100)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	107.0	100.0	103.0	103.0	106.0	105.0	107.0	113.0	117.0
Danmark	85.0	100.0	106.0	107.0	107.0	103.0	107.0	111.0	114.0
BR Deutschland	98.0	100.0	102.0	103.0	107.0	111.0	120.0	(1) 127.3	N/A
Hellas (1)	91.1	100.0	102.7	102.8	108.1	112.3	112.9	116.9	N/A
España (1)	95.6	100.0	103.5	107.9	112.9	102.9	N/A	N/A	N/A
France	93.0	100.0	103.0	105.0	107.0	111.0	113.0	113.0	113.0
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	91.0	100.0	102.0	107.0	112.0	114.0	117.0	118.0	119.0
Luxembourg	92.0	100.0	104.0	110.0	117.0	129.0	136.0	140.0	139.0
Nederland (1)	98.2	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portugal	105.0	100.0	112.0	120.0	128.0	134.0	125.0	(1) 127.2	N/A
United Kingdom	N/A	100.0	105.0	112.0	119.0	124.0	122.0	118.0	N/A

(1) Estimate

Source: Eurostat: National Accounts

**Table 4: Distribution  
Gross value added at market prices**

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	11 433	14 208	16 814	18 345	18 928	19 738	22 597	24 130	25 643
Danmark	5 766	10 075	11 103	11 241	11 011	11 426	12 209	12 760	13 705
BR Deutschland	61 585	81 786	88 432	93 867	98 766	103 089	118 575	130 116	N/A
Hellas (1)	3 308	5 110	4 778	4 640	5 091	5 577	5 739	6 133	N/A
España	21 605	31 024	33 173	35 242	40 233	47 443	54 578	N/A	N/A
France	58 166	85 688	93 278	97 226	102 192	110 449	119 396	121 806	126 591
Ireland	1 152	2 172	2 170	2 254	2 171	2 837	3 528	3 289	N/A
Italia	50 053	89 813	98 507	105 603	112 417	123 118	132 131	143 248	145 317
Luxembourg	471	643	682	736	792	896	990	1 049	1 080
Nederland	14 794	19 969	22 962	24 310	25 213	26 568	28 975	30 498	31 910
Portugal	3 590	5 455	6 010	6 255	6 906	7 889	8 061	(1) 9 525	N/A
United Kingdom	44 293	68 782	69 621	69 512	85 398	85 919	86 820	93 231	89 377
EU (1)	276 211	414 705	447 542	469 219	509 107	544 938	593 591	627 611	660 651

(1) Estimate

Source: Eurostat: National Accounts



## Impact of the Single Market

Recently, the EU distribution sector has undergone considerable restructuring. Thus, concentration, expressed in terms of the number of large operators and vertical links between manufacturers, wholesalers and retailers, has increased in the sector. Moreover, a tendency towards diversification of activities into other service areas and into new geographical markets has been observed.

In this context, European market integration has created a need for Europe-wide distribution networks. The Community's actions in the transport, competition, investment, structural funds and enterprise policy areas are helping this to come about. However, operators in the distributive sector face two conflicting pressures in trying to meet the challenge. Firstly, the concentration and integration in the distributive sector, encouraged by cost reductions following the completion of the Internal Market, have forced operators in the sector to seek cross-border opportunities. Secondly, there is still a requirement to respect local culture in the delivery of services. In the future, the top priorities of the sector are that the consumer protection and social legislations should take into account the specificities of companies in this sector.

## REGIONAL DISTRIBUTION

The most obvious influence of geography on the sector is in the different definitions of what a wholesaler is and in the role of the small retail outlet.

In Germany, for example, wholesaling tends to be thought of as the distribution and procurement activity of manufacturers. In France, the tendency of manufacturers to subcontract sales activities and of retailers to subcontract buying, results in wholesaling being seen as a large growth sector. The Dutch import-export agencies, which are major economic operators, contribute to that country having the feeling that the sector is dynamic, while in the United Kingdom, a more restrictive view is taken, namely that of the old-style "middle man" between manufacturer and retailer, now in decline.

Taking these differences of perception into account, the major feature of geographical variance in wholesaling is that the northern Member States exhibit much more evidence of a blurring of activities between manufacturer, wholesaler and retailer than do those in the south.

For retailing, countries in the two main groups - Mediterranean and Northern Europe - may have similar sales formats, but these may not be at the same stage: concentration in retailing is thus correlated with the level of economic development of the Member State, except for Italy, which retains its high number of small shops. Franchising, cooperation networks in general, discount shops and non-shop retailing are also notable for some geographic variance, explained in the monograph on retail distribution.

## ENVIRONMENT

Traditionally, the distributive trades have been seen as purely intermediate functions, only operating in response to supply impulses, and therefore not at all involved in the environmental debate. This view, however, is set to change. Distributors, especially purchasing centres in the retail sector, are increasingly playing a pivotal role in translating trends in consumer preferences into final demand and are thus able to boost the sales and the production of so-called "eco-goods". In some Member States, such as Germany, this is particularly the case.

Moreover, more and more distributors are taking on new functions, including packaging. This activity entails a series of environmental issues which has to be taken into account by the sector.

## OUTLOOK

The changes inherent to the sector itself (concentration, increased use of technology, segmentation, vertical and horizontal integration and diversification) must be seen together with extraneous developments such as the entering into force of the internal market on 1 January 1993, the potential opening-up of East European markets and changes in consumption patterns as a result of ageing population structures.

While the achievement of an integrated EU market will require a European distribution system (and the Community's actions in the transport, competition, investment, structural funds and enterprise policy areas are helping this to come about), operators in the distributive sector face two conflicting pressures in seeking to meet the challenge. The first is the increased competition from other Member States as the concentration and integration in the sector, encouraged further by cost reductions following the completion of the Internal Market, forces them to broaden their horizons and seek cross-border opportunities. The second feature is the continuing requirement to respect local culture in delivery of services, a feature which reduces the scope for rationalisation and internationalisation.

Accordingly, there is a growing awareness among small, independent enterprises that their position can only be defended by their working together in groups, whatever form such co-operation may take.

Another key element may thus be effective streamlining of operations through technology, enabling the operator to carry out more activities at an overall higher level of sophistication. Electronic Consumer Response (ECR), Electronic Data Interchange (EDI), Electronic Point-of-Sale (EPOS), and Direct Product Profitability (DPP) techniques are used widely as essential tools in upgrading activities. The use of multimedia will also play an increasingly important role.

The problem is, of course, for smaller players, who may find that the required investment in technology is too great for them to support. Again, through cooperation, they are able to benefit from the services offered by the group to which they belong and participate in such technologies.

The opportunities created for logistics planning and management by the abolition of internal frontiers should contribute to expansion in physical distribution activities. Taken together with the liberalisation in road transport, this area should see major change. This will in turn produce a situation where distribution strategies will influence consumption patterns and where marketing activities typically performed by manufacturers may be taken on by distributors and traders.

Lastly, as consumer spending on retail goods has not yet returned to pre-recession levels, the battle for market shares will be reinforced and therefore influence the present structure of the industry. Perspectives for growth of private consumption remain modest because real disposable income might come under pressure from falling employment, continued wage moderation, higher taxes and social security contributions which will constrain output growth of the distributive trades in consumer markets. On the other hand, export orientated wholesales (capital goods) are expected to rebound strongly. Cost structures are forecast to change in the coming years as retailers attempt to reduce costs mainly by improving the efficiency of their operations, perhaps, for example by cutting unit labour costs by removing levels of management. Food retailers are likely to take the lead in the process.

Written by: European Commission, DGXXIII

# Wholesale trade

## NACE 51

Wholesale trade represents 20 % of commercial firms, accounts for 32 % of persons engaged in trade and employs 3.3 % of the working population in the European Union. Its turnover represents 58 % of the trade sector. It accounts for a substantial proportion of the import and export trade of every Member State. It is a dynamic sector as regards employment. Its continuous expansion (apart from the food sector) depends on how it adapts and above all on how it develops in the functions which it performs and the services which it offers (logistics, trading functions, financial and technical services).

### INDUSTRY PROFILE

#### Description of the sector

Wholesale trade embraces all purchasing and temporary storage activities relating to goods which are to be resold generally in large quantities to professional users and retailers, to the exclusion of final consumers. The sector embraces firms and intermediaries operating in the fields of foodstuffs, non-food consumer goods and products which are to be processed (fuels, ores, chemical products etc.). Its intermediate position makes it dependent on the general trend of the branches of which it forms part: industries producing consumer goods and retail trade (in the case of wholesale trade in food or non-food goods); sectors of activity consuming or using intermediate products or equipment (in the case of other wholesale activities).

Wholesale trade occupies an important position in the economy of the European Union and in service activities. In 1991, it comprised: 637 605 firms, or 20 % of commercial firms, and 7.3 % of all firms. The sector's turnover amounted to 1 772 million ECU (not including Greece), or 58 % of trade. Its wage and salary earners numbered 5 069 883, or 32 % of the total workforce employed in trade and 3.3 % of the EU's working population. Economically, four countries (Germany, the United Kingdom, France and Italy) account for over 80 % of EU wholesale trade.

#### Recent trends

Between 1981 and 1990 the average annual growth rate of GDP was between 1.5 % and 3.0 % in the various EU Member States (excluding Ireland). During the same period the average annual growth rate of industrial output ranged from 1.1 % to 4.1 % (excluding Ireland). The 1990s have witnessed a gradual slowing of the EU economies. Some recovery is observable in 1994.

#### International comparison

The wholesale trade does not have the same relative weight in the three major world economic areas. Its weight is particularly great in Japan, where intermediary trade has always occupied a larger place than in Europe and the United States. This difference can also be seen in the weight of the wholesale food trade in the sector (1987-88).

#### Foreign trade

Wholesale trade has a pronounced international function. Although it is not possible to assess its statistical extent at EU level, it should be noted that wholesale trade is an important element in both imports and exports. In France, a survey carried out by the Direction du Commerce Intérieur shows that 12 % of the turnover of the wholesale trade sector comes from exports (involving 32 % of the firms in the sector).

### MARKET FORCES

#### Demand

Demand is affected by two main factors:

- the wholesale food trade is tending to decrease in all countries where large-scale distribution occupies a dominant position in wholesale trade. The supply function of wholesale trade is declining, more generally, in all countries characterised by increased concentration of retail trade;
- the customer base of the wholesale trade does not have the same structure in all the sectors concerned. While two-thirds of the sales of the wholesale food trade go to resellers (central purchasing bodies and retailers) and one-third to professional users (producers or collective bodies), the proportion is reversed for the wholesale non-food trade: one-third to resellers and two-thirds to professional users.

**Table 1: Wholesale trade**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	50 043	110 866	(4) 184 579
Danmark	18 704	53 643	170 784
BR Deutschland	(3) 113 192	474 135	1 077 232
Hellas (1)	(5) 30 623	N/A	115 422
España (1)	46 281	62 854	361 808
France	84 898	302 701	926 559
Ireland	3 016	13 179	41 394
Italia (2)	114 056	270 456	718 347
Luxembourg	1 575	4 788	10 339
Nederland	47 553	136 788	394 726
Portugal (3, 6)	7 252	21 011	147 693
United Kingdom	120 412	322 139	N/A

(1) 1988

(2) 1989

(3) 1990

(4) Number of employees

(5) Number of local units

(6) Covers only enterprises with at least 5 employees.

Source: Eurostat; Mercure



**Table 2: Wholesale trade  
Employment structure, 1992**

	Share of female workers	Share of employees workers	Share of part-time (%)
Belgique/België	32.7	74.7	8.0
Danmark	32.2	87.5	15.1
BR Deutschland	37.9	91.0	12.2
Hellas	27.3	63.5	2.5
España	25.0	78.7	2.7
France	32.2	92.8	5.1
Ireland	24.0	84.4	4.8
Italia	29.2	57.9	4.6
Luxembourg	34.7	94.4	5.6
Nederland	25.9	91.6	15.3
Portugal	26.7	72.9	3.5
United Kingdom	31.2	88.9	12.4
EU	31.4	83.9	8.6

Source: Eurostat: Labour force survey

### Supply and competition

The position as regards competition varies considerably between the sectors of activity in which wholesale trading is involved. The degree of concentration of the wholesale trade varies greatly according to the degree of concentration of the customer base. While the wholesale trade serving craft undertakings and small businesses consists mainly of small independent businesses, that serving medium-sized or large businesses is much more concentrated. The first case involves short-range trading depending on the local density of the clientele. In the second case the type of distribution involved is more modern and the competitive challenges are more complex.

### Production process

Traditionally, the intermediate position of the wholesale trade has involved three types of functions:

- a complete logistical function comprising transport, storage, packaging of the products to be resold or processed,
- an intermediate financial function, financing storage and assuming responsibility for part of inter-firm credit,

- a function of dissemination of information between the producer, the reseller and the processor.

These traditional functions are now changing significantly. Several points should be noted in this connection:

- Wholesale trade in the food sector is becoming less important, but appears to be becoming increasingly international, with a growing proportion of its activity being focused on the distribution of imported products. The role of supplying the retail trade remains strong in the fresh produce sector (fruit, vegetables, fish, meat), where it is also accompanied by an internationalisation of export activity.
- Wholesale trade in non-food consumer goods has also seen a decline in its role of distribution to the retail trade, with the concentration of the latter and the growing role of procurement centres, which buy direct from producers. This applies particularly to maintenance and clothing products and footwear. On the other hand, this sector is still essential for the perfumery, pharmaceuticals and stationery business.

**Table 3: Wholesale trade  
Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	166 504	155 144	158 823	164 112	172 654	177 211	181 450	184 579
Danmark	138 765	155 532	161 355	166 476	163 061	158 885	158 977	N/A
BR Deutschland	975 480	900 424	916 733	936 801	956 600	975 110	1 012 202	1 073 836
Ellada (1)	N/A	N/A	N/A	N/A	115 422	N/A	N/A	N/A
España	N/A	N/A	N/A	N/A	313 885	N/A	N/A	N/A
France	885 056	849 603	843 971	855 006	879 835	910 107	899 858	886 804
Ireland	N/A	N/A	N/A	N/A	38 005	N/A	N/A	40 086
Italia (1)	N/A	N/A	N/A	N/A	679 571	718 347	N/A	N/A
Luxembourg	7 634	7 800	7 976	8 251	8 610	9 112	9 617	9 704
Nederland	N/A	N/A	N/A	N/A	306 836	321 116	337 369	352 614
Portugal (2)	N/A	N/A	N/A	136 238	144 899	154 331	146 375	N/A
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Number of persons employed

(2) Covers only enterprises with at least 5 employees.

Source: Eurostat: Mercure



**Table 4: Wholesale trade  
International comparison, 1990-91**

	EU (1)	Japan (2)	USA (3)
Number of enterprises	637 605	475 967	466 700
Share of total number of enterprises (%)	20	24	23
Number of employees	5 069 883	4 773 000	6 073 000
Share of trade employment (%)	32	41	24
Turnover (million ECU)	1 772	2 651	1 260

(1) Eurostat: Mercure

(2) Japan Statistical Yearbook

(3) US Census of Wholesale Trade

Source: Eurostat: Mercure

Many concentrations have taken place in this type of wholesale trade in recent years.

- Inter-industry wholesale trade is, on the other hand, growing steadily. Its role as intermediary between producers is strengthening with the adoption of new functions:
- Wholesale trade is tending to enlarge its role of marketing of finished or semi-finished goods intended for processing firms. Its selling techniques have developed considerably, and include mail-order selling from catalogues and telephone sales.
- Its logistic functions are diversifying, to include stock management or procurement for third parties, maintenance and after-sales services. In some fields the wholesaler is the guarantor of the service offered to the final user.
- Wholesale trade can also include participation in industrial activities. In the timber sector, wholesalers undertake drying, planing and pre-cutting operations.

- In some cases wholesale trade even includes still more specific services: installation, training of users, financing of retail facilities (as in the beverages sector), etc.

- The development of the wholesale trade in the branches of activity in which it is involved is accompanied by changes in structures, management methods and the use of information systems (development of links between the customers' and suppliers' systems).

The separation between the retail trade and the wholesale trade is furthermore tending to become less clear-cut in a number of cases:

- in the case of goods for mass consumption we are witnessing the formation of large groups engaging in both retail and wholesale trade. Similarly, in the inter-firm wholesale sector, some firms are subsidiaries of industrial groups;
- the wholesale trade is opening up to individual customers in some countries. In France, especially, wholesalers of

**Table 5: Wholesale trade  
Largest wholesale companies by country**

	Company	Number of employees	Turnover (million ECU)
Belgique/België	Fina	504	1 214
	Makro	2 600	937
Danmark	N/A	N/A	N/A
	Stinnes AG	34 687	12 500
BR Deutschland	Haniel & Cie	32 989	9 200
	Thyssen Handelsunion	28 701	7 200
	N/A	N/A	N/A
Hellas	N/A	N/A	N/A
España	Coop. Farmaceutica	576	836
	Makro Mayorista	2 065	637
France	Pinault	N/A	5 990
	Sonepar	N/A	3 317
Ireland	Musgrave Ltd	660	539
	Walsh & Sons Ltd	15	497
Italia	RHIAG	272	79
	Melchioni	222	110
Luxembourg	Trade Arbed	212	57
	Aral	14	56
Nederland	Otra N.V.	5 183	1 450
	Hagemeyer	5 254	1 650
Portugal	Makro	80	413
	EPAC	1 101	335
United Kingdom	Booker Belmont	9 382	2 130
	Makro Selfservice	8 362	780
	Palmer & Harvey	3 007	1 410

Source: Panorama 1994



building materials and supplies for the home have opened up significantly to the do-it-yourself market.

The same is happening in the sectors where cash and carry firms, initially confined to professional customers and then gradually opened to individual customers (footwear, clothing, equipment for the home), have developed.

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## INDUSTRY STRUCTURE

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### Companies

The numbers employed in this sector are rising in most Member States of the European Union. The number of wage and salary earners rose by between 5 and 15 % in the main EU countries between 1988 and 1991.

The level of concentration of the wholesale trade in Europe is illustrated by the emergence of large groups and firms.

### Strategies

Mergers, acquisitions and alliances have become more and more numerous during the last five years in the pharmaceutical products distribution sector, in the wholesale food trade sector and in the building materials sector. Several developments should be noted in this connection:

- an internationalisation of big wholesale firms within the EU
- an even greater concentration in the case of suppliers to large firms (iron and steel products, for instance)
- increasingly frequent incorporation of retail trading (e.g. the Metro group or the Pinault group).

### Impact of the Single Market

Wholesale distribution represents a key factor for many industries, as it provides the integration of different added value functions that have to be performed to distribute products from manufacturer to users such as catalogue composition, sourcing, storage, assembly, re-packaging, distribution, support and financial services.

The common market has been globally positive so far for this sector. Measures reducing delays and transport costs are of obvious benefits to the sector. This has been the case with the abolition of controls at internal frontiers to achieve free movement of goods, and with the liberalisation of transport and telecommunications. Moreover, measures of technical harmonisation such as uniform standards in sizes, weight, qualifications, safety, hygiene and veterinary requirements will simplify and facilitate trade and allow economies of scale. Besides, the legislation on environment protection is relevant to the sector as the activities in this sector includes activities such as butchers, and also results in packaging wastes.

- The creation of the Single Market has created a need for European wide distribution networks. However, operators in the distributive sector face two conflicting pressures in trying to meet the challenge. Firstly, the concentration and integration in the distributive sector, encouraged further by cost reductions following the completion of the Internal Market, have forced the operators in the sector to seek cross-border opportunities. Secondly, there is still a requirement to respect local culture in the delivery of services. In addition, the regulation on consumer protection and social issues has not taken enough into account the ability of the EU companies to achieve ever increasing standards. A simplification or better explanation of the legislation would address this problem. Another top priority for the sector is the Community's external policy, due to the growing importance of this sector internationally.

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## REGIONAL DISTRIBUTION

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The wholesale trade is located geographically in the main centres of activity and consumption in the largest EU countries. With the growing role of large wholesale firms in imports and exports, an increasing number of establishments of these firms are being sited in the hinterlands of the main EU ports, chiefly in Northern Europe: Belgium, the Netherlands and Germany.

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## ENVIRONMENT

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The wholesale trade is subject to the same constraints as the sectors of activity from which it buys and those which compose its clientele. Many national professional organisations have technical agencies which draft quality recommendations or charts for use by their members. They distribute, in varying quantity, data and information designed to make the markets more transparent.

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## REGULATIONS

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The wholesale trade is subject not only to all national or EU regulations concerning trade but also to those concerning specific types of products (regulations on foodstuffs, pharmaceutical products etc.). With regard, more specifically, to Community rules, the wholesale trade has to comply with all provisions forbidding concerted practices: concertation between a number of undertakings and practices which have restrictive effects on competition and especially on prices.

The foreign trade activity of the wholesale trade might be affected by new EU legislation resulting from the implementation of the GATT's Uruguay Round.

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## OUTLOOK

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The wholesale trade will be affected by several trends during the period 1994-97:

- a diminished presence for the wholesale food trade, which will at the same time do more for its customers;
- a growth in turnover of the sector similar to the GDP forecasts;
- a further concentration of the sector, particularly in the area of supplies for industry.

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The industry is represented at the EU level by: FEWITA, founding member of EuroCommerce. Address: rue Froissart 123-133, B-1040 Brussels; tel: (32 2) 230 5874; fax: (32 2) 230 0078; and Comité Européen de Liaison des Commerces Agro-Alimentaires (CELCAA). Address: Rond Point Schuman 9, Bte 4, B-1040 Brussels; tel: (32 2) 230 9970; fax: (32 2) 230 4323.

# Retail trade

## NACE 52

Retail trade occupies an important place in the European economy. It comprises 80 % of commercial undertakings and 26 % of all businesses. The numbers employed represent 68 % of the commercial sector as a whole and 7 % of the working population. Two trends are changing the sector: increased concentration, highlighted by the size of the large distribution groups, and the growth of independent organised trade, accompanied by increased Europeanisation and even internationalisation. As a result of this development relationships between industry and commerce are undergoing major changes.

### INDUSTRY PROFILE

#### Description of the sector

Retail trading comprises all activities involving the purchase of goods for resale to the end consumer or user, generally in small quantities and without significant processing.

The retail trade is a vital element in the economy of the European Union and in the service sector. In 1991, it comprised 2 552 913 undertakings or 80 % of commercial undertakings and 26.1 % of all businesses. The sector's turnover was ECU 1.261 million or 42 % of commerce as a whole. Numbers employed amounted to 10 971 842 or 68 % of commercial employees and 7 % of the working population. The development of this sector depends more and more directly on retailable consumption. The development of purchasing power plays an important role in this, but other phenomena, too have become increasingly important. Since 1991 there has been a decline in consumption, the causes of which are not solely economic. Conversely, the relative revival of growth in 1994 has not been accompanied by a real revival in consumption. This trend of consumption is also partly attributable to socio-cultural factors.

#### Recent trends

The national markets which make up the single European market vary widely. In 1990, the standard of living (Source: Eurostat) was half as high in Greece, Ireland and Portugal, on the one hand, as in France, Germany, Italy and the United Kingdom, on the other. Consumption per head of population varies in the same proportion (around 5 000 ECU in Greece, Portugal and Ireland and 9 000 to 10 000 ECU in Germany, France, Italy and the United Kingdom). The share of retailable goods in total consumption varies even from country to country. Even within this retailable consumption, the proportion of expenditure under different headings (food, clothing, domestic equipment, etc.) varies significantly from country to country. In countries like Greece, Portugal and Ireland, with a low standard of living, food still accounts for 40 % of retailable consumption (which represents 65 % of total consumption) whereas in countries like Germany, France, Belgium and the Netherlands, it accounts for 16 to 19 % of retailable consumption (which represents slightly over 50 % of total consumption).

#### International comparison

Retail trade continues to be largely marked by its national features. The internationalisation of retailing groups is slower than that of the industrial groups which are their suppliers. Few examples are to be found of the establishment of retailers outside their country of origin before the 1970s. Today, ten groups achieve over 30 % of their turnover outside their country of origin (EU and other countries). All the other major groups have an international turnover of below 30 %, or even below 20 %. Two phenomena, on the other hand, are tending to involve the retail sector in international trade (in other words, cross-border trade):

- its increasingly diversified purchases, including outside the EU (often via specialised subsidiaries);
- the emergence of EU-wide shopping centres.

**Table 1: Retail trade**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	123 848	39 530	(1) 181 111
Danmark	30 116	23 450	199 406
BR Deutschland	(4) 422 629	(4) 259 455	2 194 285
Hellas (2)	(5) 185 712	N/A	337 133
España (2)	454 860	76 612	1 006 867
France	399 606	264 105	1 873 405
Ireland	20 901	10 734	109 102
Italia (3)	536 846	236 957	1 903 632
Luxembourg	3 544	3 553	18 475
Nederland (6)	98 154	65 765	664 000
Portugal (4, 7)	10 869	12 621	149 426
United Kingdom (8)	265 828	268 421	(9) 2 335 000

(1) Number of employees

(2) 1988

(3) 1989

(4) 1990

(5) Number of local units

(6) Excluding pharmacies, including also repair of motor vehicles and bicycles.

(7) Covers only enterprises with at least 5 employees.

(8) Excluding retailing of medical goods, cosmetics and cleaning materials.

(9) Excluding retailing of motor vehicles and motor fuels.

Source: Eurostat; Mercure



**Table 2: Retail trade  
Employment structure, 1992**

	Share of female workers	Share of employees workers	Share of part-time (%)
Belgique/België	58.1	55.6	21.2
Danmark	55.4	85.6	38.0
BR Deutschland	64.3	84.5	27.0
Hellas	41.6	30.5	3.3
España	50.2	49.6	6.4
France	54.3	73.3	16.8
Ireland	47.5	73.6	16.0
Italia	37.0	33.7	6.8
Luxembourg	58.5	83.0	11.3
Nederland	57.5	83.5	52.2
Portugal	47.0	54.4	6.4
United Kingdom	59.5	85.0	42.9
EU	53.3	66.2	22.3

Source: Eurostat: Labour force survey

**Table 3: Retail trade  
Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990
Belgique/België	159 497	158 848	160 306	164 992	172 233	176 761	180 112
Danmark	167 849	182 095	188 404	191 696	183 989	181 139	180 455
BR Deutschland	1 692 620	1 622 630	1 634 319	1 671 973	1 709 471	1 732 034	1 791 160
Ellada (1)	N/A	N/A	N/A	N/A	337 133	N/A	N/A
España	N/A	N/A	N/A	N/A	501 815	N/A	N/A
France	1 204 658	1 210 788	1 220 267	1 247 913	1 438 837	1 493 675	1 485 853
Ireland	N/A	N/A	N/A	N/A	74 467	N/A	N/A
Italia (1)	N/A	N/A	N/A	N/A	1 896 331	1 903 632	N/A
Luxembourg	12 047	13 257	13 468	13 826	14 493	15 033	15 569
Nederland (2)	N/A	N/A	N/A	N/A	422 873	440 140	508 309
Portugal (3)	N/A	N/A	N/A	121 335	N/A	162 102	147 922
United Kingdom (1, 4)	2 363 000	N/A	2 300 000	2 287 000	2 309 000	2 428 000	2 435 000

(1) Number of persons employed

(2) Excluding pharmacies, including also repair of motor vehicles and bicycles.

(3) Covers only enterprises with at least 5 employees.

(4) Excluding retailing of medical goods, cosmetics, cleaning materials, motor vehicles and fuels.

Source: Eurostat: Mercure

**Table 4: Retail trade  
Changes in retail sales volume (1)**

(%)	1985	1986	1987	1988	1989	1990	1991	1993
Belgique/België	1.6	4.2	1.6	-0.8	5.0	3.3	-1.2	-4.5
Danmark	1.1	2.6	-3.3	0.6	-0.7	0.5	2.3	0.7
BR Deutschland (2)	N/A	2.5	3.6	2.9	1.8	8.9	5.1	-4.1
Hellas	-2.5	-2.7	5.3	17.5	-0.7	-2.1	-6.2	-3.6
France	0.8	3.7	2.7	4.7	2.9	1.9	0.3	1.4
Ireland	1.8	-0.5	-1.4	2.1	4.8	2.7	-0.2	1.7
Italia (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7
Luxembourg	-0.3	2.8	4.9	2.9	2.4	1.7	2.3	2.7
Nederland	0.4	2.5	3.2	1.7	4.3	4.9	2.0	0.2
United Kingdom	4.6	5.3	5.9	6.3	2.0	0.8	-1.0	3.5
EU (4)	N/A	N/A	N/A	N/A	2.3	3.8	1.4	-0.3
USA	N/A	N/A	N/A	N/A	2.6	-0.9	-1.4	4.1
Japan	N/A	N/A	N/A	N/A	5.5	6.6	0.6	N/A

(1) Based on gross index (not seasonally adjusted).

(2) Data covers only former West-Germany.

(3) Includes only enterprises with at least 10 wage and salary earners.

(4) Weighted average of countries with comparable indices.

Source: Eurostat: Monthly bulletin on Services and transport

**Table 5: Retail trade  
International comparison**

	EU (1)	Japan (2)	USA (3)
Number of enterprises	2 552 913	1 519 186	1 529 700
Share of total number of enterprises (%)	80	76	77
Number of employees	10 971 842	6 936 000	19 527 000
Share of trade employment (%)	68	59	76
Turnover (million ECU)	1 261	682	1 350

Source:

(1) Eurostat: *Mercure*

(2) *Japan Statistical Yearbook*

(3) *US Census of Wholesale Trade*

## MARKET FORCES

### Demand

Demand is affected by several phenomena. It is considered nowadays that the development of demand is governed by four factors:

- the level of household consumption;
- the movement of prices: between December 1993 and November 1994, this movement differed in the largest EU countries: +2.7 % in Germany, +1.6 % in France, +3.7 % in Italy, EU average +2.6 %;
- unemployment rate: 6.2 % in Germany, 11.3 % in France, 12 % in Italy, 9.1 % in the United Kingdom, EU average 6.1 %;
- the development of GDP.

### Supply and competition

The dominant feature is the growing concentration of distribution groups, together with the development of trading in large stores. The progress of this form of distribution is not the same everywhere. It is much more advanced in the countries of northern Europe and in France. It is also beginning to affect Italy, Spain, Portugal and Greece. Wherever large-scale retailing has increased, traditional small-scale retail trade has declined.

SMEs can only be competitive if they discover new niches or cooperate in buying groups, franchises or voluntary chains.

With regard to the structure of retail trade, the relative extent of its various forms within the European Union differs from country to country. Three phases can be distinguished in the

development of retailing, each characterised by a specific balance of power between the retail trade and its industrial suppliers

- a phase with traditional trade domination, and industrialists in a position of strength in dealings. This is the case at present particularly in Greece and Portugal.
- a phase with modern retailing emerging and gradually beginning to impose new rules of the game (especially in the food sector). This is the case at present in Italy and Spain.
- lastly, a phase of consolidation of large-scale retailing (including the non-food sector). The relationships between industry and retailing sometimes involve conflicts, but may also be characterised by the emergence of new forms of cooperation. This is now the situation in France, Germany and the United Kingdom.

### Production process

The most fundamental development in the field of retailing has been the growth of information systems comprising both the processing of management data and also all logistical operations upstream of selling.

This phenomenon is highlighted by the growth in the number of points of sale equipped with terminals with bar-code readers.

## INDUSTRY STRUCTURE

### Companies

In recent years, total numbers employed in this sector have been growing in most of the Member States of the European Union. They increased by between 2 and 25 % between 1988

**Table 6: Retail trade  
Large food stores - Number of hypermarkets and superstores of 2500 m<sup>2</sup>+**

(units)	1981	1986	1987	1988	1989	1990	1991	1993
Belgique/België	79	88	88	N/A	98	98	98	98
Danmark	N/A	13	13	14	13	14	14	N/A
BR Deutschland	821	952	956	N/A	982	996	1 004	1 185
España	31	59	69	79	86	102	116	157
France	433	599	651	687	743	790	849	945
Ireland	3	N/A	4	N/A	5	N/A	N/A	N/A
Italia	12	N/A	43	49	64	86	103	(1) 165
Luxembourg	39	35	N/A	36	N/A	40	N/A	N/A
Nederland	4	6	7	8	16	18	20	N/A
United Kingdom	279	432	457	500	578	644	733	861

(1) 1994

Source: IFS



**Table 7: Retail trade**  
**Number of EAN scanning stores**

(units)	1981	1983	1985	1987	1989	1991	1992
Belgique/België	N/A	12	115	278	648	1 147	(1) 2 250
Danmark	N/A	N/A	14	107	530	1 300	1 800
BR Deutschland	23	69	290	966	2 252	7 260	9 773
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	4
España	N/A	2	36	188	912	5 039	8 180
France	2	37	420	1 626	3 471	6 650	10 000
Ireland	N/A	N/A	N/A	10	30	101	169
Italia	9	13	20	550	1 250	3 690	5 500
Luxembourg	N/A	N/A	N/A	17	18	20	-1
Nederland	1	36	137	386	740	1 100	1 750
Portugal	N/A	N/A	N/A	N/A	83	269	N/A
United Kingdom	7	42	160	793	2 792	6 043	9 000
EU	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) For 1992-1993, Luxembourg is included under Belgique/België.  
Source: EAN

and 1991 in the main EU countries. However, more recent estimates show that employment in the sector has started to decrease.

The level of concentration of trade is evident from the emergence of large retailing groups in the various Member States of the EU.

### Strategies

The strategies of the retailing groups are formulated in terms of several parameters:

- the reference market, which is defined geographically. It is thus possible to distinguish national strategies (aimed at one or more national markets) and international strategies (centred on the European market as a whole or on markets outside Europe)
- a level of diversification, while remaining within the basic profession, particularly through the creation of new spe-

cialised chain stores or going outside the basic profession (creation of joint ventures in other sectors of activity, with incorporation of upstream activities)

- lastly, a price policy ranging between two extremes: value enhancement through sharp differentiation of what is offered, especially in terms of associated services, or, at the opposite extreme, strategies of domination through prices, as exemplified by discount and hard-discount practices.

Also worthy of mention, side by side with the move towards concentration highlighted by the emergence of big groups, is the considerable growth in franchise trading (which is giving a stimulus to some sectors of traditional trade). At the beginning of 1993 the European Union had 2 216 franchisers with a total of 111 340 franchise-holders (or over 4 % of points of sale).

**Table 8: Retail trade**  
**Largest retail based organisations in the EU by turnover, 1992**

Company	Country (million ECU)	Turnover 1991/92 (%)	Change	Sector
Tengelmann	D	21 568	1.2	Food
Rewe-Handelsgruppe	D	18 485	1.6	
Carrefour	F	17 838	24.3	Food
E. Leclerc	F	15 533	20.7	
J. Sainsbury	UK	13 213	20.9	Food
Promodès	F	12 822	17.4	Food
Groupe Pinault-Printemps	F	10 695	106.0	Dept. store
Tesco	UK	10 475	17.4	Food
Koninklijke Ahold	NL	9 899	14.0	Food
Karstadt	D	9 548	14.6	Dept. store
Groupe Casino	F	9 378	54.6	Food
Kaufhof	D	9 028	19.7	Dept. store
Delhaize 'Le Lion'	B	8 191	11.9	Food
Marks & Spencers	UK	8 149	0.9	Dept. store
Asko Deutsche Kaufhaus	D	7 368	-15.7	Dept. store
Corte Ingles	E	7 176	8.5	Food
Argyll Group	UK	7 089	12.7	Food
Quelle Group	D	6 995	9.1	Mail order
Otto Versand	D	6 924	23.2	Mail order
Spar Handels	D	6 512	13.6	Food

Source: Fortune, August 1993

## Impact of the Single Market

Retailing is the activity in the distribution channel which makes goods and services available for purchase and consumption by consumers. It is the point of sale where manufacturers are able to display their products and where the final customers make a choice. Thus, campaigns have been focused on creating customer preferences. However, a number of common themes can be identified. Thus, at the operational level, the adoption of the marketing concept has been fundamental in order to enhance sales. Consequently, these developments have led to investments in ways to control costs and to manage the operation more efficiently.

Various aspects of the Single Market have influenced retail trade. Firstly, the mutual recognition of national product safety standards, along with the removal of border controls, has influenced positively the sourcing, transport and movement of product. This has been further facilitated by the liberalisation of transport and telecommunication. The European legislation on environment of protection has also been relevant to the sector, especially in the area of packaging waste. Thirdly, aspects of the social charter have influenced the employment structures, making them less flexible. Finally, fiscal harmonisation (particularly of VAT) will potentially affect the final transfer process to consumers. Nevertheless, the retail sector remains a mainly local business, not only because of geographically determined cultural differences, but also because of differences in organisation and selling techniques. The Internal Market programme has contributed to a growing internationalisation of the sector, and has led EU retailers to grow in size. Future priorities for this sector on the European policy front are the further harmonisation of EU legislation in the area of consumer protection and social issues, and standards harmonisation.

## REGIONAL DISTRIBUTION

The geographical pattern of retail trade is determined by the main areas in which consumption is centred. In the largest EU countries it is estimated that the consumer has to make a journey taking about 11 minutes to do his shopping. The growth in large-scale retailing at the expense of its traditional forms has not fundamentally changed this idea of proximity, which is a dominant feature of retail trade.

The structure of the commercial sector varies greatly from country to country. A distinction can be made between:

- high-density countries, where the number of traders per 10 000 population ranges between 110 and 175. This is the case in Portugal, Greece, Ireland and Spain;
- low-density countries, where the number of businesses per 10 000 inhabitants ranges from 60 to 95. This is the case in the rest of EU Member States.

Average turnover per business also varies considerably from country to country. In 1990 the figure was between 114 000 ECU and 116 000 ECU for retail trade in Greece and Portugal and over 800 000 ECU for Germany, Luxembourg and the United Kingdom.

## REGULATIONS

The retail trade is subject to all national and EU trade regulations. Several points should be mentioned in this connection:

- the largest EU countries have enacted regulations for commercial town-planning which are binding in varying degrees for the development of large-scale retailing and selling areas. These rules have played a considerable part in determining the pattern of large-scale retailing and its establishments (especially in Belgium, France, Germany and Italy);
- national legislations still differ as regards the rules governing price fixing, recommended prices, refusal to sell and loss leaders;
- with regard to Community rules, retail trade is subject to the provisions prohibiting concerted practices which restrict competition, prices and distribution agreements (franchising, exclusive and selective agreements);
- lastly, the Community has established a specific system for the protection of customers' health and safety, economic interests, rights to information and rights of representation.
- Product legislation also has an impact on the retail trade, given the increase of own-branded products.

## OUTLOOK

The retail trade will display several trends during the period 1995-97:

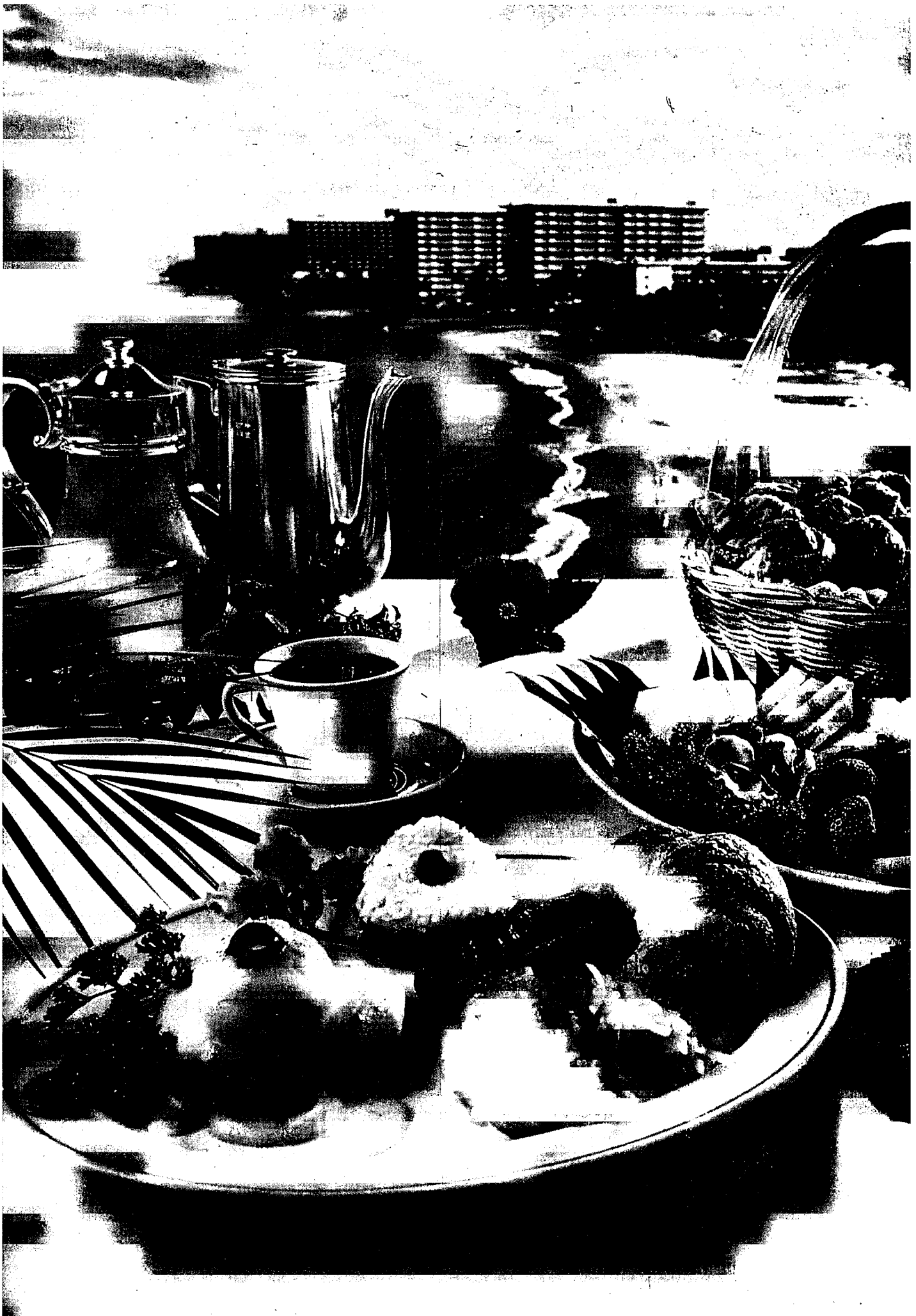
- continuation of the concentration process which began during the 1980s;
- the main retailing groups will become still more Europeanised (by strengthening their positions in the southern markets such as Portugal, Spain, Italy and Greece but also in markets outside Europe);
- the continuing development of hard discount;
- lastly, forecasts of the development of retail trade predict annual growth rates ranging from 3 to 5 %.

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## Overview

NACE 665, 667, 771, 661

*The tourism industry in Europe is in a constant state of evolution. This is in direct response to the changing demands being placed on suppliers by tourism consumers who are becoming ever more sophisticated in their tourism expectations in terms of quality of service, diversity of tourism products, and improved provision of accommodation, 'winning and dining' facilities, entertainment and travel services. With more disposable income and leisure time to devote to leisure, increases in both short-break and long haul holidays segments of the tourism market are taking place.*

*So far, the European tourism industry, in the main, has responded to the current challenges put before it by developing appropriate tourism products to satisfy the new demands. Rapid changes in demand means that analysis of this constantly evolving market continues to be necessary. Tourism is an extremely "horizontal" industry which comprises a wide variety of services and industries. The performance of the industry to date on the world and home markets has continued to grow and to improve.*

*Analysis of market forces, trends and the regulations which impact on the development of tourism in Europe, all indicate a positive outlook for the future development of the industry. However, in order to improve the performance of the European industry, future strategies should incorporate greater diversification of tourist products, bearing in mind the "value-for-money" aspects.*

## INDUSTRY PROFILE

### Description of the sector

Tourism represents a complex economic and social phenomenon which affects millions of citizens in Europe as well as all over the world. The impact of tourism on these citizens is felt both as beneficiaries of tourism products and services and as providers of a variety of services which seek to meet the various needs of tourism. The pervasive impact of tourism throughout the world on local communities is matched by very few other industries. It entails a complex network of businesses engaged in the provision of accommodation, food and drink, transport facilities and services and entertainment for the tourist.

According to the World Tourism Organisation (WTO) definition adopted by the United Nations Statistical Commission in March 1993, a tourist is defined as a visitor staying at least one night and for no more than one consecutive year in a place other than that corresponding to his usual environment. However, when considering the nature of travellers engaged in the various forms of tourism, the term "visitor" represents the basic concept of tourism statistics: there are visitors making pleasure trips for purely tourist purposes or in order to visit friends and relatives as well; and then there are those who make business trips. Another important and growing segment of the market is that of the excursionist or same-day visitor who does not stay overnight away from his usual environment.

The tourism industry is thus better viewed as a market rather than as a sector given the wide range of related industries

**Table 1: Tourism**  
International tourist arrivals in Europe

(thousands)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgique/België	2 237	2 460	2 454	2 516	2 700	3 007	3 163	2 944	3 220	3 285	3 304
Danmark	1 300	1 281	1 216	1 171	1 150	1 218	1 275	1 429	1 543	1 569	1 585
BR Deutschland (1)	13 450	14 241	13 458	16 147	16 732	16 115	17 045	15 648	15 913	14 348	14 494
Hellas	5 523	6 574	7 025	7 564	7 923	8 082	8 873	8 036	9 331	9 413	10 072
España	27 176	27 477	29 910	32 900	35 000	38 867	37 441	38 539	39 638	40 085	43 232
France	35 379	36 748	36 080	36 974	38 288	49 549	52 497	55 041	59 710	60 100	60 639
Ireland	2 579	2 536	2 467	2 664	3 007	3 484	3 666	3 535	3 666	3 814	4 232
Italia	23 043	25 047	24 672	25 749	26 155	25 935	26 679	25 878	26 113	26 379	27 276
Luxembourg	594	622	616	645	760	875	820	861	796	831	862
Nederland	3 218	3 329	4 829	4 922	4 876	5 206	5 795	5 842	6 083	5 757	6 178
Portugal	4 119	4 989	5 409	6 102	6 624	7 116	8 020	8 657	8 884	8 434	9 132
United Kingdom	13 644	14 449	13 897	15 566	15 799	17 338	18 013	17 125	18 535	19 488	19 705
EU	132 262	139 753	142 033	152 920	159 014	176 792	183 287	183 535	193 432	193 503	200 711
Österreich	15 110	15 168	15 092	15 761	16 571	18 202	19 011	19 092	19 098	18 257	17 894
Suomi/Finland	489	543	598	823	877	882	866	786	790	798	833
Island	85	97	114	129	129	131	142	143	143	157	179
Liechtenstein	88	91	76	75	72	77	78	71	72	65	66
Norge	1 745	1 933	1 638	1 782	1 704	1 867	1 955	2 114	2 375	2 556	2 830
Sverige	839	853	824	814	830	837	731	623	650	659	673
Schweiz/Suisse	11 900	11 900	11 400	11 600	11 700	12 600	13 200	12 600	12 800	12 400	12 561
EFTA	30 256	30 585	29 742	30 984	31 883	34 596	35 983	35 429	35 928	34 892	35 036
Other Europe (2),(3)	37 886	41 480	44 595	47 096	57 503	59 652	63 887	66 076	77 194	79 796	84 346
Europe	200 404	211 800	216 370	231 000	248 400	271 040	283 157	285 040	306 554	308 191	320 093
Share of the world (%)	N/A	64.6	63.8	63.3	62.1	63.1	62.1	61.5	60.9	60.1	60.1

(1) From 1984-1989 excluding former German Dem. Rep.

(2) Includes Albania, Cyprus, Gibraltar, Israel, Malta, Monaco, San Marino, Turkey, former Yugoslavia, Bulgaria, former Czechoslovakia, Hungary, Poland, Romania and former USSR.

(3) From 1984-1989 including former German Dem. Rep.

Source: WTO

**Table 2: Tourism**  
**International tourism receipts in Europe (1)**

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Belgique/België	2 109	2 179	2 308	2 581	2 907	2 775	2 920	2 910	3 122	3 477	4 333
Danmark	1 637	1 738	1 787	1 922	2 057	2 099	2 609	2 804	2 915	2 606	3 015
BR Deutschland	5 448	6 222	6 395	6 651	7 145	7 681	8 271	8 412	8 516	8 974	8 961
Hellas	1 664	1 871	1 865	1 965	2 026	1 794	2 032	2 072	2 518	2 848	2 794
España	9 780	10 681	12 252	12 785	14 111	14 680	14 603	15 336	17 087	16 588	18 014
France	9 629	10 408	9 880	10 282	11 659	14 745	15 854	17 250	19 298	19 991	21 085
Ireland	584	696	649	727	843	971	1 136	1 219	1 248	1 400	1 505
Italia	10 893	11 474	10 013	10 545	10 489	10 835	15 721	14 866	16 524	17 524	20 132
Luxembourg	132	193	196	174	201	260	228	230	221	248	245
Nederland	2 147	2 177	2 255	2 334	2 452	2 767	2 856	3 427	4 034	4 005	4 722
Portugal	1 217	1 490	1 558	1 858	2 031	2 437	2 792	2 994	2 867	3 566	3 786
United Kingdom	7 755	9 330	8 294	8 857	9 309	10 337	11 734	10 547	10 733	11 485	11 765
EU	52 995	58 459	57 452	60 682	65 231	71 382	80 754	82 067	89 084	92 713	100 357
Österreich	6 399	6 662	7 066	7 677	8 533	9 727	10 532	11 137	11 190	11 585	11 074
Suomi/Finland	620	711	608	713	831	923	919	1 006	1 048	1 058	1 106
Island	43	54	61	74	91	98	109	110	99	113	117
Norge	836	989	1 076	1 087	1 240	1 223	1 233	1 328	1 521	1 579	1 647
Sverige	1 429	1 559	1 578	1 761	1 984	2 302	2 290	2 182	2 353	2 263	2 388
Schweiz/Suisse	4 009	4 121	4 295	4 630	4 837	5 031	5 332	5 670	5 749	5 979	6 557
EFTA	13 336	14 096	14 683	15 943	17 517	19 304	20 416	21 433	21 961	22 576	22 889
Other Europe (2)	N/A	7 252	5 900	6 833	7 486	9 064	9 101	9 034	12 604	15 494	18 905
Europe	N/A	79 807	78 035	83 458	90 234	99 750	110 271	112 534	123 649	130 783	142 151
Share of world total (%)	N/A	52.5	54.6	55.8	53.5	51.0	53.8	52.1	52.7	49.9	50.0

(1) Excluding international transport.

(2) Includes Albania, Cyprus, Gibraltar, Israel, Malta, Monaco, Turkey, former Yugoslavia, Bulgaria, former Czechoslovakia, Hungary, Poland, Romania and former USSR.

Source: WTO

and services involved right across the economy, the most important of which being the lodging subsection, catering, sports and entertainment, travel services and the transport and crafts industries.

The aim of this chapter is to focus on the following sub-sectors:

- Hotels (NACE 665);
- Other accommodation (NACE 667);
- Travel services (NACE 771);
- Restaurants (NACE 661);
- Recreation parks;

The diversity and fragmented nature of the tourism industry is a disadvantage when collecting and aggregating statistics particularly when making comparisons at the international level. The current work developed by the European Commission is co-operation with EU and EFTA Member States and international organisations such as OECD and WTO aims to harmonise methods and definitions used on tourism statistics in order to gather reliable and coherent figures at the international level.

### Recent trends

According to the World Tourism Organisation (WTO), of international tourist arrivals were estimated at over 200 million in 1994 in all EU Member States, (EU 12) representing 38 % of the world market share.

For the same year international tourism receipts, excluding transport expenditure, represented over 100 billion ECU which constitute 35 % of the world market share. In order of importance the principal international tourist destinations in the Community, are France, Spain and Italy which together receive 1/4 of all international arrivals in the world and 1/5 of receipts.

These figures exclude domestic tourism as well as same-day visitors. The volume of domestic tourism - overnight stays

in the country of residence - exceeds outbound tourism considerably. It is estimated that about 2/3 of all holidays generated by the EU population can be classified as "domestic"; 22 % is related to international tourism between the EU Members States and 13 % of all holidays are spent at destinations outside the Community. Domestic tourism is even more important in the Mediterranean countries (84-87 %) and in Portugal where the rate (90 %) is the highest of the Community.

The growing importance of same-day visits as part of tourism is confirmed in many industrialised countries. At the international level, it is estimated that day trips to neighbouring countries, constituted in Europe one out of every two trips.

The fact that tourism constitutes an important source of revenue for EU Member States is confirmed by Eurostat's estimate that tourism contributed 5.5 % of the Community's GNP. In Spain and France the relative importance of tourism activities in their economies, is approximately double that of the Community average. Greece, Portugal and Ireland are also above average.

### International comparison

According to WTO estimates the world tourism industry has maintained its rate of growth. The economic recovery has had a positive effect on trends in travel abroad. In 1994 intentional tourist arrival increased by 4 % in respect of the previous year, reaching 533 million world-wide. The increase in receipts has been important, being more than the double of the arrivals in terms of growth rate.

In 1994 all Europe registered 320 millions internationals arrivals (3.9 % more than in 1993). Europe, with a world market share of 60 % of all international arrivals, still represents the principal driving force of international tourism. However, between 1970 and 1994 Europe has lost 14 % of its world market share to new destinations located in third countries particularly in South East Asia and the Pacific area.

**Table 3: Tourism**  
**Nights spent by tourists in all types of accommodations, 1993**

(thousands)	Resident	Non-resident	Total
Belgique/België	12 253	11 681	23 934
Danmark	13 830	10 453	24 283
BR Deutschland	276 382	34 694	311 076
Hellas	12 537	37 108	49 645
España	68 512	88 132	156 644
France	153 187	(1) 110 909	264 096
Irland	N/A	N/A	N/A
Italia	169 039	82 594	251 633
Luxembourg	373	2 537	2 910
Nederland	38 991	17 178	56 169
Portugal	13 458	17 831	31 289
United Kingdom	(2) 157 900	180 100	(2) 338 000
EU	916 462	602 692	1 519 154
Österreich	24 306	70 494	94 800
Suomi/Finland	9 738	2 929	12 667
Norge	11 941	6 882	18 823
Sverige	(2) 26 000	6 060	(2) 32 060
Schweiz/Suisse	38 142	36 729	74 871
EFTA	110 127	123 094	233 221
Total	1 026 589	725 786	1 752 375

(1) Campings only (except Ile de France)

(2) Estimates

Source: Eurostat estimates

At world level in 1994 East Asia and the Pacific area have continued to experience significant progress, with an increase of 7.2 % in terms of arrivals and 12.4 % in terms of receipts.

The United States continued to lead the world in terms of tourism expenditure (36.6 billion ECU) and tourism receipts (48 billion ECU) in 1994. WTO's estimates indicate for 1994 an increase of the expenditures of 5 %.

American tourists coming to Europe in 1994 are estimated as 13 millions in terms of arrivals. The United Kingdom is still their principal destination (over 3 millions arrivals) followed by France, Germany, Italy, and Spain.

With 14 million Japanese travelling abroad, of whom 46 % visited other Asian countries. Japan is the third most important spender in the world on travel abroad. It has been estimated that Japanese tourists spend on average four times more than the European tourists and twice as much as American tourists travelling abroad. 1.7 million Japanese visited Europe in 1994 12 % more than in 1993, principally in the United Kingdom, France, Italy and Germany.

France continues to maintain its position as the world's leading tourist destination, receiving 60.6 million international tourists in 1994. After the United States, France maintains also second place as a top earner or international tourist receipt, followed by Italy, Spain and the United Kingdom.

### Foreign trade

According to WTO, international tourism receipts represent 1.74 % of the total GNP of the European Union in 1993. The contribution of tourism receipts to GNP is substantially higher in Portugal, Greece, Ireland and Spain. More than 50 % of tourism receipts finance the trade deficit of France and more than 40 % in Italy and Spain. In Austria, the top earner country in the world in terms of tourism receipts, tourism represent 2/3 of export and 7.39 % of GNP.

As a positive contribution to the balance of payments, tourism represents 27.7 % of the services exported by the Community to third countries.

Even though European long-haul travel almost doubled in the last decade, intra-Community flows still dominate the mar-

ket. The most important markets for tourism into the EU are the EFTA countries, United States and Japan. Europe is also important as a source market for most regions: in South Asia, in the Middle East and in Africa.

With 35.1 billion ECU, Germany is the main European spender at world level, second only to the United States. Other main European spenders, the top eight at world level include the United Kingdom, France, Italy and the Netherlands.

## MARKET FORCES

### Demand

The demand for holidays is influenced by a variety of factors which affect the decision whether to take a holiday, what type or length of holiday and where to take it. The most important of these factors include: income, available free time, age and family circumstances, comparative price level, environmental conditions.

Overall European demand, in terms of nights spent by tourists in accommodation establishments of the commercial circuit, is estimated for 1993 to be around one billion and seven hundred fifty thousand. Of this, 59 % is attributable to domestic tourism, the remainder to international tourism.

During 1993 the overall demand for tourism in EU and EFTA countries has suffered a reduction in terms of nights (-1.8 %). The decrease is slightly less for tourists who have chosen hotels (-1.6 %) as compared to those who have chosen supplementary accommodations (-2.0 %); similarly the difference is slightly less for international tourists (-1.6 %) as compared to domestic tourists (-1.9 %). This phenomenon is explained by the fact that domestic demand (in which vacation tourism has the greatest weight) is more sensitive to economic crises as compared to international demand.

The countries which have felt the greatest decline in demand are Belgium (-13.3 %), Portugal (-7.2 %) and Denmark (-5.47 %). The countries that have greatly increased their overall flows, besides Luxembourg (8.9 %) whose role in the tourism market is of a special nature, are the following: Sweden (8.9 %), Finland (6.7 %) and Spain (6.3 %). The Scandinavian

**Table 4: Tourism**  
**World tourism performance, 1994**

	Arrivals (million)	(% annual change		Tourism receipts (million ECU)	(% annual change	
		1994/93	1993/92		1994/93	1993/92
Africa	18.3	-0.5	3.3	5 301	7.0	8.9
America	107.8	3.5	0.3	81 954	7.2	17.9
East Asia/Pacific	74.6	7.2	10.9	49 644	12.4	22.9
Europe	320.1	3.9	0.5	142 150	8.7	5.7
Middle East	8.2	-5.0	0.3	3 113	-13.2	-13.8
South Asia	3.7	6.6	-1.4	2 019	7.4	21.9
World	532.7	4.0	1.6	284 147	8.6	11.5

Source: WTO

countries have therefore registered high performances both on the foreign and domestic markets. This latter fact is probably due to a shift from flows that were once towards international destinations towards national destinations.

Domestic tourism also seems to show a close correlation with the devaluation of the currency, even though it is less obvious than in the case of foreign tourism, since it is also more sensitive to other phenomena. The revaluation of currency results in a decrease in domestic nights due to the propensity of tourists in one country to look for more economical offers abroad (particularly in those countries that have witnessed an inverse monetary variation), while the devaluation results in an increase in domestic demand as a response to decreased purchasing power abroad.

The less than brilliant trend of 1993 tourist activities is evidenced also by the utilisation levels of hotels and similar establishments. In almost all the countries in fact, a decrease in the use of beds in such establishments has been registered when considering either the gross or net usage (that is excluding the periods in which the hotels are closed). Only Portugal is an exception; its negative year in 1993 was preceded by another negative year of similar magnitude. It can be observed in fact that from 1990 to 1993 to gross usage rate has fallen from 37 % to 34 % although a slight recovery has taken place during the last year.

Income, linked with education and social status, in particular affect the level of holidays taken. Those with high disposable income tend to travel more frequently. In addition, business travel, which is becoming increasingly important, is usually much more frequent than leisure travel.

There are a number of new trends which are characterising tourism demand in Europe: the expansion of the short-breaks market and second holidays as well as growth in outbound travel from the southern Europe markets.

Changes in population age-structure also strongly influence the nature, incidence and timing of holidays during the last decade of the century. An emerging fast growing segment market is the "senior travel market" which constitutes the 20 % of the trips taken by the Europeans.

Mobility of holiday-makers in terms of varying destinations and seasonality and more active behaviour is increasing. Even though traditional tourist products associated with sun, sea and beach resorts still dominate the market, the interest when taking holidays in cultural activities, in a broad sense, is growing and may contribute to the better staggering of holidays.

Another important factor which may strongly influence tourist flows is the emphasis placed on value-for-money. As tourists continue to become more sophisticated they demonstrate willingness to receive higher standards of quality and services.

#### Supply and competition

The tourism industry comprises both a wide range of economic activities and a supply of products which come from a whole range of different types of enterprise. Their common characteristic is the variety of the existing enterprise structures as well as of the number of services available. For this reason in this domain there co-exist various forms of ownership from small individual proprietors to multinational corporations. Supply reflects demand, both in terms of structure, and in terms of trends. According to this hypothesis, concentration of the industry within a country will only occur in a sustainable manner, if the aspects of demand encourage and justify it economically in the long-term. The basic factors of demand are very asymmetric across the European market, as they vary significantly from country to country. Government regulation together with the number and size of enterprises determines the degree of competition which in the main tourist activities seems to be relatively high.

**Table 5: Tourism**  
**Market share of tourist arrivals by region**

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Africa	2.6	3.0	2.7	2.7	3.1	3.2	3.3	3.4	3.5	3.6	3.4
America	21.6	20.2	21.1	21.0	20.8	20.3	20.5	20.9	20.6	20.3	20.2
East Asia/Pacific	7.4	9.4	9.9	10.8	11.4	10.8	11.6	11.8	12.4	13.6	14.0
Europe	65.6	64.6	63.8	63.3	62.1	63.1	62.1	61.5	60.9	60.1	60.1
Middle East	2.1	1.9	1.5	1.5	1.7	1.8	1.7	1.5	1.7	1.7	1.5
South Asia	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: WTO

**Table 6: Tourism**  
**Market share of international tourism receipts by region**

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Africa	2.6	2.2	2.1	2.2	2.3	2.1	2.0	1.9	1.9	1.9	1.9
America	24.6	28.9	27.1	24.6	25.5	27.7	26.7	28.7	27.6	29.2	28.8
East Asia/Pacific	8.4	11.0	12.2	13.2	15.2	15.8	14.9	15.0	15.3	16.9	17.5
Europe	59.5	52.5	54.6	55.8	53.5	51.0	53.8	52.1	52.7	49.9	50.0
Middle East	3.4	4.1	2.8	3.0	2.6	2.5	2.0	1.6	1.7	1.4	1.1
South Asia	1.5	1.2	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.7	0.7
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: WTO

### Production process

According to Eurostat of over 1.3 million enterprises involved in hotel and restaurant activities in the Community, 96 % are made up of micro-enterprises (less than 9 employees). European leadership at world level in terms of accommodation capacity is confirmed. For Hotels and similar establishments, the trend in the Community is towards a reduction in the number of enterprises and a gradual increase in the accommodation capacity in absolute terms as well as in terms of average size in the Community which went up from 43 to 45 beds; the rate is however still low in relation to areas outside the Community. Nevertheless, in this case also, the situation varies from one individual Member State to another:

- lower than EU average in United Kingdom (25 beds per establishment). Germany (34) and Luxembourg (38);
- higher in Denmark (170 beds), Portugal (106), and Spain (101), where the boom in package tourism had led to investment in large hotels.

In spite of the difficulty of evaluating the impact of tourism on employment, it is certain that all sectors of the tourism industry are labour-intensive. Jobs in tourism activities in the Community number some 9 million. Tourism represents about 6 % of total jobs in the Community, taking into account only jobs directly linked with tourism products and services. Besides these direct jobs, it is also necessary to consider the indirect or spin-off jobs, created in sectors outside tourism in the strict sense. The structural flexibility and, in some cases, the weakness of this segment of the market may explain the degree of attraction which the sector has for women and young people, often constituting their first employment. Moreover in the services sector, which employs six people out of ten in the Community, tourism also has a high proportion of female employment which varies from 45 to 65 % from one Member State to another. The seasonality of employment, another particular feature of tourism, is moreover very variable in different branches: low in cafes and restaurants and in travel agencies, medium in hotels and high in holiday camps and open air facilities.

Important new technologies have been introduced into all segments of the tourism industry in recent years. However, the general impact has been on improved quality of service rather than in labour content reduction.

### INDUSTRY STRUCTURE

#### Companies and strategies

Estimates by the World Travel and Tourism Council indicate that investments in these areas of activity in the Member States reached 192 billion ECU in 1995 equivalent to 15.5 % of total investments.

In 1995 in terms of capital investment planned for tourism in relation to the total investments for all the industries, the largest investors in travel and tourism are expected to be

Ireland (32 %), Spain (24 %), Belgium and Finland, (21 %), and finally France (18 %).

The structure of the tourism industry is moving towards rationalisation:

- gradual withdrawal from the market of very small, marginal establishments;
- reinforcement of partnerships in various forms (integrated chains, franchising etc.).

In Europe, as has been the case in the United States, the main trends of market strategies are:

- concentration on niche markets on a world-wide scale;
- differentiation and segmentation

This approach is being applied in the hotel industry: on the one hand, the major European groups through mergers and acquisitions are trying to compete with US groups which are the leaders in the market world-wide; on the other hand, the early 1990s saw the emergence of associations of small hotel groups and consortia whose aim is to improve market awareness.

The performance of the tourism industry can be better achieved through:

- wider integration between the tourism sector and the other economic activities, especially through planned regional development;
- improved balance between price and quality of services provided;
- rapid response to changing tourist behaviour;
- the further application of new technologies in marketing and managing businesses;
- the improvement of the so called "internal marketing".

Human resources are a key factor to success in the process of change being experienced in the sector. The cross-frontier mobility of manpower is higher than in other sectors. The full implementation of the internal market encourages mobility and offers reinforced guarantees for employees and their families. The mutual recognition of diplomas also contributes to this mobility. Conscious of the importance of vocational training, the European Union will continue to support this field in order to improve the quality and performance of labour in the sector and stimulate exchange of experience at international level between the major "actors" involved.

### REGIONAL DISTRIBUTION

The tourism industry continues to be concentrated in certain regions, generally in seaside and mountain locations. Urban tourism, which takes in historical and cultural cities, is another relevant segment of the tourism market that still continuing

**Table 7: Tourism**  
**Top twenty tourism destinations in Europe, 1994 (1)**

1985	Rank 1994	Country	Arrivals (thousands)	% change 1994/93	% of total
1	1	France	60 639	0.9	18.94
2	2	España	43 232	7.9	13.51
3	3	Italia	27 276	3.4	8.52
8	4	Hungary	21 425	-6.1	6.69
5	5	United Kingdom	19 705	1.1	6.10
4	6	Österreich	17 894	-2.0	5.59
16	7	Poland	17 595	3.5	5.50
12 (2)	8	Czech rep.	17 000	47.8	5.31
6	9	BR Deutschland	14 494	1.0	4.53
7	10	Schweiz/Suisse	12 561	1.3	3.92
10	11	Hellas	10 072	7.0	3.15
11	12	Portugal	9 132	8.3	2.85
15	13	Nederland	6 178	7.3	1.93
20	14	Turkey	6 031	2.2	1.88
13 (3)	15	Russian Fed.	4 643	-21.3	1.45
17	16	Ireland	4 232	11.0	1.32
14	17	Bulgaria	4 055	6.0	1.27
18	18	Belgique/België	3 304	0.6	1.03
19	19	Romania	2 998	3.0	0.94
21	20	Norge	2 830	10.7	0.88
Total 1-20			305 296	3.8	95.38
Total Europe			320 093	3.9	100.00

(1) Excluding same-day visitors

(2) Former Czechoslovakia

(3) Former USSR

Source: WTO

to expand. Among the European capital cities, London, Paris and Rome are the principal destinations.

## ENVIRONMENT

The success of tourism relies to a great extent on the quality of the environment where it takes place. While tourism activity is influenced by the environment, the environment is greatly influenced by tourism. While tourism activity is influenced by the environment, the environment is greatly influenced by tourism. Without proper planning and management the industry may damage the resources it depends on for its success. Over the last 20 years the European tourism industry has been characterised by sustained growth which has led to development pressures, both in established tourism resorts and in previously unexplored areas, particularly coastlines. This has led to resource-management problems, both in terms of physical tourism development and the management of facilities and visitors.

The growth in general consumer awareness of environmental problems has led to actions by both the public and private tourism sectors to combat the problems which can be caused by tourism. Development related issues can cause substantial impacts on physical and built environments and tourism in general may cause air, noise and water pollution, congestion, erosion and various social disturbances. The importance of particular locations and seasonal factors may also aggravate these problems while historically the diversity of tourism has made it a difficult industry to plan and regulate. The industry has diversity of tourism has made it a difficult industry to plan and regulate. The industry has responded to the call for better environmental practice in a number of ways, these include:

- the development of sustainable tourism strategies in the public sector and the setting up of environmental associations in the private sector;

- the development of various codes of conduct and self-regulation measures by the private sector;
- a range of joint partnerships at European, national and local level related to research on sustainable tourism and pilot projects which test its applicability;
- the development of new holiday products for certain environmentally conscious market segments.

Alongside these activities broader environment policy at European and national level continues to influence the development of tourism. The increasing (on occasions mandatory) use of Environmental Impact Assessment in tourism may signal a first step towards greater legislative intervention in the industry, particularly in the form of taxation related to energy use and of anti-pollution laws. Tighter planning regimes at a regional level are already in evidence in many parts of the EU. Often environment focused activity enables parts of the industry to come together to tackle a common and fundamental interest. The improved protection of the environment will remain one of the main challenges facing the industry during the next decade.

## REGULATIONS

Given the horizontal nature of the tourism industry, a wide range of local, national and EU regulations impact on the tourism industry, although few are prepared with the specific intention of regulating this particular sector.

Within the framework of the European Union, many measures have had either a direct or indirect impact on the tourism industry because of the sheer number of activities that the comprises. A full assessment of Community measures affecting tourism has been made by the Commission in its communication of April 1994.

The legislation relevant to tourism can be considered in four main groups;

**Table 8: Tourism**  
**Top twenty tourism earners in Europe, 1994 (1)**

1985	Rank 1994	Country	Receipts (million ECU)	% change 1994/93	% of total
3	1	France	21 035	5.2	14.80
1	2	Italia	20 132	14.7	14.16
2	3	España	18 014	8.6	12.67
4	4	United Kingdom	11 765	2.4	8.28
5	5	Österreich	11 074	-4.4	7.79
6	6	BR Deutschland	8 961	-0.1	6.30
7	7	Schweiz/Suisse	6 557	9.6	4.61
28	8	Poland	5 175	34.6	3.64
9	9	Nederland	4 722	17.9	3.32
8	10	Belgique/België	4 333	24.6	3.05
14	11	Portugal	3 786	6.1	2.66
10	12	Turkey	3 786	11.9	2.66
12	13	Danmark	3 015	15.7	2.12
11	14	Hellas	2 794	-1.9	1.97
13	15	Sverige	2 388	5.5	1.68
15	16	Israel	2 015	11.8	1.42
22 (2)	17	Czech Rep.	1 654	24.3	1.16
17	18	Norge	1 647	4.3	1.16
20	19	Cyprus	1 533	28.6	1.08
19	20	Ireland	1 505	7.5	1.06
Total 1-20			135 895	8.1	95.60
Total Europe			142 151	8.7	100.00

(1) Excluding transport  
(2) Former Czechoslovakia  
Source: WTO

- measures associated with the completion and functioning of the Internal Market associated with the removal of physical, technical and financial barriers;
- measures aimed at protecting the environment and consumer interests;
- measures intending to bring about social and economic cohesion among all the Member States;
- measures included in the Community Action Plan to Assist Tourism.

Of most interest to tourism firms within the Union, are those Community measures affecting the removal of technical and legal barriers, employment, the promotion of fair competition, the development of a business environment which in particular is more conducive to encouraging small and medium sized enterprises (SMEs) to succeed by promoting transnational co-operation and the use of new technologies and the development of a comprehensive, environmentally-sensitive European transport network linking even the peripheral regions.

The multi-annual action programme, adopted by the Council in 1993, serves to reinforce the main lines of action of Community enterprise policy.

The abolition of tax frontiers and the introduction of minimum rates for VAT and excise duties across the Member States from January 1993 are expected to let market forces pull VAT rates closer together. In the interest of consumers and enterprises much effort continues to be put in towards achieving a greater level of harmonisation.

Directive 92/77/EEC on the approximation of VAT rates, modifying the 6th VAT Directive (77/388/EEC), set the minimum standard rate of VAT at not less than 15 %. However, on products or services of a social or cultural nature - a list of items which includes passenger transport, tourist accommodation provided by hotels and similar establishments, sports and entertainment - the Member States can introduce one or two rates of at least 5 %.

Another aspect of VAT which is under review is the simplification of the system in order to reduce the administrative burden placed on businesses. Within the framework of the preparatory work to establish a definitive regime on VAT, the Council has already identified key conditions to be considered.

The implementation of the White Paper on Employment, Growth and Competitiveness includes major initiatives to tackle the long term underlying presence of unemployment in the Community and to stimulate the speed of new job creation, growth and employment. The nature of tourism as an employment sector lends itself well to the issues addressed in this initiative and the potential of tourism in this context has been recognised within the framework of the social dimension. Proposed legislation concerning the regulation of working time and young workers which still under consideration has implications for the tourism industry.

With the use of the new structural funds for 1994-1999 and the new cohesion fund 1993-1999, tourism continues to be an important tool for regional development and the reduction of social and economic disparities between the regions. Within the previous Community Structural Frameworks (1989-1993), measures concerning tourism were focused on improving the supply and geographic spread of tourism, reducing the seasonality of the industry, full exploitation of the cultural and environmental heritage, developing rural tourism and developing tourism training for employees. The reforms of the objective areas 1-5, taking place with the implementation of the new structural funds are likely to continue to favour tourism development.

With the creation of the Cohesion fund, an extra billion ECU has been made available to assist Ireland, Spain, Portugal and Greece and those regions which are largely rural or suffering industrial decline and thus lagging far behind the richer regions of the Union. This assistance and investment is intended to enable them to achieve a comparable level of development in terms of communications networks while at the



**Table 9: Tourism**  
**Top twenty tourism spenders in Europe, 1994 (1)**

1985	Rank 1994	Country	Expenditure (million ECU)	% change 1994/93	% of total
1	1	BR Deutschland	35 132	9.6	27.74
2	2	United Kingdom	15 400	4.5	12.16
3	3	France	11 910	8.9	9.40
7	4	Italia	10 249	-8.1	8.09
4	5	Nederland	9 241	20.6	7.30
5	6	Österreich	7 850	12.3	6.20
8	7	Belgique/België	6 508	19.7	5.14
6	8	Schweiz/Suisse	5 485	10.7	4.33
9	9	Sverige	4 162	9.1	3.29
12	10	España	3 455	-14.1	2.73
10	11	Norge	3 074	0.9	2.43
11	12	Danmark	3 015	9.8	2.38
14	13	Israel	2 437	23.4	1.92
13	14	Suomi/Finland	1 330	-3.7	1.05
19	15	Portugal	1 265	-19.7	1.00
15	16	Ireland	1 089	1.6	0.86
16	17	Hellas	936	9.3	0.74
21	18	Hungary	787	24.3	0.62
17	19	Turkey	770	4.4	0.61
18 (2)	20	Czech Rep.	700	56.3	0.55
Total 1-20			124 797	7.4	98.54
Total Europe			126 644	N/A	100.00

(1) Excluding transport  
(2) Former Czechoslovakia  
Source: WTO

same time ensuring the protection of the environment. Both items clearly benefit the tourism industry.

Since the Treaty on European Union, consumer policy has been given clear recognition of its role in establishing the internal market. The removal of barriers to freedom of movement offers fantastic opportunities for the development and exploitation of tourism in Europe. Tourism, by its very nature, enables tourists to move outside of their usual environment both in order to purchase and to take their holiday. This phenomenon can also make tourism consumers very vulnerable and in special need of information and also legal and financial protection. The provision of information about products and services, and the provision of insurance and compensation, in the event of a faulty product or service, may seem burdensome for the entrepreneur but, in the long term these measures are necessary for the full functioning of the internal market. Well informed consumers, safe in the knowledge that wherever they make purchases in the Union they will have access to justice are more likely to take advantage of the opportunities afforded by the internal market, which should in turn lead to increased enterprise activity and competition. In the third Consumer Policy programme adopted by the Commission in 1993, there is a certain amount of proposed legislation to safeguard the interests of the tourist but also to help to establish a level playing field on which firms can compete fairly with each other.

In the field of Computer Reservation Systems, the Council adopted a regulation (3089/93/EEC) on 29 October 1993, modifying the original of 24.07.89 (2299/89) on the implementation and operation of a code of conduct for air transport and air passengers using central reservation systems. The scope of the regulation has been extended to non-scheduled services and bundled products. Also the ranking criteria for the display of information on air transport services have been strengthened and clarified. The aim of the code is to ensure the non-discriminatory and transparent use of such systems and improved information for air passengers.

Of the proposed consumer measures under consideration during 1994, it should be noted that the Directive concerning Timeshare property contracts (94/47/EC) was adopted on 26.10.94 by European Parliament and the Council following modifications to the text by the Consultation Committee. Under this Directive, having signed a contract, consumers will have a 10 day period, in which they can withdraw from the contract should they not wish to go ahead with the purchase. During this period vendors are not allowed to take any advance payments as a means of guaranteeing the commitment to purchase.

The proposal for a Council Directive concerning the protection of consumers when negotiating contracts at a distance, despite undergoing a series of modifications, has still to be adopted in its current form, tourism services are exempted from the majority of the Directives provisions. Monitoring of the implementation of the package travel Directive still continues. At the present time only Ireland, Spain and Greece have not adopted national legislation. A major problem with regard to implementation has been the need to establish a system of guaranteeing the safety and protection of consumers interests. Tourists more than other consumers are vulnerable in gaining access to justice across frontiers. Following the adoption of the Green Paper on access to Justice, further action is being taken by means of a proposal for a Directive and a recommendation for the development of extra-judicial measures.

On 21.04.94, the Commission adopted a proposal for a Council Directive concerning comparative advertising amending the Council Directive (84/450/EEC), on misleading advertising.

While protection of the tourist as consumer is an essential consideration, a balance has to be struck whereby the industry can still function without being overburdened by excessive regulation.

Since January 1993, the first Community Action Plan to assist tourism has been in operation. The three year action programme, with a budget of 18 million ECU aims to ensure the co-ordination of its own action with actions being imple-



mented under other Community measures and policies. It will be achieved by focusing on three main lines of action:

- ensuring that tourism is taken more into account in Community and Member States' policies;
- co-operation between representatives of the sector and its various professional associations;
- support and development of specific actions.

The first objective seeks to achieve greater consistency in the initiatives taken within the Commission, with other bodies implementing policies or taking measures that might have an influence on tourism, with Member States, to complement their actions in certain fields of tourism, develop actions allowing the broadest possible convergence of their policies, or provide them with the overall information necessary about the activity, in order to direct their actions better, and encourage all forms of international exchanges on tourism.

The second objective will be implemented basically by means of consultation and co-ordination activities with tourism professionals in order to convey the importance of this industry in economic and social terms, ensure better representation of its interests, and develop information within the industry itself about the policies and measures by the Community with direct repercussions on its business.

The third objective is mainly concerned with actions to guide future policy: to provide better information regarding tourists and those working within the industry, for supporting demonstration projects and which could be transposed to various regions of the Community and for a general improvement in the quality of tourism services.

Promotion is the subject of a pilot projects, to enable distant markets to be explored and tested, and to increase the numbers of tourists from those markets, on the basis of an a single tourism image of Europe as a whole.

The scope of specific measures will be quite broad, covering a very varied number of fields (cultural, rural or social tourism, environmental tourism; vocational training). These actions are directly aimed at the public authorities, industry decision makers and at tourists themselves.

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## OUTLOOK

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The World Tourism Organisation forecasts a growth of 50 % in intentional tourist arrivals by the year 2000. An annual growth rate of 3.5 % is envisaged for the first decade of the 21st century: by the year 2010 there will be an estimated 937 million arrivals. The regions generating this flow of tourism are expected to include Central and South America, Asia and Africa. These host tourist regions which experience above average growth, including the Caribbean, East and South Asia and the Pacific area. Even if Europe will still be the main tourist destination, it may continue to lose market share, mainly to East Asia and the Pacific area.

Written by: European Commission - DG XXIII - Tourism Unit



# Restaurants

## NACE 661

The restaurant sector includes a diverse range of establishments from fast food take-away to haute cuisine. Throughout the 1980s, changing tastes, rising levels of disposable incomes, greater female labour force participation and increases in tourism expenditures contributed to a steady increase in restaurant revenues. The industry is very susceptible to economic conditions and turnover declined in some EU Member States in recent years. Entry and exit barriers are very low. As a result the industry is predominantly populated by small independent establishments, although rapid growth of fast-food chains, particularly franchise outlets, has provided a high degree of uniformity in that subsector. The use of new technology, mainly in food preparation, has increased, while attraction and retention of workers is a growing problem in many Member States. Despite the recent slowdown, the outlook for the industry is relatively buoyant and the factors which drove growth during the 1980s should continue to operate over the remainder of the 1990s.

### INDUSTRY PROFILE

#### Description of the sector

Among the most vibrant and visible commercial sectors of the EU, restaurants are present in virtually every local community. As a sector, restaurants are important to the European economy and to the economies of Member States and regions, but they play their most significant role in their contribution to the local economy of almost every village, town and city in the EU.

There is substantial variation within the restaurant sector, from fast food outlets to high class restaurants, providing very different markets with a variation of the same service, the provision of ready to eat food. Most restaurants are stand alone

operations, although some are an integral part of the services provided within other sectors, principally hotels but also including recreation parks, public houses, railways, ferries and night-clubs. There are also other service branches specialising in the provision of food including contract caterers, work canteens and messes, and hospitals/convalescent homes. However, while the type of operations are diverse, the sector is dominated by family restaurants.

There is a fine distinction at the margin between sub-segments of the restaurant industry. Unlike hotels, most grading of restaurants is unofficial, often relatively subjective and generally only applies to the top end of the market.

#### Recent trends

Official employment figures in the restaurant industry are available for only a limited number of EU Member States. Eurostat data indicates strong growth in employment across all Member States, except Portugal, for which data is collected.

While the number of restaurants and cafe-restaurants in the EU increased in the late 1980s and early 1990s across Member States, the trend in both Denmark and Luxembourg is downward.

The increase in enterprise numbers and employment is in line with growth in restaurant turnover along a well established upward trend over the last decade. There are variations across different Member States and growth has slowed over the last two years reflecting the impact of economic recession on business, tourism and other leisure demand. Within the overall trend increase, turnover in the fast food and take-away sector has grown most rapidly, although again there are substantial variations across countries with meals in bars and public houses showing the fastest growth in both the United Kingdom and Ireland.

Restaurant services are not internationally traded although an important market for their services are foreign visitors on holidays or business trips. Estimates for expenditure by tourists on food vary from 20 % to 25 % of their total expenditure.

**Table 1: Restaurants, snack bars, cafés and other eating places  
Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	21 445	2 268	(8) 43 878
Danmark (1)	5 894	1 680	41 686
BR Deutschland	(4) 85 311	(3) 9 377	(4) 312 887
Hellas (2)	(7) 19 200	N/A	50 980
España (3)	118 524	11 619	(8) 106 306
France	68 476	13 170	320 059
Ireland	2 223	400	15 363
Italia (4)	(7) 91 102	N/A	N/A
Luxembourg	475	203	3 707
Nederland (5)	17 792	3 415	103 000
Portugal (4, 6)	2 912	605	35 811
United Kingdom	46 607	11 562	N/A

(1) Including also nightclubs, dance halls, etc.

(2) 1988

(3) 1989

(4) 1990

(5) Including also sleeping- and dining-car services.

(6) Covers only enterprises with at least 5 employees. Including also canteens, messes, sleeping- and dining-car services.

(7) Number of local units

(8) Number of employees

Source: Eurostat: Mercure

**Table 2: Restaurants, snack-bars, cafés and other eating places**  
Number of employees

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	23 201	29 872	30 666	32 262	40 279	43 116	44 107	43 878
Danmark (1)	27 031	33 664	35 003	36 491	35 994	36 965	37 914	N/A
BR Deutschland	233 260	259 710	282 908	288 538	302 582	307 114	323 832	338 849
España	N/A	N/A	N/A	N/A	91 248	106 306	110 330	119 010
France	N/A	165 197	179 577	179 087	204 870	233 651	237 790	239 683
Luxembourg	1 500	2 074	2 188	2 404	2 590	2 864	3 027	3 207
Nederland (2)	N/A	N/A	N/A	N/A	60 500	64 000	67 944	74 000
Portugal (2, 3)	N/A	N/A	N/A	N/A	33 573	37 341	35 046	N/A

(1) Including also nightclubs, dance halls, etc.

(2) Including also sleeping- and dining-car services.

(3) Covers only enterprises with at least 5 employees. Including also canteens and messes.

Source: Eurostat: Mercure

**Table 3: Restaurants, snack bars, cafés and other eating places**  
Number of establishments

(units)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	11 069	15 107	15 327	15 605	16 282	16 922	17 656	18 231	N/A
Danmark	10 170	11 027	12 314	12 584	13 036	13 266	12 809	11 555	(1) 8 753
BR Deutschland	68 027	N/A	80 959	N/A	85 810	N/A	90 326	N/A	N/A
España	27 381	37 227	39 220	40 038	43 985	49 167	50 047	51 154	53 145
France	N/A	66 289	65 935	61 743	68 667	71 223	73 747	N/A	N/A
Italia	86 739	N/A	89 424	88 990	88 119	88 713	90 049	91 102	N/A
Luxembourg	313	401	420	425	436	460	477	475	N/A
Nederland	N/A	N/A	17 204	17 533	18 044	18 798	19 154	20 120	21 613
Portugal	1 639	N/A	2 693	2 889	2 916	3 016	3 504	4 078	4 751

(1) Excluding cafés and other eating places.

Source: Eurostat: Tourism Yearbook

## MARKET FORCES

### Demand

The demand for restaurant services is influenced by a variety of factors including disposable incomes, demographic factors, changing consumer tastes and the level of tourist activity. Restaurants also compete with other leisure activities including cinema, theatre, home video and sports for the discretionary spending of the consumer. The propensity to eat outside the home is most strongly, and positively, linked to increases in disposable income. As a result, the general trend in demand

for restaurant services has been upwards, although it has come under new pressure from the development of home-delivered foods and retail sales of high quality pre-prepared meals.

Private expenditure on eating out is generally a luxury and is vulnerable to dips in disposable income. Similarly, corporate entertainment, important at the upper end of the restaurant market, is closely linked to the level of economic activity. Growth in this area is inhibited by policies in several Member States which have imposed tax penalties on corporate entertainment.

**Table 4: Restaurants, snack bars, cafés and other eating places**  
Turnover

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	774	1 124	1 245	1 367	1 505	1 708	1 965	2 268
Danmark (1)	884	1 459	1 581	N/A	245	258	266	1 680
BR Deutschland	N/A	N/A	N/A	8 766	N/A	9 377	N/A	N/A
España	N/A	N/A	N/A	N/A	N/A	11 619	N/A	N/A
France	N/A	8 088	8 663	8 714	10 423	11 909	13 185	13 170
Luxembourg	55	91	102	116	126	145	171	203
Nederland (2)	N/A	2 135	2 276	2 396	2 545	2 811	3 060	3 415
Portugal (2, 3)	N/A	N/A	N/A	N/A	457	571	605	N/A
United Kingdom	4 234	7 228	6 991	8 358	9 887	10 798	11 302	11 562

(1) Including also nightclubs, dance halls, etc.

(2) Including also sleeping- and dining-car services.

(3) Covers only enterprises with at least 5 employees. Including also canteens and messes.

Source: Eurostat: Mercure

**Table 5: Restaurants, snack bars, cafés and other eating places  
Ten leading restaurant groups in Europe, 1993**

Rank	Group (Country of origin)	Branded outlets	Turnover (million ECU)		Number of outlets	
			1993	1992	1993	1992
1	Mc Donald's (USA)	Mc Donald's	24 775	17 320	1 808	1 542
2	Accor (F)	L'Arche, BB. Burger, Boeuf Jardinier, Cafe Route, Cesario, Courte Paille, L'Ecluse, Pizza del Arte, Sites de Tradition	6 016	5 967	522	510
3	Autogrill SPA (I)	Allemagna, Amico, Arabesque, Autogrill, Motta, Down Town, Duomo Center, La Pergola, La Terraza, Pentes, Magic, Spizzico	4 300	4 100	386	370
4	Grand Metropolitan (UK)	Burger King, Haagen Dazs, Country Carvery, Country Grill, Old Orleans	4 140	3 208	511	534
5	Whitbread (UK)	Beefeater, Beml, Churrasco Pizza Hut, TGI Friday's	3 970	4 900	701	667
6	Forte (UK)	Happy Eater, Harvester, Le Dome, Little Chef, Sbarro, Sogerba, Welcome Break, Wheelers KFC	3 943	4 278	640	1 015
7	Lufthansa Service (D)	LSG Airline Catering, Partyservice, 21 Airport-Gastronomie	3 900	3 836	N/A	N/A
8	GIB Group (B)	Family Buffets, Lunch Garden, New Motocest, Quick	3 464	3 091	308	283
9	Gate Gourmet International Swissair (CH)	Restaurants Aeroport, Relais la Tour, Musees, Traiteur, Catering Aerien	2 877	N/A	N/A	N/A
10	Micros Gastronomie (CH)	Restaurants Migros, Gourmessa, Glattzentrum	2 628	2 519	204	202

Source: *Néo Restauration Magazine*

Overall, however, the proportion of total consumer spending on eating out has risen over the last decade. It is estimated that the EU average is over 5 %, although this hides substantial variations between Member States. In some cases these differences reflect the importance of the tourism sector. The proportion is above average in Spain and Portugal, while in others it reflects traditional attitudes to eating out.

If the EU catering industry is to follow the USA, where it is often cheaper to dine in a fast food or family restaurant than to buy equivalent ingredients and cook at home, then the tendency for locals to choose to eat out on the basis of cost and convenience will become more established. The trend, in the EU, towards eating out is in fact becoming more commonplace and relatively less expensive.

The growth of tourism is clearly a major source of business for the consumer catering industry in the EU. Even when staying in self-catering accommodations the tourist tends to eat out rather than cook for himself; when staying in hotels and similar establishments there may be little choice but to frequent restaurants and cafes. In common with many other companies who deal in the totems of popular culture, the large fast food firms view the relatively young and increasingly affluent populations of southern European Member States as providing the best prospects for continued growth in Europe in the 1990s. The ageing of the EU population will, however, dampen the growth of fast food outlets in the medium term. In addition, the "saturation point" for fast food restaurants is approaching in a number of northern Member States and is thought to have already been reached in the United Kingdom. Relatively rapid growth in demand for ethnic restaurants, particularly those with cuisines which are not well represented at present, is also expected across the EU.

The increasingly rapid spread of communications media, through satellite television for example, aided by the growth

of international tourism flows has accelerated the trend towards greater internationalisation of the restaurant market and aided the growth of US-type food outlets serving hamburgers and pizza. There are significant trends also towards healthy foods, e.g., pasta and the replacement of red meat and red wine by their white counterparts and by fish. In addition, the number of ethnic restaurants in many European cities is growing, reflecting internationalisation trends and the increased confidence and sense of experimentation among consumers. Conventional food service styles, products and concepts are being rendered obsolete by 1990s lifestyles. An exception to these trends is the resurgence of regional cuisine; especially in France, Spain and Germany.

Family restaurants relying usually on local business may also benefit from growth in tourism. Smaller restaurants in remote areas may gain from international tourism slumps, as EU nationals spend their holidays exploring their own countryside. Transport restaurants are also susceptible to fluctuations in tourism. A recent trend has been the development of fast food and theme restaurants in airports, rail and ferry terminals.

### Supply and competition

The key competitive factors in the restaurant industry are location, food quality, price and decor. Entry and exit barriers in the restaurant sector are negligible at most levels of the industry and small, often family-run, firms predominate. As a result, and because of the localised nature of competition, there is little danger of monopolistic practices emerging and strong competition is evident both within and across segments of the industry.

Take-away and fast food has been the main growth area in the European restaurant sector in recent years. USA chains provide the driving force behind this growth. Having expanded initially in the United Kingdom, they are spreading through mainland Europe, though facing increasing competition from

indigenous companies. Theme restaurants are also rapidly spreading. This spread is not simply driven by ethnic entrepreneurs but also by the larger restaurant chains who are increasingly using sophisticated market research techniques to examine concepts, test pilot operations and are utilising Epos (Electronic point of sales) information and geo-demographic databases to determine suitable locations. Like fast food outlets before them, a new set of US-based theme restaurants are now well established in the UK - Tex-Mex, Cajun, and 1950s nostalgia themes - and expanding elsewhere in northern Europe. A more recent development has been the growth of home-delivery food services in Europe. These outlets prepare pizza and oriental dishes in a central location for delivery within a neighbourhood. This service, coupled with the growth in home video and satellite television is encouraging more Europeans to eat prepared food at home rather than in a restaurant.

A critical issue facing the restaurant sector within the EU over the coming decade is labour availability and the ability of the sector to compete with other industries in offering a worthwhile career to staff. Because it is dominated by family owned enterprises, the concept of "employment" in much of the European restaurant sector is blurred. Very frequently husband and wife work together in a restaurant and may be helped by grandparents, children and other family members whose remuneration may be "in kind" rather than through cash payment. Throughout the EU, however, owners of family restaurants are discovering that their offspring are being attracted to other employment areas.

Staff turnover in restaurants is high and there is a lack of structured training in several countries. Where employment is regulated, pay and conditions in EU restaurants tend to be towards the minimum for each Member State. There are exceptions, but generally employment conditions in restaurants involve long and unsociable hours, relatively low levels of basic pay and a reliance by employees on gratuities and service charges. Pay and conditions tend to be best where agreements have been reached between employers and trade unions; but, these agreements tend to be confined to the larger and more structured employers. Many restaurants in the EU offer pay and conditions at the lower end of the scale applicable to unskilled workers at the national level and this is a contributing factor to high levels of staff turnover.

EU Social Legislation will improve the working conditions of thousands of restaurant workers in the Community. It will also raise the cost-base of employers in the sector. Organisations representing European restaurant owners have expressed concern about the impact of the legislation and the ability of Member States to guarantee fair competition through EU-wide enforcement of the legislation.

As demographic patterns develop and family sizes decrease, particularly in northern Member States, and turnover continues to grow, the restaurant sector will experience staff and skill shortages. This is already evident in the United Kingdom, Germany, Benelux, France and Denmark where restaurant chains are seeking to recruit part time workers, students and senior citizens as well as immigrants from outside the EU. The problem is not as serious in southern Member States. However, tourist authorities in these Member States have expressed concern that there will be migration of restaurant (and other hotel) workers from Greece, Spain, Portugal and south Italy to fill vacancies in north Europe. Such migration is likely to add to pressures to improve wages and other working conditions.

Competition in the restaurant sector is similar to that in other services which are dominated by small individually-owned enterprises. The cost of entry to the business is relatively low and this encourages entrepreneurs to enter a local market, particularly when the restaurant business is seen to be growing. The establishment of restaurants is, however, governed by

regulations in all Member States. These include the granting of planning permission, the certification of the premises by the local health authority and in some Member States the granting of a license to sell alcohol. Generally, different regulations governing restaurants are not a barrier to competition. Future mergers to create national or supranational chains are also unlikely to distort competition in the sector.

Competition within the sector is complex and differs across market segments and locations. Price elasticity tends to be lower at the top end of the market where competition is based on reputation, image and a perceived high quality of food and service. These competitive criteria also exist in the broad segment of family restaurants in which marketing and advertising are rarely undertaken. Location is a key factor but ambience, quality of food and personality of the proprietor are also important. Price assumes greater importance when the reputation of the restaurant is largely confined to the local community. Price as a key factor is also particularly evident in "in store" cafeterias and restaurants, in coffee shops and in the fast food sector. Overall the trend has been for prices to move in line with inflation but strong local competition has kept price increases below inflation in larger cities throughout the EU.

The relatively minor position of corporations and chains in the European restaurant sector and the USA base of some major players make it difficult to comment on profitability. Statements from HOTREC, the EU hotel and restaurant lobby organisation, and from national associations of restaurant owners indicate a relatively high level of business failures among EU restaurants over the past decade and that the lack of expansion by the vast majority of restaurants reflects lack of profitability. For a majority of European restaurant owners the business is a "way of life" which is sufficient to provide a modest standard of living for a family. In the case of some of the major players, such as retail stores, restaurants provide a service that attracts customers and make a contribution to the overall profitability of the enterprise. Within each Member State there are also large numbers of restaurant businesses which provide a good commercial return on investment.

### Contract catering

In addition to public catering, the contract catering sector is a fast growing segment in the restaurant business (15 % a year, according to FERCO). The number of meals served by the EU contract catering industry grew from 1.1 billion in 1980 to 2.1 billion in 1990. It is forecast that 3.3 billion meals will be served by the year 2000. The market segmentation in the contract catering business sees the predominance of business, industry and State institutions which together account for 66 % of the market. The remaining third is shared by healthcare (14 %) and education (19 %).

Contract catering, provides quality food at an economic price. In 1990, sales reached 1 982 million ECU in France, 1 884 million ECU in the United Kingdom and 1 708 million ECU in Italy. By contrast, sales in the German market did not exceed 445 million ECU.

The future of the contract catering industry looks optimistic: as it expands from offices and factories into schools, clinics and military establishments, the growth projection continues on its steep upward curve.

### Production process

The preparation and service of food has traditionally been a labour intensive exercise and this is still largely true. In most restaurants the raw materials tend to be supplied in a fresh state, prepared by hand, cooked by traditional methods and served to diners at their tables. Fast-food outlets differ from this categorisation in that the raw materials are often semi-prepared and take-away business is of considerable impor-

**Table 6: Restaurants, snack bars, cafés and other eating places  
Ten leading fast food restaurants in Europe, 1993**

Rank	Group (Country of origin)	Countries established	Turnover (million ECU)		Number of outlets	
			1993	(1992)	1992	(1992)
1	Mc Donald's (USA)	All countries except four (1).	24 775	17 320	1 808	1 542
2	Grand Metropolitan Burger King (UK)	DK, D, E, F, IRL, NL, UK, N, S	3 800	N/A	500	N/A
3	GIB Group Quick (B)	B, F, L	2 806	2 474	234	210
4	Pepsico KFC (USA)	DK, D, GR, E, F IRL, NL, UK, CH	1 924	1 776	375	353
5	Food Service System Italie Cremonini (I)	I	533	432	65	54
6	Goody's SA (GR)	GR	494	358	75	63
7	Groupe Le Duff Brioche Doree (F)	E, F, I, NL, UK	377	N/A	135	118
8	La Croissanterie (F)	GR, E, F, IRL, I, P	252	284	132	150
9	Group Holder La Viennoisiere (F)	E, F	N/A	187	N/A	182
10	Bretonniere SA Pomme de Pain (F)	F	180	165	45	43

(1) Albania, Bulgaria, Romania and former Yugoslavia.  
Source: Néo Restauration Magazine

tance. It should be noted that some restaurants have reacted to the recession by moving into the "home deliveries" market.

Some machinery may be used in the chopping and mixing of raw materials and some foods may be stored under frozen or chilled conditions, but these are often the limits of technology in a European family restaurant. Pressures on the availability of skilled staff as well as high labour costs are, however, forcing the industry to look towards technology to help reduce unit costs. Automation and technology are playing an increasingly significant role in the preparation of restaurant meals.

While progress in introducing new technologies is relatively slow in the small independent restaurants, use of new technologies are very evident among restaurant chains and larger enterprises. Fast food restaurants and contract caterers have practised bulk preparation of food and its storage under frozen or chilled conditions for many years. Such methods are also used in hospital catering and in the provision of meals in industry and institutions. Frozen products, including meat, fish, potatoes and vegetables are used extensively in the fast food and "quick service" sectors and there has been widespread development of freezers and regeneration cookers. However, the refrigeration industry has been subject to criticism because of its use of CFC gases in refrigeration units. As a result, a new generation of "environmentally friendly" refrigerators and freezers which are "CFC free" are now on the market.

Worries about meal "quality" are a key consideration limiting the spread of bulk preparation methods throughout the restaurant industry. New technologies used in "cook chill" and "sous vide" systems have helped reduce the importance of this barrier. The principal advantage of the "cook chill" system is that food can be prepared in batches, according to strict specifications, and these "batches" are then used to compile meal menus. The ability to cook food in bulk and to "hold"

it for several days has enabled restaurants to reduce staff requirements; particularly at night or over week-ends. Clusters of restaurants, particularly in the non-hospitality sector, are increasingly investing in central production units (CPUs) from where prepared food is transported to the point of sale for finishing and service. "Sous vide" originated in France and is growing in popularity at all levels of the market. Under this system, dishes and delicate sauces are cooked and preserved in a plastic pouch, which is chilled, for regeneration prior to serving. The system has enabled caterers to expand their menu by having additional dishes under storage.

Electronic technology has offered greater control over traditional cooking media such as ovens and gas or electric ranges. The "combination oven" which can cook foods in several ways, is a product of this technology and enables designers to add "cooking cycle programmes" and electronic probes that measure temperature and moisture content of the food during the cooking cycle. Microwave ovens, which are now widely used at all levels of the market, are also enhanced by electronic controls. Energy costs in restaurants are relatively high and this has led to greater emphasis on energy efficient cookin

The advent of halogen elements in electric ranges and induction cookers provide the most promising developments.

The principal "stock in trade" of restaurants is food in a raw or semi-prepared state. At all levels of the industry there is increasing demand for conformity to specifications and continuity of supply. The "Quality" system has been employed informally by the vast majority of restaurateurs over the centuries and still works effectively today. Among corporately-owned restaurants, however, quality is achieved through more formal structures. Detailed specifications are drawn for each food item and there is a greater emphasis on partially processed

or prepared foods which are frequently supplied in a frozen state. A growing number of corporately-owned restaurants now operate just-in-time systems similar to those operated by the manufacturing industry.

## INDUSTRY STRUCTURE

### Companies

While becoming increasingly dominated by big chains, as growth in the fast food and take-away sector outpaces average growth, all EU countries continue to offer an enormous range of family run restaurants and cafes that are central to the appeal and character of the industry. The increase in market share and overall market growth of the chains has, however, been at the expense of the traditional independently-run operations. An Economist Intelligence Report, "Eating Out in the United Kingdom" estimated that the restaurant market was becoming increasingly concentrated.

The sector includes chains of restaurants, often owned and operated by conglomerates, and also embraces the fast food subsector which is largely controlled by USA companies operating through local franchises. The largest catering group in the EU, McDonald's, fits this profile perfectly. Fast food restaurant chains are both multiple retailers and a production enterprise. In both these facets of their activities they have similarities with multinational multiple retailers and with multinational manufacturing enterprises. Like the retailers, expansion across national borders has occurred first and most substantially in the wealthiest EU Member States.

The most significant group of restaurants, which represents more than 90 % of the sector across the EU, is family-owned and employs less than ten people, some of whom may be casual or part time employees. Family-owned restaurants span the full spectrum of dining out in Europe from simple take-away "fish and chips" shops in the United Kingdom to the award-winning restaurants of the famous French chef-patrons. The local family restaurant often offers dishes based on local or regional cuisine. More and more, this cuisine is offered outside its country or region of origin. It is no longer unusual

to find, for instance, restaurants serving Italian cuisine in France, Greek restaurants in the United Kingdom or French restaurants in Germany. A trend throughout Europe has also been the success of restaurants offering regional cuisine outside of their own regions, for instance Tuscan dishes in Veneto or the cuisine of Andalusia in Catalonia. Similarly, many upmarket French and Italian restaurants are adopting more adventurous menus featuring regional dishes and their influence is filtering down to more mainstream European restaurants.

The gourmet segment of the market is dominated by family-owned restaurants and in most Member States it is the personality, reputation and skill of the patron who may be the chef or the maitre d' hotel on which the success of the enterprise is based. Many such family-owned restaurants at the top end of the market are relatively large concerns employing up to 100 people and some, like the Roux Brothers in the United Kingdom and Paul Bocuse in France, have developed ancillary enterprises. More typical even at this level, however, is the restaurant serving 50 dinners each evening, owned and operated by a single proprietor and employing a staff of around 20.

Corporations and chains are rare in gourmet dining, except in the context of hotels. Many four and five star hotels of Europe offer at least one restaurant serving gourmet food. The scale and variety of the food offered in hotels is also expanding. More hotels are now operating ethnic restaurants in addition to the cuisine of their region, an international menu and informal dining in brasserie and coffee shop styles.

### Strategies

Investment by corporations has been most obvious towards the lower end of the market, particularly in the areas of popular catering, transport catering and fast food. Groups like Forte's Little Chef (United Kingdom), GIB (DK), Quick (F), GfnBAB (D) and Autogrill (I) have developed successful chains of restaurants close to motorways and associated restaurants can also be found in towns and cities. These chains tend to be national rather than transnational and a dominant EU-wide restaurant chain has yet to emerge.

**Table 7: Restaurants, snack bars, cafés and other eating places  
Top 20 restaurant chains in Europe, 1993**

Rank	Group	Country	Turnover (million ECU)	Number of units
1	Mc Donald's (1)	USA	3 737.4	1 808
2	Accor	F	907.4	522
3	Autogrill / SPA	I	648.6	386
4	Grand Metropolitan	UK	624.4	511
5	Whitbread	UK	598.8	701
6	Forte	UK	594.7	640
7	Luftahnsa Service	D	588.2	N/A
8	GIB Groupe	B	522.5	308
9	Gate Gourmet	CH	433.9	N/A
10	Migros Gastronomie	CH	396.4	204
11	Casino	F	384.6	225
12	AGAPES	F	384.6	158
13	Mövenpick	CH	362.0	115
14	KFC Europe	USA	290.2	375
15	Servais/Saresco	F	281.0	N/A
16	DSG Deutsche Service der Bahn	D	200.6	428
17	Cremonini Restauration	I	181.0	208
18	Nordsee GmbH	D	172.3	287
19	GfN Raststätten	D	167.9	217
20	Karstadt AG	D	165.3	137

(1) Non-European enterprise  
Source: HOTREC



**Table 8: Restaurants, snack bars, cafés and other eating places**

**Expected average annual growth rates in the EU**

(%)	1994-95	1995-98
Turnover	4.0	4.0
Employment	2.0	2.0

Source: Fitzpatrick Associates, Economic Consultants

A transnational restaurant chain may emerge through activities in other sectors such as retailing or hotels. Forte's "Little Chef" is expanding alongside the hotel group's hotel joint ventures in Italy, Spain and Ireland. Supermarkets and department stores already operate large chains of cafeteria style restaurants in France, Germany, Benelux, United Kingdom and Italy. The expansion of these stores within the Community would lead to the expansion of their restaurants also. Karstadt, Hertie and Kaufhof operate large restaurant chains in Germany and the Casino supermarket chain operates the largest group of restaurants in France. Another large scale retailer involved in restaurants includes GB Inno-BM of Belgium. In addition, individual restaurateurs have opened restaurants offering their own national or regional cuisine in larger cities of Member States. EU capitals for instance are locations for restaurants in the style of virtually all Member States.

Investment by corporations from outside of the EU has been an increasingly important phenomenon since the early 1980s. This has been confined almost entirely to the fast food sector and has been spearheaded by the USA chain, McDonald's, which had 1 808 outlets in Europe at the end of 1993. Other chains which originated in the USA like Burger King, Kentucky Fried Chicken and Pizza Hut have also been making an impact on this segment of the market - Burger King and Pizza Hut are now owned by the United Kingdom companies, Grand Metropolitan and Whitbread, respectively.

Popularity of fast food and fast service can be attributed to the European acceptance of American dining culture, particularly among young people; to the expertise of the American chains in the areas of product development, location of outlets, staff training, consistency in quality; and, to changing living patterns in Europe. The principal food products served in this sector include hamburgers, chicken, pizza, pastry, fish and potatoes. Entrepreneurs in each Member State have established national and regional fast food chains which compete with the US-originating franchised outlets. In this area France, for example, has achieved considerable success with groups like Quick, La Brioche Dorée, La Croissanterie and Pomme de Pain.

Investment in the EU restaurant sector has also come from entrepreneurs from outside of the EU opening "ethnic" restaurants. Thousands of restaurants owned by immigrants and offering Chinese, Indian, Thai, Vietnamese, Argentinean, Indonesian and other cuisines scattered throughout the Community, are seeing their market share increase.

### Impact of the Single Market

The removal of barriers to movement within the EU and the creation of the Single Market has had an indirect effect on the hotel sector. The free movement of goods, capital and services had an almost negligible effect on this sector. The measures which have been most relevant are those ensuring the free movement of people, this constituting the mainstay of the tourism sector. Increased intra-EU business flows for instance have assisted business travel. However, this free movement of people has not fully materialised yet and, when it does, it will be more in the framework of the Schengen Convention than of the Single Market. It must also be remembered that the hotel sector already operated on a tran-

snational basis long before the Internal Market programme was launched.

There remains important distortion to travel due to differences in VAT rates across Member States. Hotel and restaurant services have not been fully incorporated in the lower VAT bands, and much is left up to the individual Member States. Hotel services are included in the lower band of VAT at the discretion of the Member States. This situation may, however, change in the near future with the setting up of a definite VAT regime.

In the meantime, negative impacts on the hotel sector through loss of competitiveness due to VAT rate against non-EU countries have materialised. According to all major sources on tourism (e.g. World Tourism Organisation, OECD, European Travel Commission, etc...) while tourism in Europe is growing, it is growing at a much slower pace than the rest of the world. Europe has the lowest growth rate for tourism in the world and is below the international average. Europe has also lost approximately 10% of its market share of international tourism over the last 10 years.

The industry remains concerned about the increasing regulatory burden being placed through developments in consumer, social and environmental legislation. Social legislation and the issue of atypical workers also affects this sector to a very large degree.

### REGIONAL DISTRIBUTION

Restaurants are ubiquitous in Europe. Many restaurants at the upper end of the market are often found in relatively remote rural areas; an aspect which may serve to improve their "charm". In many cases location is a key factor, both in terms of the ambience it may lend to the overall "dining" experience, as in high quality restaurants or in terms of the throughput it helps generate.

In general, concentration and level of competition is related to population densities. Cities and larger towns have more restaurants per capita than do villages and rural areas. An exception lies in areas of tourism interest which tend to have a large number of restaurants competing for tourism business, although some may operate on a seasonal basis.

### REGULATIONS

There are a wide variety of national and EU regulations impacting on the restaurant trade. The most important include compliance with hygiene regulations and certification by local health authorities, regulations relating to working conditions; and, in some cases, the granting of a licence to sell alcohol. In some Member States restaurants must also comply with local and national regulations on the protection of the environment. Hygiene regulations across the EU are in the process of being harmonised, and the harmonisation of qualifications is improving worker mobility. In addition, EU labour legislation is constantly impacting on conditions of work. Harmonisation of VAT rates (and excise duties on alcohol) will also have differential impacts on restaurants across the Community over the next five years. Restaurant services are not included in the list of goods and services to which Member States may apply a reduced rate of VAT. However, the Member States that were applying a reduced rate to restaurant services at 1 January 1991 are allowed to continue to do so at least until the end of 1996.

The Directive on the hygiene of foodstuffs (93/43/EEC) was adopted in June 1993. Standards of hygiene are set out in the annex to the Directive together with suggestions of ways in which Member States can assist firms in achieving these standards. Firstly, it is recommended that ISO 9000 quality standards be promoted within the EU. Secondly, it is recommended that codes of practice for food hygiene be drawn up



for particular sectors, in order to assist firms and individuals in fulfilling their legal obligations, as set out in the annex. It is envisaged that these codes of practice may eventually be harmonised at an EU level. Thirdly, the use of the HACCP (Hazard Analysis and Critical Control Points) system is to be encouraged among those who have legal obligations in relation to food hygiene. Finally, it is important to remark that the HACCP system has been highly criticised as impossible to implement in SMEs, which make up the bulk of the restaurant sector.

A number of National Associations representing the sector are lobbying to have the lower rate of VAT applicable to all restaurant services within the EU after 1996.

## **OUTLOOK**

The restaurant sector in the EU grew throughout the 1980s and despite a slowdown in recent years overall growth is likely to continue during the 1990s. With most EU Member States well recovered from the recession which commenced in late 1990, accelerating demand for restaurant services can be expected in the short-term. With economic prospects remaining bright into the medium term, the outlook for the restaurant trade is similarly good. Increased spending on eating out, somewhat above the level of GDP growth, is expected. The EIU predict GDP growth in western Europe to average 2.5 % over the 1995-99 period.

Growth in intra-EC travel and in the number of visitors from outside the EU will increase demand for restaurant facilities. Reflecting an increased emphasis on quality and higher value-added tourism, restaurant expenditures per tourist should increase. More short-breaks and second holidays should contribute to increased trips and restaurant expenditures among domestic tourists in north Member States; and, international tourism revenues in the Mediterranean Member States should continue showing strong signs of growth similar to 1994.

While a growing share of household expenditure was devoted to eating out during the 1980s, this trend may have run its course in some of the more developed Member States. Disparities in Gross Domestic Product (GDP) and private consumption expenditure growth rates will create higher levels of demand for restaurant services in those Member States whose economies grow fastest.

Employment growth is expected to be below that of turnover. The level of automation will increase, motivated by cost-cutting, service improvement and problems with attracting staff. Restaurateurs are also likely to seek other service innovations reducing labour usage.

National growth rates will also be affected by the prevailing tradition of dining in restaurants, which varies widely across EU Member States. Social attitudes towards eating out are gradually changing and as the EU becomes more integrated, the dining tradition is likely to spread. Different segments will also grow to varying extents across Member States.

Countries with an emerging youth population will also see more rapid growth in fast service and fast food restaurants and those with an ageing population will see more growth in health food and leisure style restaurants. Changing demographics, social patterns and tastes will also offer opportunities for restaurants to increase sales for home deliveries, although this may have some impact on traditional sales. As more people move into urban areas there will be fewer family meals, greater consumption of snacks and small meals and more dining in restaurants as a leisure activity.

Written by: Fitzpatrick Associates

The industry is represented at the EU level by: Confederation of the National Hotel and Restaurant Associations in the EC (HOTREC). Address: 111 Blvd Anspach Bte 4, B-1000 Brussels; tel: (32 2) 513 6323; fax: (32 2) 502 4173; and European Federation of Contract Catering Organisations (FERCO). Address: Rue Franklin 136, B-1040 Brussels; tel (32 2) 735 0186; fax (32 2) 735 9601.

# Hotels

## NACE 665

The hotel sector comprises a disparate variety of establishments in terms of size and range of services provided. Tourists and business travellers form two distinctly different markets for hotel services, both of which are now recovering strongly having slumped in 1991 and 1992. Fragmentation of demand in recent years has resulted in growth of both affiliated hotels providing a uniform product at different price/quality levels, and of hotels striving to differentiate their product. Concentration in the industry is growing as large hotel chains increase market share, although this increase should not be a source of concern to competition authorities. In response, smaller hotels are increasingly joining voluntary associations. The outlook is for modest growth during the mid-1990s.

### INDUSTRY PROFILE

#### Description of the sector

The hotel sector comprises establishments which vary widely both in terms of size and services provided. At one end of the scale there are small, single location, family run enterprises providing accommodation services and at the other are large hotels, frequently part of a chain, operated in a highly professional manner and providing a wide range of services. Such services might include restaurant and banqueting, public bar services, health and leisure facilities, foreign exchange facilities, shopping facilities, business secretarial services and conference facilities. The number of hotels supplying accommodation only is now relatively small, with a discernible trend towards larger establishments providing a broader range of services. As a result, the extent to which the business of hotels impinges on other service sectors is increasing.

Official statistics on hotel turnover and value-added in different EU countries do not exist. Nor are there consistent definitions

of hotels and similar establishments across countries, making aggregations and inter-country comparisons difficult.

Eurostat data indicates that the hotel industry is most important in Italy and Germany, although definition differences suggest care in making any comparisons. For example, France has fewer enterprises and hotel employees than Germany, but has considerably more bed-places.

#### Recent trends

Official employment data in the hotel industry is only available for eight of the twelve Member States. The trend in overall employment is upward reflecting industry growth and the limited possibilities for capital substitution. The overall growth in total employment masks a decline in the number of self-employed persons, reflecting growth rates of larger chain operations at the expense of smaller traditional hotels.

Despite definition differences, a trend increase in the volume of turnover in accommodation services, between 1987 and 1992, is evident from guest flows in most Member States. However, the strength and volatility of this growth varied across Member States. Spain was the only Member State to experience a decrease in hotel guest nights between 1987 and 1992. Increases in northern Member States were, on average, higher than in Mediterranean countries. The trend in non-resident guest nights differed from that in total guest nights in most Member States. While Belgium, France, Ireland and Portugal all recorded sharp growth in guest nights from non-residents between 1985 and 1992, falls were recorded in Spain and Italy. In value terms, however, turnover is unlikely to have risen since 1990 because many hotels have been forced to reduce tariffs to maintain occupancy levels.

Analysis of available bed nights indicates an increase in the supply capacity of the industry. The number of bed places increased in all Member States over the 1985 to 1992 period showing a continuation of the trend in the first half of the decade. The increase in available capacity was less evident in Italy where growth was only 4 %; while, Denmark, West Germany, Greece, Spain and Portugal all experienced increases in excess of 20 %.

The increase in the number of beds and bedrooms was against a background of a slight decline in the number of hotel and

**Table 1: Hotels**  
**Main indicators, 1991**

	Number of enterprises employed	Turnover (million ECU)	Number of persons
Belgique/België	2 128	834	(7) 14 666
Danmark	851	793	16 995
BR Deutschland	(3) 38 755	(2) 8 473	252 686
Hellas (1)	(6) 5 493	N/A	41 116
España	(6) 9 503	5 188	(7) 124 370
France (4)	28 687	9 165	181 443
Ireland	1 050	635	23 084
Italia (3)	(6) 36 166	N/A	N/A
Luxembourg	326	151	2 890
Nederland	2 531	1 341	35 000
Portugal (3, 5)	591	539	26 192
United Kingdom	13 633	9 138	N/A

(1) 1988

(2) 1989

(3) 1990

(4) Excluding guest and boarding houses

(5) Covers only enterprises with at least 5 employees.

(6) Number of local units

(7) Number of employees

Source: Eurostat: Mercure

**Table 2: Hotels**  
**Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	11 544	10 920	11 216	11 508	12 135	13 032	14 293	14 666
Danmark	12 428	15 379	16 218	15 747	15 580	16 995	16 871	N/A
BR Deutschland	126 990	144 570	148 993	153 287	157 558	160 708	168 781	174 570
España	N/A	N/A	94 880	N/A	100 434	112 528	113 769	124 370
France (1)	N/A	121 886	122 420	119 987	129 768	140 692	143 940	148 095
Luxembourg	1 850	2 143	2 134	2 194	2 333	2 347	2 466	2 461
Nederland	N/A	N/A	N/A	N/A	26 100	28 000	29 877	30 000
Portugal (2)	26 525	24 209	24 399	N/A	27 399	25 680	25 915	N/A

(1) Excluding guest and boarding houses

(2) Covers only enterprises with at least 5 employees.

Source: Eurostat; Mercure

similar establishments. This reflects the industry trend towards larger units. Capacity also increased faster than guest flows, while occupancy rates in the hotel industry fell sharply in 1991. They were above 60 % in 1989 and 1990 in each of the eleven EU Member States surveyed by Pannell Kerr Forster (PKF), ranging from 62 % in Luxembourg in 1989 to 79 % in Italy. However, in 1991 they fell in all Member States and have remained low. Low occupancy rates are particularly evident, in Spain (53 %), Portugal (54 %), Belgium (60 %) and France (60 %) during 1993.

Data collected by PKF on average room rates across different European countries places France's hotels as the most expensive; although as discussed later, patterns in EU capitals reflect different factors. Prices in EFTA countries tended in general to be higher than in the EU with particularly high average rates in Austria and Switzerland.

Price levels and changes in the EU's capital cities, however, reflect local supply and demand imbalances and local property prices. Analysis by the Economist Intelligence Unit (EIU) indicates that the prices of hotels fell in most Member States in response to lower demand between 1990 and 1993; after having risen sharply in the late 1980s. Reflecting lower prices and falling occupancy rates profit levels also declined in 1991 and 1992.

### International comparison

Horwath International's analysis of the overall performance of hotels by global regions indicates that income before fixed charges per available room and revenue per room were highest

in Europe in 1992. However, Horwath data is most pertinent to chains.

### Foreign trade

Available data on hotel nights does not facilitate a breakdown into intra-EU and extra-EU "exports" and "imports." Most Member States distinguish between resident and non-resident guest nights. Over the second half of the 1980s, the strongest growth in most Member States was non-resident guest nights. However, a slowdown in international tourism growth in the early 1990s, particularly in 1991, has contributed to a decrease in non-resident guest nights in a number of Member States. While official data for 1994 is not yet available, growth in non-resident nights increased rapidly.

## MARKET FORCES

### Demand

The most important consumers of hotel services are tourists, although their importance varies across Member States. For example, Horwath International's hotel survey indicates, that business travellers are of much greater importance in Germany and the United Kingdom.

The commencement of the Gulf War in mid-1990 to the end of 1993 was one of the most difficult periods in the recent history of the European hotel industry. In addition to the war's impact on international travel, recession in Europe and the United States combined to depress the tourist and business accommodation markets. The downturn in demand for hotel

**Table 3: Hotels**  
**Number of guest-nights, total**

(thousands)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	6 472	7 908	7 712	7 735	7 847	9 185	9 580	9 296	10 512
Danmark	8 194	8 744	8 781	9 017	9 034	9 837	10 635	11 231	11 556
BR Deutschland	131 235	128 510	131 299	134 800	140 260	146 980	155 387	160 457	174 495
Hellas	38 081	44 558	43 690	43 754	44 075	44 709	47 037	41 622	48 956
España	96 438	121 016	129 514	138 721	137 338	131 425	119 880	134 499	131 704
France	N/A	N/A	119 980	120 543	125 801	139 064	145 803	141 058	151 239
Ireland	9 529	7 336	N/A	6 665	N/A	N/A	N/A	9 423	N/A
Italia	165 498	170 689	176 660	183 121	188 371	187 301	191 065	195 707	192 567
Luxembourg	906	974	995	997	1 039	1 188	1 194	1 182	1 113
Nederland	11 504	12 240	12 240	11 596	12 233	13 233	14 498	14 752	15 211
Portugal	16 684	N/A	19 700	20 272	21 269	22 053	23 814	26 261	25 314
EU (1)	N/A	N/A	N/A	677 221	N/A	N/A	N/A	745 488	N/A

(1) Excluding UK

Source: Eurostat; Tourism Yearbook



**Table 4: Hotels**  
**Number of bed-places**

(units)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	87 785	87 863	86 766	89 137	87 175	92 543	93 710	86 472	101 804
Danmark	68 574	70 960	73 588	79 004	83 973	85 014	88 468	92 524	96 024
BR Deutschland	568 038	750 595	748 892	739 258	795 244	811 025	824 546	919 727	922 913
Hellas	261 105	316 033	324 301	336 506	350 833	370 648	378 421	393 305	404 259
España	596 874	622 428	637 073	664 839	683 152	707 974	735 749	781 091	817 965
France	663 440	974 872	993 474	1 013 762	1 036 534	1 082 138	1 087 714	1 101 692	1 198 272
Ireland	42 484	39 351	39 583	40 147	40 873	41 260	41 318	43 924	46 434
Italia	1 550 168	1 617 211	1 608 360	1 646 513	1 665 319	1 670 451	1 678 910	1 708 033	1 717 116
Nederland	88 658	98 359	98 888	101 993	100 700	104 043	107 200	108 952	112 511
Portugal	47 945	54 634	58 060	61 050	62 632	64 606	68 045	71 883	76 427
EU (1)	3 975 071	4 632 306	4 668 985	4 772 209	4 906 435	5 029 702	5 104 081	5 307 603	5 493 725

(1) Excluding L and UK  
Source: Eurostat: Tourism Yearbook

bed-nights also had a depressing effect on rates. As hotels strove to maintain occupancy rates the gap between officially published "rack" rates and "achieved" rates widened. As economic growth in most European economies began to pick up, demand growth recovered strongly in 1994.

The distinction between tourist and business market demand is important as they are affected by different factors. While both are strongly affected by the general level of economic activity, business travellers, and in particular the conference market, are more sensitive to economic downturns than tourists. International and domestic business demand is higher in northern Member States. Recent analysis by stockbrokers, Kleinwort Benson Securities, in the EIU's Travel and Tourism Analyst, suggests the importance of service industries and the level of concentration are important components of the demand for domestic business travel. Large service firms tend to have a greater number of branches than their manufacturing counterparts and, thus, generate substantial travel. Closer integration of the EU Internal Market, and subsequent cross-border expansions, will continue to increase the importance of inter-EU business travel.

Traditionally, business travellers are less price sensitive than tourists but become more price conscious during economic downturns. This has been very evident in recent years and may have led to a permanent shift in attitudes towards corporate travel budgets. The implications go beyond seeking lower cost hotel deals. Often, the economic rationale for foreign trips is more carefully scrutinised and cheaper alternatives such as video-conferencing, and greater use of the electronic communication techniques are examined. Technological developments will also aid business travel though. Smart cards and bio-metric technologies are being refined to enable frequent business travellers to save time at international airports. However, Visa International's September 1994 Corporate Travel Survey indicates that a majority of business travellers, in all ten countries surveyed, would like to reduce the number of business trips they take, but they were also strongly of the opinion that one-to-one meetings were invaluable and would not be replaced by video-conferencing. A similar conclusion was reached by a 1994 EIU report on Business Travel which suggested that technology would be most useful in terms of follow-up but would never "act as a wholly acceptable substitute for the introductory meeting or concluding meeting at the end of a business arrangement".

Income levels are an important determinant of overall tourism demand. In more prosperous northern Member States second annual holidays are now commonplace while in the southern Member States international tourism has only recently grown. This reflects rising incomes and increased leisure time arising

from shorter working hours. Increased frequency of holiday-taking spreads seasonal tourist flows and favours hotels relative to the other popular forms of accommodation. In addition, with increased female participation in the workforce and a tendency towards smaller families, a growing proportion of European households have two incomes and higher levels of disposable income.

The relative importance of international versus domestic demand varies widely across Member States. The tourist attractions of France, Greece, Italy, Portugal, Spain and to a lesser extent the United Kingdom and Ireland attract substantial numbers of foreign hotel-guests. Traditional factors, such as climate and income levels affect the habits of domestic holiday-makers across Member States with relatively greater usage of hotel accommodation in northern Europe. A slight reversal of the traditional north to south tourism flows was evident in recent years reflecting increased international holiday-taking by southern Europeans and the declining relative importance of sun and beach holidays. Both trends should boost hotel demand somewhat at the expense of other accommodation. However, having revamped their product and broadened the range of attractions, Mediterranean sun destinations are successfully regaining market share and demand rose sharply in 1993 and 1994. Bad weather in Northern Europe and currency devaluation also helped kick-start demand for Mediterranean destinations.

Long distance travellers are much more likely to use hotel accommodation and in particular hotels at the upper end of the market, while tourists from EFTA countries are more likely to use budget or non-hotel accommodation. Initial tourist flows from eastern Europe may also favour non-hotel accommodation. An ageing European population and the continued importance of business travel will help maintain demand for hotels at the upper end of the price-quality range, but such hotels will be adversely affected by trends towards cheaper and independently organised holidays. However, not all independent tourists seek budget accommodation and many hotels at the upper end of the market are cooperating with other suppliers and adapting their product offer to attract the more lucrative segments of this market.

### Supply and competition

Economic power is important in negotiations between the industry and upstream suppliers, such as major tour operators, but the need to maintain goodwill and quality standards generally tempers excessive exercising of power. Similarly, the emergence of anti-competitive practices through increasing vertical integration is less likely because of the volatility of the tourism demand, the "contestable" nature of the industry

**Table 5: Hotels**  
**Room occupancy and average room rate**

	Room occupancy (%)		Average room rate (ECU)	
	1989	1993	1992	1993
Belgique/België	64.6	60.2	62	80
Danmark	76.4	69.3	77	81
BR Deutschland	69.3	62.9	66	93
Hellas	69	73.1	63	78
España	72.5	55.4	90	112
France	75.8	60.4	104	161
Italia	78.9	69.7	83	97
Luxembourg	61.7	N/A	66	N/A
Nederland	70.6	62.6	70	90
Portugal	66.4	54.1	78	91
United Kingdom	71	64.9	86	70

Source: Pannell Kerr Forster: Eurotrends 1994

and the high degree of inter-dependence between its various segments. Characteristics of the hotel industry affecting competition include: ease of entry and exit, the often localised nature of competition and competition between segments within the industry and non-hotel establishments supplying similar services. These factors ensure that, in general, monopolistic positions are rarely attained: exceptional hotels at specific locations, such as The Gleneagles in Scotland, can maintain excess margins. In addition, in 1992 only 14 % of hotel rooms in the EU were publicly traded companies, indicating concentration remains low despite the recent growth of chains. Thus, increasing competition through mergers of large chains in the European market is not a cause for significant concern for competition authorities.

The nature of the hotel industry is such that imbalances between supply and demand are generally localised in either time or space and invariably lead to variations in prices and in profit levels. Surpluses and shortages in "time" are most common. With high fixed overheads, the marginal cost of selling an extra room is low and hoteliers throughout Europe respond to falling demand by reducing prices to maintain occupancy levels. Thus, the downturn in tourism demand over the last two years resulted in good deals for consumers but substantial losses for many hotels. In addition, high levels of investment during the late 1980s in increasing capacity or in refurbishment left many hotels financially ill-equipped for the subsequent downturn. Re-possession reached a record high during 1991 in the United Kingdom. In 1993, the high profile quoted companies Queens Moat Houses (UK), Resort Hotels (UK), Ciga (I) and Fimpar (I) had their share quotations suspended and Forte (UK) cut its dividend for the first time in 20 years. Accor (F) maintained its dividend despite a 42 % drop in after-tax profits. Increasing demand in some Member States, such as the UK in 1993, and more generally in 1994 is rectifying this demand-supply imbalance. Occupancy rates are increasing sharply and price growth should follow in 1995.

Seasonal variations in demand for hotel rooms typically result in lower prices (or additional value-added in terms of special incentives) in many rural and resort hotels in the off-season. Many urban hotels are also capitalising on the growing short break market to boost overall occupancy in hotels which are filled during the week by business travellers. Capacity imbalances also result in profit variations around normal margins. In other cases, time and location supply constraints place strong upward pressure on prices; for example, major sporting events like the Olympic Games.

Reflecting weak demand, hotel prices, particularly in the moderate/comfortable category, fell during 1991 and 1992, picking up in some cities in 1993. Price variations vary widely re-

vealing different supply and demand conditions, but trends in all capital cities (except Berlin) reflect a divergence between the boom 1985-90 period and the stagnant 1990-93 period. For example, EIU data indicates the price of a single room in the moderate/comfortable category in Madrid rose more than threefold in 1985-90, but remained static in 1990-93. Price levels and price changes in cities reflect local supply and demand imbalances, with local property prices having the greatest effect on hotel prices. The sharp differences across cities is evident in that the average tariff for a room in a similar hotel in Greece fell (in current ECU) even in the boom 1985-90 period.

During the 1980s operating profits were generally higher in chains, i.e. affiliated hotels, than in their independent counterparts. However, the importance of scale is recognised by many small hotels and increasing numbers are becoming affiliated to voluntary associations or franchising.

EU hotels cannot compete with most extra-EU counterparts on price alone. The labour intensive nature of the industry ensures that hotels in developing countries have a strong competitive advantage. EU hotels are often reliant on the tourism strengths of their location and other quality factors. A wider range of facilities, better quality and other local attractions are important differentiation factors against the cheaper prices of East European countries. The cost of travel to many non-EU destinations is also a factor, as demonstrated by the increasing popularity of Asian locations. Reductions in the cost of long distance travel can be expected to divert more tourists from competing EU resorts.

### Production process

Services provided by hotels vary widely across the industry. At one extreme hotels may simply provide accommodation, although this is quite rare. More commonplace is a mixture of accommodation, restaurant food and retailing of alcoholic beverages. However, the variety of services may also include banqueting, health and leisure facilities, a variety of business services, shopping, foreign exchange facilities, conference facilities, laundry facilities and touring services.

The hotel industry is a service industry where most of the service offered is based on labour intensive methods. In particular, it involves substantial use of part-time and female workers. This labour intensity is creating problems on two fronts. Firstly, it is a major and increasingly expensive cost item, and secondly, attraction plus retention is a problem. As a result, increased automation is apparent, particularly in northern Member States where problems with labour retention and the attraction of new workers are sharpest. A recent survey at Oxford Brookes University highlights conditions of em-



**Table 6: Hotels**  
**Regional comparisons of performance, 1992 (1)**

	Occupancy rate (%)	Average daily rate (ECU)	Total revenue (ECU)	Income before fixed charges (ECU)
Africa and Middle East	60.8	50.71	23 624	6 416
Asia & Australasia	69.7	60.03	26 914	7 499
North America	60.1	42.47	14 008	2 736
Europe	60.6	59.44	29 553	7 718
Latin America	58.7	44.72	15 134	1 891
All hotels	61.6	55.62	25 397	6 524

(1) Data based on median averages  
Source: Horwath International

ployment, perceived lack of prospects and attractions of competing employment opportunities as key factors discouraging young people, particularly women, from entering the hotel industry.

The introduction of the 5 day or 40 hour week, night shift compensation, with weekends and holidays to enjoy, lure people away from labour intensive jobs with unsociable hours. Many hotels and chains have introduced innovative programmes to tackle recruitment and retention problems. Their intent is to enable personnel to move within the industry with clear career paths and to improve cooperation with schools in terms of curricula and candidate selection. While the Single Market process is increasing the reservoir of labour available to the hotel industry, greater mobility and higher expectations may accentuate staff retention problems.

Technological developments have led to some employment substitution effects. For example, in some hotels guests now check themselves in. In general, however, increased use of technology, yield management and CRS, front office systems, in-house entertainment, and improved kitchen equipment contribute to greater skill requirements for hotel staff rather than displacement. However, "fear" of such techniques remains an impediment at some levels of the industry. The proportion of automated bookings from CRS relative to telephone reservations is still very low in Europe compared to the US but such applications are gaining ground as hotels become increasingly appreciative of the potential they offer for improving management efficiency and profit margins. Some major chains have introduced innovations to encourage CRS bookings - Utell, Marriott and Kempinski for example, have each established different schemes related to faster or guaranteed

commission payments. Use of yield management techniques, which apply basic economic principles to pricing and controlling room inventory to maximise revenues, is also facilitated by technological advancement. The techniques enable the anticipation of late demand and the offer of an appropriate number of rooms at the higher rates these guests are willing to pay. Yield management systems are also useful for market information, such as knowledge of repeat customers' preferences, identifying clients, and deducing crucial factors affecting decisions.

Driven by economic developments, the spread of large chains, the growing complexity of the industry's market and the availability of sophisticated management information systems, there is a growing trend towards more professional management in the industry. This is reflected in strategies for labour saving, such as the increasing number of hotels offering buffet breakfasts.

## INDUSTRY STRUCTURE

### Companies

Overall the hotel industry is fragmented but the importance of large hotel chains has increased considerably over the last decade. While these chains have brought a degree of homogeneity to the industry in many European countries, the structure and importance of the industry differs across Member States. In terms of bed places offered, there is considerable concentration among the chains. The top ten chains operating in Europe provide as much capacity as the next forty chains combined. It should be noted, however, that while the incidence of branded chain hotels is increasing, in some cases these

**Table 7: Hotels**  
**Number of non-resident guest-nights**

(thousands)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	4 379	5 536	5 292	5 316	5 424	6 575	6 874	6 631	7 694
Danmark	4 349	4 591	4 338	4 480	4 378	4 887	5 429	5 963	6 178
BR Deutschland	19 003	23 895	23 473	24 314	25 226	28 389	29 766	27 768	28 378
Hellas	27 665	34 045	33 708	33 960	33 341	33 320	35 612	30 159	36 945
España	58 654	78 919	87 698	92 444	88 351	78 301	64 627	74 439	77 341
France	N/A	41 117	37 139	37 450	41 548	51 705	55 934	53 045	59 635
Ireland	5 471	5 540	5 268	5 005	6 417	7 434	8 277	9 423	9 333
Italia	66 188	63 978	65 150	70 194	70 406	68 139	66 012	65 843	63 415
Luxembourg	860	932	934	941	969	1 092	1 085	1 066	1 007
Nederland	6 250	6 926	6 808	6 521	6 762	7 316	8 102	7 993	8 424
Portugal	9 580	12 941	14 284	14 522	15 005	15 467	16 710	19 089	17 877
EU (1)	N/A	278 420	284 092	295 147	297 827	302 625	298 428	301 419	316 227

(1) Excluding UK  
Source: Eurostat: Tourism Yearbook

**Table 8: Hotels**  
**Analysis of guest types, 1992**

(%)	D	GR	F	IRL	NL	P	UK
Business travellers	50.6	13.1	25.6	23.8	37.7	33.9	41.1
Holiday tourists	22.4	79.6	48.3	62.8	39.8	43.5	31.7
Conference delegates	15.2	2.4	13	6	13.7	8.8	15
Government officials	2.4	0.5	0.7	1	N/A	2.7	1.9
Other categories	9.4	4.4	12.5	6.4	8.8	11.1	10.3

Source: Horwath International

are run by independent hoteliers on a franchise basis. Pressure for increased size comes from economies of scale in marketing, greater ability to meet the trend towards market segmentation with a complete range of differentiated services and advantages in covering a range of major destinations in any specific area. The strength of the chain to invest in CRS is another factor which will shape the industry in the coming decade; although advances in technology, competition among CRS companies, improved user-friendliness and the advantages of these systems will increasingly see smaller hotels availing of CRS.

In identifying the world's top hotels, the magazine "Hotels" distinguishes between three different types of hotel companies: corporate chains, with a strong brand identification, professional hotel management companies (HMCs) and voluntary chains and associations. There is overlap between these categories. For example, Best Western, a voluntary group is included among the corporate chains because of strong brand image, while many of the larger corporate chains have their own HMCs which may run the hotels of other groups in certain locations. Each of the top five corporate chains franchise part of their room stock. The five top HMCs in the world have Hilton (USA), Sheraton (USA), Radisson (USA), Marriott (USA) and Days Inn (USA) among their portfolios.

Other forms of affiliation such as leasing and joint ventures are currently being explored as a means of expansion by several chains, including Accor (F) and Forte (UK). Forte, for example, currently has joint ventures in Ireland (with Aer Lingus), in Italy (with Agip) and in Spain (with Repsol), while Accor has several joint ventures with Ifil (I). Accor's strategic alliance with Carlson (USA) is likely to bring flow-on synergism with the hotel chain. Radisson and Sol (E) have also established a joint venture with German tour operator, ITS, to develop a Primasol budget brand.

By global standards the top EU hotel companies are not as large as North American-based chains, but they are larger than their Asian counterparts. The 1994 listing of the world's top corporate chains in 1993, by the magazine "Hotels," included eight North American-based chains in the top ten, although the second largest corporate chain, Holiday Inns, is owned by a United Kingdom brewing conglomerate, Bass Plc. Similarly, the top ten second tier management companies listed by "Hotels" included only one EU company, the troubled Queens Moat Houses Plc. However, reflecting the continued importance of small hotels in Europe the "Hotels" listing of voluntary chains and associations had seven EU-based companies, among the top ten in the world. The top hotel company in the EU in 1992 was Accor (F) with 250 000 rooms, well ahead of its nearest rival Forte (UK) who had 79 000 rooms. However, Forte narrowed the gap during 1994 with the purchase of the Meridien chain from Air France.

### Strategies

The most important developments in the hotel industry in recent years have been the expansion of the chains/voluntary associations and segmentation of hotel properties into branded products each aimed at specific clientele. While different levels

of service and quality across hotels has always been a feature of the industry, segmentation within the major hotel chains has resulted in increasingly distinctive products. It is also argued that too many brands within some chains may lead to customer confusion. Segmentation in Europe is not as advanced as in the United States but has increased substantially, to the extent that nearly all major hotel chains now have a range of differently specified products. For example, the French-based Accor, Europe's largest chain with a presence in nine Member States, has a highly-developed set of branded products, ranging from the four-star Sofitel (F) to the one-star Formule 1 (F) and budget chain Motel 6 (F).

The fastest growing segment of the market is the budget and "no-frills" establishment, a format which is well developed in France and spreading to other EU Member States. Forte's joint ventures, for example, have all been aimed at expansion in budget brands. Their joint venture with Repsol (a Spanish petrol company) is to construct up to 100 Travelodges along Spanish motorways. Likewise, the French group Bajen and the Spanish group Sagas have plans for 50 motorway motels. Greater economic cohesion within the EU alongside greater cost consciousness among business travellers and demand from East and Central Europe are expected to contribute to increased demand for low-cost no-frills establishments. Along with Formule 1, other budget and no-frills chains include the French sister companies Campanile and Premiere Classe, Forte's Travelodges and Holiday Inn Express hotels. However, segmentation is not solely based on simple price/quality features, resort hotels and hotels specialising in the growing conference market are also considerations.

Consistent delivery of good service, particularly for business travellers, is the key element to maintaining loyalty as repeat business is the most cost-effective way of generating profits. Marketing, sometimes in partnership with other hotels or upstream services, is a key strategy element in generating new business, but as articulated by Thomas W Storey, Executive vice-president of Radisson Hotels International "We've calculated it costs 15 USD to get a new trial guest and 2.50 USD to get a repeat guest".

Due to different travelling objectives, business travellers and long distance travellers are distinct from the leisure traveller. The discussion on demand trends in the industry suggests that there is need for a wide range of products to keep pace with the increasingly diverse forms of demand. The more a hotel can differentiate itself from its neighbour, for example by reflecting the special character of its surroundings, the more it is likely to appeal to the discerning guest. Similarly, with the growing importance of short break holidays many hotels are becoming the central element in a package of accommodation and leisure activities designed to attract short-break guests, particularly in the off-season. Many resort and medium-sized hotels are also adding attractions such as fitness centres and other forms of all-weather entertainment.

Catering for new and alternative forms of tourism, such as activity holidays, also requires many hotels to re-think their strategy vis-à-vis non-hotel accommodation. Evolving pack-



**Table 9: Hotels  
Prices in European capitals, 1993**

	Luxury Price (ECU) 1993	Change 1985/93 (%)	Change 1990/93 (%)	Moderate Price (ECU) 1993	Change 1985/93 (%)	Change 1990/93 (%)
Amsterdam	211	39	11	141	85	-6
Athens	194	49	-2	51	-25	-43
Berlin	242	N/A	17	92	N/A	78
Brussels	332	188	25	136	99	-34
Copenhagen	154	31	38	134	N/A	13
Dublin	141	25	20	107	62	8
Lisbon	186	128	8	131	123	-4
London	297	61	24	197	50	-33
Luxembourg	194	126	18	88	102	8
Madrid	236	192	11	195	232	-2
Paris	273	79	3	203	162	13
Rome	201	30	20	150	94	-29

Source: Economist Intelligence Unit

ages to attract these new tourism market segments may involve coordination with other tourism and leisure facilities in the locality and other forms of accommodation. Cooperation between hotel groups is also a feature. For example, in order to improve its marketing in Europe, Radisson has cooperated with SAS (S) hotels, Mövenpick Hotels (D) and Concorde Hotels (F). Similarly, cooperation between smaller hotels has resulted in segmentation, generally with a stronger leisure dimension, through the formation, or expansion of existing voluntary chains.

While the top hotel groups in the EU are predominantly EU owned, in general, large hotel chains are international in character. Two of the top chains, Hilton and Holiday Inns, originated in the US, were recently purchased by United Kingdom companies. The political and economic changes related to 1992 and German re-unification should have a positive "ripple" effect on hotel investment, although the ongoing recession has dampened investment at the present time. There is probably already a sufficient number of hotels in most major EU locations to cater for increases in demand and most investment will be in the form of conversions and extensions of existing properties. While the flow of tourists to less well-recognised "tourist areas", particularly rural areas, is expected to grow, much of the increased capacity required will be met by non-hotel accommodation.

The twin trends of expansion and globalisation of hotel chains have been evident in Europe over the last decade. In addition to economies of scale these trends are also driven by the perception that much business travel is global and that travel service companies and accommodation providers need to provide the same services, irrespective of location. Whether this perception is correct remains to be seen. As with tourism demand, there is little doubt that many international business

travellers will gravitate towards accommodation providers with whom they are familiar and whose standards they are comfortable with. According to Inter-Continental's European vice-president Michael Stajdel, "the fastest growth area for hotel bookings is through global distribution systems." Nevertheless, there are dangers in such a strategy as the bulk of business travellers are still of domestic origin, even in international capitals and gateway cities. Furthermore, as shown by the Visa survey, business travellers from different countries have strikingly different views on what their priority travel requirements are.

Discernible trends indicate take-overs are the preferred expansion mode, as current players seek further economies of scale and/or expansion into new markets. The economic downturn resulted in a temporary slowdown in merger activities, but with more properties coming on the market activity levels are increasing. For example, Forte's take-over of Meridien during 1994; successfully fending off a bid by Accor. The sale of the Ciga chain in Italy also indicates expansion tendencies among leading hotel groups - Forte, Accor, Hyatt, Marriott and ITT Sheraton all expressed interest at various stages, with Sheraton finally gaining control. Prior to the recent slowdown, a feature of merger activities was extra-EU hotel chains, particularly from the US and Japan, seeking to expand in Europe. These chains include the US-based Marriott Corporation, ITT Sheraton, Ritz-Carlton, Holiday Inns, Hilton Hotels Corporation and Radisson and Far East chains such as Nikko (JPN), Seibu Saison (JPN) and Aoki (JPN). The trend is partially based on "globalisation" strategies: although US chains are also encouraged by saturation in their domestic market. The nature of the European hotel market and its "modus operandi" is a major constraining factor for US chains. To date they have been most successful in gateway cities rather

**Table 10: Hotels  
Composition of sales, 1993**

(%)	B	DK	D	GR	E	F	I	NL	P	UK
Rooms	54.5	58.2	55.7	49.7	53	61.5	59	58.7	56.8	50.8
Food	27.6	22.9	26.2	36.4	24.1	23.3	28.7	25.2	24.1	28.6
Beverage	9.5	7.6	10.9	5.4	9.2	9.1	7.3	7.4	7.2	10.6
Telephone	4.4	5.7	3.3	3.7	4.9	3	2.8	4.9	5.8	4.4
Other operational depts	2.8	3.9	2.9	2.7	4.3	2.1	1	2.8	5.3	4.9
Rental and other income	1.1	1.7	0.9	2.1	1	1	1.2	1	0.9	0.6

Source: Pamell, Kerr Forster Associates, Eurotrends 1994





**Table 11: Hotels  
Operating statistics, 1992**

	D	GR	F	IRL	NL	P	UK
Cost of sales/deptl. revenue (%)							
Food	30.7	25.8	30.5	40.6	28.5	40.8	33.8
Beverage	21.5	18.3	19.1	50.8	26	25.6	33.6
Operating profit/deptl. revenue (%)							
Rooms	68.1	74.4	69.3	73.5	65.6	72.2	66.3
Food/beverage	13.9	41.1	6	24.9	19.5	2.6	28.6
Gross operating profit/total sales (%)	25.8	20	25.1	17.4	27.4	22.8	28.2
Sales per employee (ECU)	54 594	28 840	73 185	34 959	54 891	34 991	46 762
Cost per employee (ECU)	20 069	20 195	28 469	10 919	20 645	12 614	15 346
Labour costs/total sales (%)	37.9	38.1	41.4	30	38.7	38.2	31.9

Source: Horwath International

than locations which attract mainly domestic business. Not all US expansions into Europe are aimed at international business travellers though. Holiday Inns plans to expand the US budget chain Holiday Inns Express into Europe and to build 20-100 premises; depending on performance over the next five years. In general, and with a long term view, Japanese investment has tended to aim for vertical expansion - hotels, restaurants, leisure facilities - rather than a significant market share in a particular subsector.

EU-based chains rapidly expanded across national borders during the second half of the 1980s in anticipation of increasing integration of the EU. This expansion slowed somewhat in the early 1990s as recession choked off investment, but has resumed over the last two years at a moderate pace. Increasing investment from large chains is unlikely to threaten the com-

petitive position of the many small, independent hotels and restaurants that create the uniqueness of European tourism. These small, independent hotels should be able to establish themselves in their own profitable niche.

Retaining traditional ambience and intimacy with their clientele are important marketing characteristics, but small hotels should also pay adequate regard to modern marketing, technological and management practices. These practices may include investment to upgrade quality, and cooperation with other tourism enterprises and other hotels in promotion, reservation systems and information systems. For example, national and international voluntary chains are expanding membership. Small Luxury Hotels of the World aims to double membership to 200 by the end of 1995, while Family Hotels Federation in the Netherlands was recently formed with the

**Table 12: Hotels  
World's top companies, 1993 (1)**

Corporate chains (2)	Headquarters	Parent HQ	Rooms	Hotels
Hospitality Franchise Systems	Parsippany, NJ USA	USA	384 452	3 790
Holiday Inn Worldwide	Atlanta, GA USA	UK	340 881	1 795
Best Western International	Phoenix, AZ USA	USA	272 743	3 308
Accor	Evry, F	F	250 319	2 181
Choice Hotels International	Silver Spring, MD USA	USA	229 784	2 607
Management companies (3)	Headquarters	Parent HQ	Rooms	Hotels
Richfield Hotel Management	Denver, CO USA	--	33 217	141
Doubletree Hotels Corporation	Phoenix, AZ USA	--	24 480	97
Interstate Hotels Corporation	Pittsburg, PA USA	--	22 879	80
Queens Moat Houses Plc	Romford, Essex, UK	--	22 100	191
Larken Hotels	Cedar Rapids, IA USA	--	15 000	65
Voluntary groups (4)	Headquarters	Parent HQ	Rooms	Hotels
Utell International	London, UK	--	1 373 681	6 858
JAL World Hotels	Tokyo, JPN	--	173 271	419
Supranational Hotels	London, UK	--	95 000	600
LRI/Grande Collection of Hotels	New York, NY USA	--	90 000	425
Leading Hotels of the World	New York, NY USA	--	76 000	277

(1) Rankings are based on total rooms open as of December 31, 1993.

(2) Companies with a strong brand identification.

(3) Professional management companies, often multiple franchisees, managing different brands as well as their own brands and independent hotels.

(4) Groups offering marketing and reservations services to independent hotels and corporate chains.

Source: IHA

**Table 13: Hotels**  
**Top 20 EU hotel chains, 1993**

Rank EU	Rank worldwide	Name of the group	Country	Number of rooms	Number of establishments
1	4	Accor	F	250 319	2181
2	9	Forte PLC	UK	78 691	855
3	13	Club Méditerranée	F	65 128	262
4	15	Hilton International	UK	52 930	159
5	16	Inter-Continental	UK	48 510	121
6	17	Sol Group	E	43 178	165
7	20	Société du Louvre	F	27 906	437
8	27	HUSA Hotels Group	E	19 000	72
9	28	Hôtels et Compagnie	F	18 939	362
10	29	Méridien	F	18 236	58
11	31	Queens Moat Houses Hotels	UK	17 096	162
12	34	Mount Charlotte/Thistle	UK	14 500	112
13	42	Maritim	D	11 465	42
14	47	Occidental	E	10 623	50
15	54	Steigenber Hotels	D	8 879	53
16	63	Fiesta Hotels	E	7 450	26
17	65	Lonrho PLC	UK	7 190	23
18	71	Jolly Hotels	I	6 346	36
19	75	Iberotel Gestur	E	6 231	24
20	76	Treff Hotels	D	6 230	42

Source: HOTREC

key objective of competing better with one to three-star chains. Cooperation can, however, take a number of forms. The simplest is combined marketing in one brochure under a single brand, but with each hotel maintaining autonomy. Another form may involve common CRS and shared payment systems. Franchising is a common form of joint branding, while trademark licensing is another. Some chains insist on exclusivity, while others, such as Logis de France, allow affiliation to more than one grouping. Cooperation can also involve joint purchasing, such as Hotusa (E) which has 650 hotels and restaurants in its purchasing pool and intends to expand into other EU Member States.

Airport locations provide prime locations for both expansion and the development of new hotels, although increasing emphasis on high-speed rail links should draw both business and leisure travel from the airlines, suggesting that railhead locations will also see new investment. A number of continental railhead hotels have already been upgraded or tied in with railway travel. InterCity (D) hotels are marketed, but not owned, by the German railways and tie-ups are being developed between Wagonlits night sleeper passengers and Accor's railhead hotels. Improved road transport networks, particularly in the EU's Objective 1 regions, will also provide scope for investment in motorway hotels. Continued growth in business and leisure travel will stimulate new investment in hotels at large business parks and in resort areas. Increased investment in budget hotels may also see traditional European heavy construction giving way to prefabricated units - bedrooms for Forte's Travelodges are factory built and assembled on site.

Investment funds are being funnelled to East and Central Europe where there is a supply deficiency, particularly of three star hotels. Investment may be diverted from EU countries, although it is expected that the bulk of the diversion will be from developing countries, with the exception of Asia. Another concern is that although freer mobility of capital may encourage large-scale investors, small operators may continue to be hampered by the reluctance of banks and other financiers. This will add to the concentration of the industry and the weakening of the independents, although a number of countries have developed incentive schemes to remedy this problem, either by providing finance as such or by guaranteeing finance. Mechanisms to guarantee borrowing are par-

ticularly prevalent in Germany, but also exist in Portugal and Italy.

## REGIONAL DISTRIBUTION

Venue availability has traditionally been considered the most important element governing the supply of hotel services. In general, hotel location follows demand rather than stimulating it, although there are exceptions. Hotels are predominantly located in cities, specialising in business travellers, and in resort areas, specialising in tourist traffic. These factors have led to significant variations in the distribution of hotels both across and within Member States. For example, the largest hotel in the EU is located in the Canary Islands.

## ENVIRONMENT

To date, regulatory pressure on the hotel industry with regard to environmental issues has not been extensive. HOTREC has identified three pieces of legislation that could have an impact, albeit indirectly, on the hotel sector. These are:

- Environmental Impact Assessment
- Packaging and Packaging Waste
- Eco-Audit Scheme

As regards any legislation on civil liability for environmental damage, its impact on the hotel sector will necessarily depend upon the eventual content of such legislation.

There are three major pieces of environmental legislation which affect the hotel industry: the requirement for an environmental impact assessment, which is required for large projects; liability for damage caused by waste; and, the obligation to clean up contaminated land. The latter two are not yet in effect and, in general, their impact will not be excessive. However, there is an expectation that pressure may increase on requirements for improved waste management and consideration to how hotel structures blend in with their surroundings.

The Fifth Environmental Action Programme has identified Tourism as one of the five priority areas. HOTREC firmly

believes that a sound environment is vital to the hotel industry, and it has formulated its position with regard to the environment on the following basis:

- The development and dissemination of better environmental management tools specific to the industry is crucial. But it is essential to keep in mind that most of the enterprises in the hotel sector are SMEs. Therefore the tools need to be adapted to them: they must be easy to access and imply no additional cost. The tolls should be developed with the double aim of protecting the environment and reducing cost.
- The hotel industry is ready to collaborate with the Commission in order to develop the most appropriate approach to the environment. This approach must be built taking in consideration three main points: first, actions must be taken and determined at the most appropriate level, be it the local regional, national or European level; second, actions should be as much as possible on a voluntary basis; actions should be adjusted to the size of enterprises.

The IHA has identified the environment as a key tourism asset and warns of stringent regulations if hoteliers do not work to improve their environmental records. They also point out that hotels may save on costs and gain in consumer goodwill by improving their environmental awareness. The World Travel and Tourism Council has a Green Globe Initiative while the IHA presents an annual "environmental award" in association with American Express. IHA also drew up twelve environmental resolutions in 1992. These resolutions include care in planning and designing new projects, energy conservation, waste management, emission of pollutants and sensitivity towards ecological habitats, local populations and culture/heritage issues.

As far as environmental management schemes are concerned, at least eight European national associations members of HOTREC have developed such schemes and more than twenty large European hotels or hotel chains are known to implement them.

Environmental policies can be improved. In particular, the construction of new hotels in terms of energy conserving design, materials chosen, location and blending with surroundings. For existing hotels there is considerable scope for improved waste management both through recycling and energy conservation. Computer-based management systems are contributing to better control of costs including those with environmental implications. Demand size management (DSM), for example, is being used to control expenditures on energy costs and to extract more out of existing facilities. Attention to such details has been motivated by escalating power plant construction costs, excessive lead time to build new plants, as well as, the public's increasing environmental concerns. German tourists are particularly environmentally conscious and TUI (D) is developing an extensive database which will enable its travel agents to ascertain the "greenness" of over 5 000 hotels. The company has developed a special hotel checklist containing minimum standards and hotels with a high enough environmental quality rating gain a special brochure symbol. Consequently, hotel groups are cooperating to promote good environmental practice. Hilton (USA), Inter-Continental Hotels, Marriott (USA), Meridien (USA), Ramada (USA) and Sheraton (USA) are among a number of groups which recently signed an environmental charter for the industry covering areas such as waste management, product purchasing, air quality, energy conservation and noise pollution. The creation of a European "tourism and environment" prize by the European Commission in co-operation with the Member States is intended to help raise awareness throughout the sector of environmental issues either created by, or that have an impact on the tourism industry. The most successful experiences and good practices will be identified as models

for widespread promotion in the hope that they will repeated by others.

## REGULATIONS

Hotels are affected by a wide variety of regulations (local, national and EU) relating to health and safety, hygiene, sale of alcohol, planning permission and consumer protection. At the EU level a range of regulations indirectly affect the hotel industry. These include the directive on Package Travel, Package Holidays and Package Tours (90/314/EEC). The directive concerning package travel, package holidays and package tours is intended to give consumers of the various types of holiday packages across the EU a minimum level of protection and information provision while at the same time assist the establishment of a European internal market of package tour services. Within this framework, it has been left to the Member States to implement measures to achieve these objectives.

Directive 90/314/EEC stipulates, in article 5, that the organiser and/or retailer party to the contract is liable to the consumer for the proper performance of the obligations arising from the contract, which includes adequate provision of safety measures in hotels (without prejudice to the right of the organiser to pursue other supplies of services). The result is that those in the industry responsible for organising tours are applying pressure and calling for more binding regulations on hotel safety.

The industry is directly affected by the 1986 Council Recommendations on fire safety in hotels (86/666/EEC), specifically aimed at a particular segment of the industry.

Regulations on competition policy, particularly on abuse of a dominant position and state aid, also potentially affect the hotel industry. However, the hotel sector is generally regarded as competitive and has not been the subject of attention from competition authorities. With regard to state aid, the hotel industry in a number of Member States, most notably southern Member States, receives state aid for infra-structural investment. This has not been contested by other sectors or hotel interests in other Member States who are often partly funded by the EU's European Regional Development Fund. This financial support is regarded as regional aid and, as such, allowable under existing regulations. The state itself is also involved in the hotel industry in some Member States, either directly or through state-owned airlines, although the incidence of state ownership is decreasing as these hotel chains are identified as candidates for full, or partial as in the case of Spain's Paradores, privatisation.

Initially, proposed changes on VAT harmonisation would have increased hotel prices and reduced competitiveness relative to extra-EU destinations. This was a worrying prospect for Mediterranean Member States whose hotel prices were also under pressure from other areas of prospective EU legislation, particularly in relation to working conditions. Furthermore, these Member States face direct competition from non-EU Mediterranean destinations such as Cyprus, Turkey, Malta and north African countries. Swayed by these and other factors, hotel services are now included among a list of goods and services to which the Member States can apply a reduced rate of VAT. Spain and Italy have used this opportunity to lower VAT rates on five-star hotels to the same level as is applied to the rest of the industry.

Finally, HOTREC has identified over 70 measures of Community origin likely to have an impact on the HORECA sector. These were outlined in August 1994 in an internal publication "EU developments of interest to the HORECA sector".

**Table 14: Hotels**  
**Expected average annual growth rates in the EU**

(%)	1994-95	1994-98
Turnover	6.0	4.0
Employment	3.0	2.0

Source: Fitzpatrick Associates

## OUTLOOK

The steady growth of the European hotel industry in the 1980s gave way to three years of stagnant demand, declining occupancy levels and falling "achieved" rates in the early 1990s. This slowdown was only temporary and reflected the underlying volatility of the demand base. Recovery, which became apparent in the UK in 1993, is now spreading to the rest of the EU. Over the next decade, global demand for both tourist and business accommodation will continue to grow. Factors contributing to growth over the next three years are: a sharp recovery in the level of economic activity in most EU economies; increased trip frequency and improved seasonal spread, pushing up room-occupancy, capacity utilisation, achieved rates and profits; more active retired people with high levels of disposable income, increasing demand for hotel accommodation; and increased business travel as a result of both closer European integration and more service-oriented industries in mainland Europe.

Cost conscious business travellers and the EU's declining share of global tourism revenue will temper growth rates, although increasing tourism expenditures by southern and eastern Europeans and arrivals from the emerging tourism markets of South-east Asia will help counterbalance the drift to extra-EU destinations. The EU hotel industry will also face stiff competition from alternative forms of accommodation and from more adventurous and demanding tourists. Value for money is another emerging criteria among EU tourists and business travellers but adoption of new technology should enable hotels to provide better service and more targeted marketing while keeping costs from rising; although there will be pressure on labour costs from both a regulatory end and from dwindling supply. Growth in guest nights should remain steady, at 3 % per annum, over the next three years.

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# Other accommodation

## NACE 667

The non-hotel accommodation sector consists of a wide variety of types and sizes of establishments. Some subsectors, such as camping, hostels and caravan sites, are dominated by smaller operators and have highly seasonal demand. Other sub-sectors, holiday villages, timeshares and integrated resorts, are less seasonal and are predominantly owned by major companies. Demand is influenced by economic trends. Growth slowed in recent years, though it is picking up in 1994. Concentration within the industry is very low and the range of products in terms of cost and quality is diverse. There is little regulatory pressure and many smaller establishments are unrecorded and operate without constraints. Overall rapid growth is expected during the 1990s. Areas where new products have been developed will fare better than more traditional establishments.

### INDUSTRY PROFILE

#### Description of the sector

The non-hotel accommodation sector encompasses a wide variety of establishments in terms of type, size and services provided. This sector includes camping-sites, caravan parks, hostels, guest houses, bed & breakfast, social tourism establishments, rural tourism establishments, apartments, second homes, timeshares and integrated resort developments. Services offered by this sector range from simple accommodation with basic amenities at the low end, to integrated resorts with restaurants, bars, shopping malls and health and leisure facilities at the high end. The former overlaps with the hotel sector at its lower end of the market while the latter competes with high and mid-range hotels. The services and facilities provided within the non-hotel accommodation sector vary widely. For example, camp-sites may provide restaurants, bars, swimming pools and other leisure amenities or just the basic facilities.

#### Recent trends

Due to the diversity and size of the sector, official statistics on turnover and value-added in different EU countries are very limited. The use of different definitions of other accommodation

throughout the EU also makes it difficult to make comparisons and obtain main indicators for this sector. This is reflected in Eurostat data which shows that turnover in the Netherlands is significantly higher than in any other Member State, including Germany which has nearly twice as many establishments. The Netherlands also ranks highest in terms of the number of persons employed, including self-employed.

Eurostat data on the number of employees shows that even after a marked decline, Spain has the highest number of employees. In Germany and the Netherlands, the other main employee markets, there has been consistent growth in the number of employees in the 1990s.

Eurostat data also provides detailed information on camping and tourist village accommodation establishments. However, there is only limited data on other categories such as holiday dwellings and social tourism establishments. Much of the data on camping and tourist villages is based on classified campsites and, therefore, underestimates the number of establishments and bed places. Furthermore, available data, mainly relating to the supply of establishments, provides very few official statistics on realised demand. The European Federation of Camp Site Organisations (EFCO), which has 14 000 members operating holiday park enterprises in the EU Member States of Norway, Switzerland and Sweden, indicated that 1994 was one of the best seasons on record for campsites in Spain, Italy and the South of France. In addition, while growth in Greece was affected by the troubles in the former Yugoslavia, which reduced access from northern Europe, their domestic camping market improved. Across northern Europe the market was variable with some operators reporting very good seasons and others poor seasons.

Available data shows that Member States reflect varying tendencies of non-hotel accommodation availability and preferences. France, followed by the United Kingdom, Italy and Germany have the largest number of camping and tourist village establishments, while Spain has the largest number of holiday dwellings. However, this figure must be treated with caution as it includes a large number of small establishments. Germany has the largest number of social tourism establishments.

While the paucity of the data hinders cross sector comparisons, Eurostat data indicates that most of the bed places provided by the non-hotel accommodation sector are located in campsites and tourist villages. France provides the largest number of bed places followed by Italy and the United Kingdom.

**Table 1: Other accommodation**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	798	(6) 168	(7) 5 309
Danmark	590	126	3621
BR Deutschland	(3) 4 273	(2) 414	12634
Hellas (1)	(5) 7 085	N/A	6293
Ireland	238	27	1024
Luxembourg	105	N/A	229
Nederland	2180	709	15000
Portugal (3, 4)	64	24	1775

(1) 1988

(2) 1989

(3) 1990

(4) Covers only enterprises with at least 5 employees.

(5) Number of local units

(6) Including also sleeping- and dining-car services.

(7) Number of employees

Source: Eurostat; Mercure



With regard to social tourism accommodation, it is difficult to gauge developments on an EU wide scale. This type of accommodation is made available through social tourism schemes for people who are unable, generally for financial reasons e.g. pensioners, large families and the handicapped, to go on holidays.

Eurostat data on the number of bed places in camping and tourist villages indicates that this sub-category of the other accommodation sector is most important for France followed by Italy. Excluding the strong growth in Italy, the capacity of this sector in the EU has remained largely static in the 1990s. According to the European Federation of Camp Site Organisations (EFCO) this is due to considerable resistance from local planning authorities to the extension of camping facilities. Comparable information for Denmark is not available and data for Portugal and Greece are seriously under-recorded. Eurostat data on social tourism establishments suggests Germany and the UK are the leading providers, although they may not be capturing all the establishments. France is generally regarded as the leader in the provision of this form of accommodation. Villages Vacances Familles (F), for example, provides around 67 000 bed-places.

Self-catering accommodation, which includes rented flats, villas, chalets, cottages and single rooms completely furnished, is reported to represent the largest subsector of non-hotel accommodation. A large proportion, perhaps 50 %, of self catering accommodation is let unofficially. The data that does exist suggests France, Spain, Italy, Greece and Portugal lead in the provision of such accommodation.

In 1993 approximately 760 000 European families constituting some 2.5 million holidaymakers, travelled on timeshare holidays. Europeans bought some 220 000 weeks of timeshare in over 1 100 holiday resorts. The greatest number of timeshares are situated in Spain followed by Portugal. Both of these markets have shown very strong growth in the 1990s. This category also includes gîtes which are generally rural properties let as holiday homes. France has the greatest number of gîtes followed by Germany and Italy. While Spain has a relatively small number of gîtes it has over 90 000 officially classified furnished flats. In the United Kingdom, Ireland and Germany bed and breakfast accommodation is very popular. Often their existence is unrecorded. Similarly, the international edition of the Fifth Report on Italian Tourism calculates that the number of resident and non-resident bednights in Italy is double officially reported figures because of under-reporting from the holiday rental and owner-occupied holiday home market.

Timeshare ownership grew sharply in the five years to 1993. The UK, which has traditionally dominated the timeshare market in terms of ownership, has grown most in absolute terms,

although all major EU Member States have experienced rapid growth in ownership.

Integrated resort developments are common, but the popular formats differ. In Spain, France, Portugal, Italy and Greece most integrated resorts are aimed at the upper-end of the market. They have high quality standards which attract these markets and have associated activities, such as golf, tennis and entertainment. They may be self-catering or food may be provided. In the United Kingdom, "holiday camps" such as the Haven, Butlins and Pontins chains are popular and are primarily aimed at the family market. They provide a wide range of activities and leisure pursuits and have been moving upmarket in recent years. In northern EU countries, resort complexes located close to conurbations, targeting the short break market, are most common. The main operators are Centre Parcs (NL), Dorint (D), Gran Dorado (NL) and Sun Parks (B). Most of these operators have spread into neighbouring countries, including the UK.

There are over 1 600 youth hostels registered with the International Youth Hostel Federation (IYHF) in the EU and a further 1 160 in other European countries. Nearly 40 % of IYHF hostels are in Germany.

There was a decline in the number of overnights spent at IYHF hostels in the EU between 1992 and 1993. In 1993 nearly 19 million nights were spent in hostels of which over one quarter were by foreign visitors. The main EU markets for youth hostel accommodation by foreign visitors, Germany, the UK and France accounted for over 2.7 million overnights. German, British and Polish IYHF hostels are predominantly used by the domestic market. According to the IYHF there has been a sharp increase in the number of cheap accommodations available to budget travellers which has resulted in poor standards of non-Youth Hostel Association accommodation. However, as a result, plans to implement youth hostel standards and common practices have been approved, which should increase the quality of youth hostel accommodation as well as the level of regulation.

A useful indicator of the markets for youth travel is the sales of student travel (ISIC) cards. Demand for these cards is consistently greatest from Germany, the United Kingdom, Spain and Ireland. In 1993 there was continued growth in the sales of ISIC cards in all of these main markets except Spain. Student travel, invariably users of non-hotel accommodation, is one of the biggest growth areas and is relatively recession-proof. Sales of Student Air Travel Association tickets almost doubled between 1988/89 and 1991/92 from 634 000 to 1 243 000 tickets.

### International comparison

Usage patterns of non-hotel accommodation in the EFTA countries are comparable to those of the EU states. EFTA countries

**Table 2: Other accommodation  
Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	4240	4430	4563	4630	5087	5182	5299	5309
Danmark	932	2863	3984	3682	3748	4033	4619	N/A
BR Deutschland (1)	N/A	N/A	11521	11391	11924	11922	12188	12634
España (2)	N/A	N/A	N/A	N/A	14795	16589	16673	14511
Luxembourg	90	141	143	137	136	145	150	160
Nederland	N/A	N/A	N/A	N/A	8000	8800	11002	12000
Portugal (3)	N/A	N/A	N/A	N/A	1220	1555	1748	N/A

(1) Number of persons employed

(2) Including also sleeping- and dining-car services.

(3) Covers only enterprises with at least 5 employees.

Source: Eurostat: Mercure



**Table 3: Other accommodation  
Number of establishments, 1992**

	Camping & tourist villages	Holiday dwellings	Social tourism establishments
Belgique/België	621	N/A	570
Danmark	406	N/A	101
BR Deutschland	2134	7393	3952
Hellas	314	N/A	N/A
España	952	118500	N/A
France	8564	723	186
Ireland	122	1572	100
Italia	2341	N/A	(2) 1 030
Luxembourg	125	N/A	13
Nederland	1028	513	487
Portugal	171	N/A	57
United Kingdom	(1) 4 231	31653	(1) 822

(1) 1988

(2) 1991

Source: Eurostat: Tourism Yearbook

generally have high standards of accommodation with Nordic countries, particularly Sweden, noted for chalet style accommodation located in forest surroundings. Though no EU comparable data is available for the US, the US touring market is very large. Americans have pioneered the recreational vehicle market and standards and levels of provision for mobile tourists in the US are very high.

Europe contains one in four of the world's timeshare resorts and nearly one-fifth of the world's timeshare owners live in Europe. This form of holiday accommodation is most popular in North America and Australia and almost non-existent in the less developed areas of the world. However, the liberation of the former Eastern bloc countries has led to rapid growth in the number of people in the Czech Republic, Hungary, Poland, Russia and the Baltic states buying timeshares; mainly at Spanish resorts.

### Foreign trade

There is insufficient data to ascertain a breakdown of non-hotel bed nights in terms of "imports" and "exports". Even if this data were available, the large number of establishments that are unrecorded would undermine its accuracy. The proportion of "camping tourists" from outside each Member State is typically in the range 30 % to 40 %. The ratio in Greece and Luxembourg is believed to be considerably higher.

Excluding youth travellers and those visiting friends and relatives (VFR), long distance tourists to Europe are infrequent users of non-hotel accommodation. The same applies to European tourists travelling to far away destinations. Non-hotel accommodation is popular with East European tourists visiting EU Member States, although it is not as common as might be expected given their income constraints. According to a report on outbound east European travel in the Economist Intelligence Unit's "Travel and Tourism Analyst," over half of the visitors to Austria from Poland, Hungary and the Czech Republic, used hotel accommodation, albeit mainly two-stars hotels.

## MARKET FORCES

### Demand

Demand for non-hotel accommodation is strongly linked to tourism demand. Most non-hotel accommodation users are leisure travellers. With the exception of niches developing in direct competition with hotels, such as serviced apartments, business travellers generally use non-hotel accommodation only when hotel accommodation is unavailable. The low level

of business demand results from the nature of the accommodation which is generally booked well in advance, by the week rather than the day, and because it is the lower end of the accommodation market.

Increasing incomes and discretionary leisure time are predominant factors in determining the amount and type of travel and use of other accommodation. Both disposable income and available leisure time increased in the EU Member States during the 1980s stimulating the demand for other accommodation. Available leisure time expanded over the last two decades as improvements in working conditions led to longer holidays and shorter working weeks, although this trend has decreased in recent years. Much of the demand for other accommodation, particularly camp-sites and rented accommodation, comes from family groups. In other cases, family based demand may relate to budgetary constraints which preclude the use of hotels.

There is a large domestic component in the demand for other accommodation. For a variety of reasons, including income levels, the weather and the attractiveness of their own country as a tourist destination, nationals of the southern Member States of Greece, Portugal, Spain, Italy, and France are more likely to holiday in their own country. In the higher income northern European countries, particularly Germany, the United Kingdom and the Benelux countries, there is higher demand for foreign holidays as travellers seek better weather and cheaper holidays. Rented accommodation should be distinguished from domestic VFR and second homes. Second home ownership is very high in Denmark, France and Italy, particularly when you consider extended family members who use the core members' home free of charge. In Denmark, the self-catering rental market to non-residents (mainly Germans and Dutch, but also eastern Europeans) is very important as a flow-on effect from second home ownership.

The demand for non-hotel accommodation is highly seasonal in nature. It is essentially limited to the warmer months, although winter sports generate demand for self-catering accommodation, particularly in the French Alps. Increased awareness in leisure, health and fitness of Europeans has encouraged growth in activity and sporting holidays. Approximately 10 % of all holidays taken in Europe are built around a specific activity or sport. This seasonality results partly from the nature of the product. Thus, camping and caravanning holidays are more suited to the summer months. Institutional factors, such as school holidays, are also responsible for seasonality. All-weather holiday parks, in the style developed by Sun Parks and Center Parcs provide facilities such as sub-

tropical swimming pools, saunas and high standards of catering which generate high occupancy levels throughout the year. Such parks are also tailored to the growing popularity of short-break holidays.

The demand for camp-site accommodation is strongly correlated with the use of cars as a transport mode. European Travel Monitor data indicates that car usage for international travel is most popular in Luxembourg, the Netherlands, Germany and Belgium. Few international tourists from Ireland, Greece and the United Kingdom use a car for even part of their travel, which indicates a lower demand for other accommodation. The opening of the channel tunnel will stimulate international car and rail travel between the United Kingdom and mainland Europe, which should in turn increase demand for the non-hotel accommodation industry. However, a few factors, such as the weather and rabies laws, a high proportion of caravan and camping holidaymakers bring their pets with them, may deter some holiday traffic from mainland Europe.

Use of other accommodation often depends on travellers' national tendencies. At present, British tourists typically do not use non-hotel accommodation when travelling abroad. Holiday villas and apartments are the exception. An article in the Economist Intelligence Unit's "Travel and Tourism Analyst" indicated only 3 % of UK holidaymakers travelling abroad used caravan or camping-sites in 1992, while 48 % seek hotels, 24 % seek villas/apartments accommodation and a further 18 % visit homes of relatives. In contrast, a third of West German holidaymakers in 1991/92 used hotels, while nearly 10 % used camping or caravan sites. Similarly, the growth in the share of continental European tourists in Ireland has resulted in substantial growth in demand for non-hotel accommodation: total visitors to non-hotel accommodation by overseas tourists increased by 26 % between 1990 and 1993.

The demand for social tourism accommodation is most prevalent in France and Belgium. This subsidised travel works by either providing holiday vouchers or aid for constructing tourist facilities. In France, vouchers are distributed by the Agence Nationale pour les Chèques-Vacances (ANCV). The objective of the scheme is to assist lower-paid employees in going on holiday with their families. These vouchers are accepted by over 30 000 establishments and more than 4 million French people, or 1 million employees and their families, benefited from the programme in 1992. Even though the number of people benefiting from the scheme is growing at around 37 % a year, there is still only 7 % take-up by those entitled to participate and only 5-6 % participation by larger employers.

In 1992, 413 million French francs, or 36 % of the total expenditure, was spent on non-hotel accommodation. Over 50 % of this was spent on social tourism establishments, 30 % on rural gîtes and the remainder on camping and caravanning. There is still potential for growth in social tourism since there is a latent demand for this type of holiday and the associated accommodation. Unlike demand for other non-hotel accommodation, social tourism holiday demand is less dependent on the factors determining growth and trends in tourism expenditures and more dependent on institutional factors. In practice, the institutions in many Member States, including France are becoming less willing to finance social tourism and groups such as VVF and Renouvea are becoming increasingly indistinguishable from budget tour operators and holiday village operators.

Spain has adopted a different approach. Whereas French social tourism is largely family-oriented, Spain subsidises off-season holidays by pensioners. A limited number of travel agency chains are picked each year to operate the scheme on the basis of a competitive tender. The 1994/95 budget is 40 million ECU for 360 000 holidays spread over eight months. A 1994 study by Price Waterhouse showed that the programme is largely self-financing through savings on unemployment pay for the tourist industry workers who are kept in full-year employment by the scheme. The study estimated that more than 20 000 jobs are protected by the scheme. Extension of social tourism to all EU countries would be beneficial both to the hotel and "other accommodation" sectors.

The rapid growth in short break and weekend holidays may be positive for some non-hotel subsectors while the same growth may have negative repercussions for other subsectors. Generally, most non-hotel accommodation establishments are poorly equipped to cater to the short break market, and would not attract the higher income groups that can afford second holidays. In addition, growth in short breaks is generally in the off-season, which is unsuitable for many "weather dependent" forms of non-hotel accommodation. If anything, growth in short breaks has contributed to a shortening of the duration of main summer holidays. Thus, the demand for caravan parks, campsites, chalets and holiday apartments is adversely affected by the trend towards more frequent holiday breaks. Integrated resorts, on the other hand, have benefited from growth in the short break market.

The demand from East European countries for other accommodation is low, but increasing. Tourism flows from these countries are likely to increase as their economies improve.

**Table 4: Other accommodation  
Number of bed-places, 1992**

(thousands)	Camping & tourist villages	Holiday dwellings	Social tourism establishments
Belgique/België	360	N/A	103
Danmark	N/A	N/A	N/A
BR Deutschland	612	238	296
Hellas	83	N/A	N/A
España	582	387	N/A
France	2662	234	12
Ireland	7	8	2
Italia	1267	N/A	(2) 78
Luxembourg	12	N/A	1
Nederland	496	133	48
Portugal	267	N/A	9
United Kingdom (1)	1230	392	123

(1) 1988

(2) 1991

Source: Eurostat: Tourism Yearbook



**Table 5: Other accommodation  
European timeshare industry**

(thousand households)	Timeshare owner's residence			Where they own their timeshare		
	1987	1990	1993	1987	1990	1993
España	N/A	3	40	107	200	330
France	50	60	90	45	55	70
Italia	30	40	85	30	40	75
Portugal	2	15	32	10	50	107
Benelux	3	9	17	N/A	N/A	2
BR Deutschland/Austria/ Switzerland	40	70	150	20	30	46
UK/Ireland	121	220	290	35	50	84
Scandinavia	20	40	45	15	20	25
Other	1	3	15	5	15	25
<b>Total</b>	<b>267</b>	<b>460</b>	<b>764</b>	<b>267</b>	<b>460</b>	<b>764</b>

Source: Resort Condominiums International

The low income levels in these countries will lead to a higher proportion of holiday makers using budget accommodation such as camp-sites. In addition, the demand for timeshare accommodation by East European countries is expected to increase as exchange organisations enable the purchase to be made in domestic currencies.

The majority of EU holidaymakers travel to the seaside, but these holidays are weather dependent and often seasonal. Many traditional resorts have tried to extend the season by improving their all-weather facilities, with hotels being the main beneficiaries. Nearly a quarter of Europeans spend their holiday in the countryside, which tends to be less weather dependent. As a result, rural tourism has shown stronger growth than sun and beach tourism. In France, where rural tourism is promoted by the government, 80 % of visitors travel independently, 20 % are foreigners, and 30 % are on short breaks.

### Supply and competition

The supply structure of non-hotel accommodation varies dramatically across segments of the industry. Integrated resorts and timeshare developments tend to be capital intensive with organised management structures. Similarly, apartment and villa establishments tend to be capital intensive with many of them marketed through travel agents as part of package holidays. At the lower end of the scale, camp-sites and caravan parks tend to be less capital intensive, while temporary accommodation in bed and breakfast establishment may be provided by altering the use of existing buildings rather than constructing new ones. Barriers to entry in the integrated resort and timeshare markets exist in terms of the high set up costs and the long lead in time associated with purpose built resorts. At the lower end of the market, especially camp-sites and caravan parks, the set up costs are much lower.

The supply of other accommodation tends to be seasonal in nature. A number of caravan sites and non-hotel accommodation establishments operate at full capacity in the summer while providing limited or no accommodation in the winter. This results in over capacity for much of the year and shortages at peak times. In contrast, integrated resorts, theme parks and some timeshare accommodation are provided all year round and significant price differentials are used to spread the demand.

The supply of social tourism accommodation is dependant on state (and in some cases Church, employer and trade-union) funding. Such funding is being cut back, at least in real terms, and many establishments are in need of modernisation and upgrading. As this funding is cut any element of unfair subsidised competition with the commercial accommodation sector is reduced. Traditionally, the degree of competitive overlap

was regarded as marginal as social tourism accommodation was originally designed to stimulate latent demand among those who cannot afford holidays rather than diverting existing holiday-makers. However, this is changing.

A number of non-hotel establishments provide similar services to hotels and compete with hotels at all ends of the market. Thus, tourists might be faced with the choice of a hotel or self-catering apartment, while businessmen are increasingly choosing between hotels and serviced apartments. Competition within the bed and breakfast market has led to improved quality and more direct competition with hotels.

Tourists in the non-hotel accommodation sector are clearly becoming more demanding and expect higher standards of comfort and facilities: e.g. sanitation, catering and sports facilities. In France, for example, around a fifth of camp-sites have a swimming pool and/or at least one tennis court. The trend is to improve the quality of the facilities and services supplied. However, there is still considerable divergence within Member States.

Competition in the non-hotel accommodation sector varies between Member States. In some Member States the market tends to be mainly domestic and the consumers choose between different regions, while southern Member States tend to attract a higher proportion of foreign visitors. It is estimated that nearly 70 % of camp-site users in Greece are from abroad. Thus, there is an element of intra-sector competition, par-

**Table 6: Other accommodation  
Number of gites, 1988**

	Gites
Belgique/België	166
Danmark	145
BR Deutschland	20000
Hellas	45
España (1)	71
France	35000
Ireland	N/A
Italia	6744
Luxembourg	N/A
Nederland	292
Portugal	N/A
United Kingdom	320
<b>Total</b>	<b>62783</b>

(1) Galicia, Basque Province and Balearics only

Source: Gfk Marktforschung: Camping and caravanning survey

**Table 7: Other accommodation  
Number of IYHF hostels and beds**

	Number of hostels		Number of beds (thousands)		Change 1992/93 (%)
	1992	1993	1992	1993	
Belgique/België	31	31	3	3	3
Danmark	105	98	11	11	-1
BR Deutschland	648	627	78	76	-2
Hellas (1)	16	16	2	2	0
España	144	147	12	13	1
France	187	187	12	12	1
Ireland	44	44	3	3	0
Italia	49	51	6	6	2
Luxembourg	13	14	1	1	7
Nederland	41	39	6	5	-5
Portugal	17	19	1	2	20
United Kingdom	340	332	20	20	-1
EU	1635	1605	154	153	-1
Österreich	110	110	10	10	-1
Suomi/Finland	157	152	10	9	-11
Norge	91	95	7	7	2
Schweiz/Suisse	80	78	7	7	-2
Poland	727	632	29	25	-11
Sub-total	1165	1067	62	58	
Total	2800	2672	217	211	-3

(1) 1992

Source: International Youth Hostel Federation

ticularly between other accommodation situated in coastal areas, where the foreign tourists are sun seekers and less concerned by the cultural and heritage aspects of their holiday. There is also direct competition between hotels and apartments in the package holiday market to Mediterranean resort destinations.

### Production process

The services provided by non-hotel accommodation vary widely across the industry. At one extreme camp-sites and caravan parks may provide a pitch or area of land, as well as, basic amenities, while integrated resorts often have restaurants, bars, shops, and health and leisure facilities. The variety of facilities and services being provided means that the production process differs significantly throughout the industry.

Camp-sites and caravan parks are the most land intensive. With regard to labour, the industry is generally not as labour intensive as the hotel industry because there are fewer services offered; and, they often come with an element of self-catering. Many of the workers tend to be part-time, for example at camp-sites and ski resorts, and in the smaller establishments, such as bed and breakfast, family and female labour is used. The integrated resorts tend to be more labour intensive and the skills are similar to those in the hotel industry.

The majority of the establishments are not technology intensive. Some sectors such as integrated resorts, apartments and villas, which are marketed as part of a package holiday, use computer reservation systems (CRS). Many small operators rely on local advertising or links through tourist agencies. Smaller pensions and bed and breakfasts rely upon guide books and literature rather than depending on travel agents.

## INDUSTRY STRUCTURE

### Companies

The pattern of camp-site and caravan park ownership varies within the EU. In France, municipal authorities have traditionally been a major force in the ownership of camp-sites. Recently, however, the private sector has increased its presence

and in 1991 owned 54 % of sites and 60 % of pitches. Privately owned sites are overwhelmingly in the hands of small business people typically running just one facility, although some of these may operate a number of facilities within a region. The industry is fragmented and dominated by a large number of small enterprises. There are a number of larger players who run organised camp-sites where the camping equipment is provided on site. For example, Haven Europe, a subsidiary of the Rank Organisation which also owns the Butlins holiday resorts, offers 47 parks in Spain and France varying in size from under 250 to over 500 pitches. Similarly, Keycamp holidays offers 100 camp-sites throughout Europe, including mobile homes. Both of these operators have increased the number of campsites they offer between 1992 and 1994 by 25 %.

The integrated resort sector of the non-hotel accommodation industry has developed over the last 10 to 15 years. This represents a much more concentrated sector. The leading developers of health and leisure centres have been Dorint in Germany, Gran Dorado in Germany and Benelux, Sun Parks in Benelux, Center Pares in Benelux, France and the United Kingdom and Pontins and Butlins in the United Kingdom and Ireland. Centre Pares and Pontins are both owned by Scottish and Newcastle Breweries (UK). The concept is highly developed in the Netherlands where the market is dominated by Center Pares with seven parks. In 1990 there were over 400 000 villa rentals and nearly 2.1 million visitors to the Benelux properties. Demand is also expected to grow in the medium term: for example, Center Pares is building its first park in Germany with 600 bungalows and Sun Parks plans to increase the number of their parks in the next two to three years.

Club Med is the largest upmarket tourism product designed for activity holidays. It is based on a system of holiday villages. Club Med currently has around 100 holiday villages with a capacity of close to 68 000 beds in 33 countries around the world. The number of villages in Europe has fallen since 1991 with the closure of villages in Yugoslavia, Switzerland and Spain. Other villages include Valtur in Italy and tour-operator-owned holiday villages at leisure resorts (including at non-seaside rural and mountain resorts, particularly in Austria and Switzerland). The biggest in this field is TUI, with its

**Table 8: Other accommodation**  
**Number of overnights at IYHF hostels**

(thousands)	Domestic 1993	Foreign 1993	Total 1993	Total 1992	Change 1992/93 (%)	Foreign as share of total (%)
Belgique/België	129	261	390	375	4	67
Danmark	538	486	1 024	1 056	-3	47
BR Deutschland	9 594	1 001	10 595	11 757	-10	9
Hellas (1)	0	36	N/A	36	N/A	99
España	910	206	1 115	1 212	-8	18
France	573	731	1 304	1 323	-1	56
Ireland	53	190	243	266	-8	78
Italia	104	463	568	552	3	82
Luxembourg	27	103	130	122	7	79
Nederland	297	455	753	823	-9	60
Portugal	120	73	193	179	8	38
United Kingdom	1 538	994	2 532	2 581	-2	39
EU	13 885	4 999	18 884	20 282	-7	26
Österreich	737	648	1 385	1 448	-4	47
Suomi/Finland	176	113	289	321	-10	39
Norge	124	218	343	336	2	64
Schweiz/Suisse	367	501	868	921	-6	58
Poland	1 508	109	1 617	1 510	7	7
Sub-total	2 912	1 589	4 501	4 536	-1	35

(1) 1992

Source: International Youth Hostel Federation

Robinson Club and Bauerndoerfer chains, but other large German operators are all active in this area. TUI markets its Robinson Clubs through other operators as well.

Despite a drop in the number of villages there has only been a 2 % drop in Club Med's sales between 1991-93. Declines in the larger French, German and Belgian markets were countered by sales growth in Turkey (86 %), the Netherlands (29 %) and Spain (22 %).

The Euro Disney resort in France is the largest theme park in Europe and offers non-hotel accommodation, including 14 rustic lodge sites with over 1 000 rooms and 400 wooden cabins. France has a further 35 recreational parks and 30 aqua parks. Most European theme parks are geared to the day trip market and generally do not include accommodation. The arrival of Euro Disney is focusing the attention of some theme parks on the short break market as a supplement to their traditional day-trip customers.

Social tourism initiatives tend to be concentrated in Belgium and France. The VVF (Villages Vacances Familles) in France provides subsidised accommodation and has a capacity of 186 villages with a total of 67 000 beds and an annual turnover of 190 million FF. VVF was largely instrumental in setting

up Euro-villages, which now has members in France, Belgium, Germany, Switzerland, Italy, Spain and Portugal.

### Strategies

The general strategy within the other accommodation industry has been to improve the quality of the accommodation and facilities. Camp-sites now offer swimming pools, sporting facilities and even cinemas and discos.

The strategy in the more sophisticated integrated resorts has been to transfer the ambience and environment of tropical resorts to northern European locations. These resorts tend to be of a higher quality than the traditional resorts with swimming pools, tennis courts, restaurants and comfortable accommodation. They also tend to be more activity based with numerous sporting and leisure facilities, and, most importantly, are independent of the vagaries of the weather. The primary target group is families with small children. Club Med's management has attributed their poor performance in recent years to price and have developed a series of special offers effectively allowing clients to opt for the basic package without the traditional free sports/full board.

The success of the timeshare establishments is largely due to their ability to offer exchange location. This initiative means

**Table 9: Other accommodation**  
**Sales of ISIC cards, 1993**

	1987	1992	1993
BR Deutschland (1)	115	214	252
España	97	138	128
Ireland	88	111	123
Italia	39	57	59
United Kingdom	153	218	228
Total (1)	492	738	790

(1) Excluding the former East Germany

Source: ISTC



**Table 10: Other accommodation  
International tourist trips by mode of travel (1)**

	Car (%)	Plane (%)	Coach (%)	Train (%)	Total trips (millions)
Belgique/België	52	23	14	9	16.5
Danmark	37	38	15	12	5.9
BR Deutschland	55	27	25	11	65.2
Hellas	18	54	23	5	2.3
España	35	35	25	8	7.2
France	38	49	18	13	14.8
Ireland	14	73	8	5	1.2
Luxembourg	62	12	19	7	0.4
Nederland	59	24	13	9	16.7
Portugal	45	28	24	8	1.8
United Kingdom	25	67	14	5	26.7
EU (2)	N/A	N/A	N/A	N/A	158.7

(1) The percentages may not sum to 100 as two answers are possible.

(2) Excluding Italia

Source: European Travel Monitor

that the owner does not have to return to the same resort every year. They are able to exchange their accommodation for another resort by using the services of the exchange companies. In any one year approximately 40 % of timeshare owners swap their timeshare and visit a different resort. The majority of timeshare resorts are affiliated with one of the two major exchange companies, RCI (Resort Condominiums International) or II (Interval International).

At the lower end of the market efforts are being made to tailor youth hostel facilities to the needs of various different groups, instead of serving all customers with the same product. Rent-a-Hostel, which aims at using Youth Hostels out of season, offers groups and families the opportunity to rent a hostel for themselves. As a result, they increased growth in turnover in 1993. Hostelling International has introduced the first computerised advance booking system "IBN" for youth hostel accommodation. The network of youth hostels using this new system is expanding.

### Impact of the Single Market

The overall impact of the Single European Market (SEM) on non-hotel accommodation is likely to have been positive, although given the diversity of types of establishments within the sector this statement cannot be regarded as definitive. While holiday apartment complexes, timeshare resorts and integrated resorts all benefited from an SEM induced increase in travel, they are adversely affected by consumer protection legislation relating to package holidays, distance selling and timeshares, and by requirements for environmental impact assessment for large developments. These considerations are of less importance at the other end of the market, i.e. for rural and social tourism establishments, including camping and caravanning sites, although with the bulk of their demand base being domestic holidaymakers these sub-sectors benefit less from increases in cross-border travel. Rural tourism and social tourism also stand to benefit from initiatives at an EU level designed to directly encourage the development of these types of holidays. Infrastructure improvements, including "trans-European" networks, also benefit this sector.

**Table 11: Other accommodation  
Club Med - Distribution of villages in Europe**

	Number of beds (1)	1991	Number of villages	1994 (2)
Hellas	5 094	6		4
España	4 241	5		3
France	8 414	17		16
Italia	7 883	7		5
Ireland	172	1		1
Portugal	751	1		1
EU	26 555	37		30
Österreich	0	0		1
Schweiz/Suisse	4 661	10		7
Bulgaria	930	1		1
Turkey	4 164	5		4
Yugoslavia	2 080	2		0
Other Europe	11 835	18		13
Total	38 390	55		43

(1) As at October 1, 1991

(2) Villages listed for 1994/5 season

Source: Club Med

**Table 12: Other accommodation  
Growth in Club Med sales by European market (1)**

(thousands)	1991	1992	1993
Belgique/België	53.9	49.4	48.8
BR Deutschland	64.6	67.2	60.5
España	7.2	7.9	8.8
France	366.5	369.5	340
Italia	81.9	95	82
Nederland	8.3	9.2	10.7
United Kingdom	22.1	20.5	24.7
Österreich	9	10.1	9.7
Schweiz/Suisse	32.5	34.3	34.2
Turkey	8	9	14.9
Other	12	14.6	17.1
<b>Total</b>	<b>666</b>	<b>686.7</b>	<b>651.4</b>

(1) Years relate to financial years ending October 31st

Source: Club Med in Economist Intelligence Unit, Travel Industry Monitor June 1994

## REGIONAL DISTRIBUTION

Location of other accommodation establishments has followed demand rather than leading it. Unlike hotels, other accommodation tends not to be concentrated in major cities but is located away from these centres. This reflects the close ties with tourism traffic and, in some cases, the industry's dependence on climatic factors. Distribution of other accommodation establishments varies from country to country and depends upon the nature of demand and the type of establishment. Camping and caravan sites, and to a lesser extent second homes and timeshare accommodation, are generally located in coastal areas.

Non-hotel accommodation not located near the coast is generally in rural, rather than urban, areas. These include caravan and camp-sites, as well as, farmhouse accommodation. Integrated resorts in northern Europe are not as dependent on natural features for their location since they are activity based and are generally self contained. An exception is Center Parcs which tends to be located in rural and forest areas. Northern European integrated resorts do, however, take account of local population structures in planning their locations. In southern Europe, integrated resorts tend to be mainly situated in coastal areas.

## ENVIRONMENT

In general, the non-hotel accommodation sector has developed without major damage to the environment. Many of the sub-categories such as rural tourism, camping and caravanning are dependent upon their location and environment as a major selling point. However, the growth of overnight parking of motorhomes, caravans and tents in the countryside outside designated campsites is a growing problem. This type of wild camping is associated with refuse and waste, as well as, a decline in the amenity of sites of natural beauty. Research in Spain indicates that this form of camping amongst motorhome owners increased by 47 % in 1991. Although land intensive, most forms of non-hotel accommodation, gîtes, farmhouses, camp-sites and small hostels tend to be less intrusive on the landscape than hotels. Since many other accommodation users are independent travellers there tends to be a high proportion of car usage associated with this type of accommodation. A green paper from the EU indicates that the use of cars as opposed to rail or bus increases congestion, produces more pollution and is a less efficient use of energy. At 25 % occupancy levels railway uses less than half as much energy per passenger kilometre as small engine cars. There may be scope to develop alternative modes of transport or

to spread the peak season so that some of the negative environmental impacts associated with the car are reduced.

Under EU legislation an environmental impact assessment is required for large infrastructure projects. Since many of the non-hotel accommodation establishments are either small in nature or not capital intensive this is unlikely to have an impact on these areas of the industry. However, there may be a need to increase environmental awareness in the development of integrated resorts and timeshare resorts. Since these resorts benefit from a clean environment it is in the interest of developers to ensure that any new developments blend in with their surroundings. The construction of new establishments might also be controlled in terms of density, materials chosen, location and more sensitivity to the regions heritage and natural/historic environment.

One area where the non-hotel sector has had a detrimental impact on the environment is in overcrowded holiday resorts where a large number of apartment blocks are crammed into coastal locations. These types of resorts are often linked to package tours. Examples can be found on the Costa del Sol in Spain, in the Algarve in Portugal, as well as, on a number of Greek Islands. These problems are now being addressed, particularly in Spain.

## REGULATIONS

National and local regulations concerning issues such as fire services, safety, food hygiene, etc. cover all forms of non-hotel accommodation. There are also specific regulations covering individual subsectors. Those affecting caravan parks and camp-sites vary across Member States but tend to cover the use of the parks in terms of the maximum number of pitches, the minimum size of the site, adequate drainage of the site, access to and within the site, car parking provision associated with the site, as well as, toilet and water facilities. Regulations generally limit the proportion of fixed facilities that may be allocated to holiday parks, 15-20 % is a typical ratio. It is attractive to the operator to develop fixed facilities, since they bring higher rent and profits. There are a large number of parks which cater to fixed facilities markets, like caravan and mobile home owners who usually pay an annual rent for the site. These parks are not operated in the same way as touring or tourist parks since they are not open to tourists. They are, however, subject to similar regulations. EFCO highlights the phenomena of unregulated use of caravan and camping accommodation or "wild camping" as the greatest threat to the camp/caravan site industry. According to EFCO this practice manifests itself in the establishment of unofficial and

unlicensed campsites and the use of land outside licensed holiday parks on beaches and in car parks.

Some of the larger accommodation providers within the other accommodation industry are affected indirectly by EU regulations. The EU Package Travel Directive will affect suppliers of apartments, villas, chalets or other accommodation as part of inclusive tour packages. The Directive makes tour operators liable if customers are not satisfied with their accommodation or if facilities are not a true reflection of those advertised. The threat of liability faced by tour operators will lead to the imposition of stricter safety criteria on providers of activity holidays and a consequent increase in the prices of these types of holidays.

Consumer legislation on access to computer reservation systems (CRS) will involve the tightening of advertising standards and may affect the way in which package holidays incorporating other accommodation products are sold. As far as the time share directive is concerned, one of the problems is that of the law applicable to the contract, because the Rome Convention on the Law Applicable to Contractual Obligations (1980) can not cover all forms of timesharing. The directive only stipulates that the purchaser can not be deprived of the protection afforded by the directive if the immovable property concerned is situated within the territory of a Member State; this gap is filled by the fact that Member States are entitled to prohibit the sale, within their territories, of timeshare rights through a contract that does not include all the protection elements included in the directive, independently of whether the immovable property concerned is located in a Member State or not.

The main components of the Directive are unchanged since it was proposed and include that it is prohibitive to ask for a deposit and the consumer has the right to demand a contract in his/her own language. Other changes to the Directive are that consumers may unconditionally withdraw from a contract, without giving any reason, within ten days; and an extension of the list of conditions under which the consumer has the right to end the contract within three months. The implementation of the directive should be done before April 1997, though a number of Member States are expected to do it well before that date.

While the most important aspect of the Directive from the consumers' viewpoint is probably the introduction of a "cooling-off period", the timeshare industry has indicated that the ban on taking a deposit will be most harmful to the industry. Without the commitment from the potential buyer that a deposit implies, it will be harder for timeshare marketers to judge sales levels and this may lead to an increase in prices.

Regulations on the harmonisation of VAT, may increase the price of non-hotel accommodation. For example, most Member States charge VAT on campsites of 4-6.5 % with the exception of Denmark (25 %) and the UK (17.5 %). However, from 1996 the minimum level may be 15 % leading to a loss of price competitiveness. In the short term this is unlikely to be a major issue because, like the hotel sector, the rate of VAT applied over the transitional period can be at a reduced rate fixed by national authorities. Although the non-hotel accommodation sector is not particularly labour intensive, the seasonal nature of this sector suggests that EU employment legislation introducing greater protection for temporary, or seasonal, workers will push up costs.

## OUTLOOK

It is difficult to provide an overall outlook for a diverse and disparate sector like non-hotel accommodation. Demand for non-hotel accommodation grew steadily over the last decade in France, Spain, Greece and Italy but has remained static in Germany and the Netherlands. There is also variation within different sectors. For example, lower growth in the traditional

**Table 13: Other accommodation**  
**Expected average yearly growth rates**

(%)	1994-95	1994-98
Turnover	6.0	5.0
Employment	3.0	2.0

Source: Fitzpatrick Associates, Economic Consultants

holiday resorts of Spain and Portugal, against strong growth in integrated resorts in northern Europe. While new legislation covering the timeshare industry is likely to restrict growth in the short-term, medium-term forecasts are buoyant, with spending on leisure likely to grow faster than consumer spending. There will also be an increase in the number of typical timeshare buyers, e.g. active and affluent people aged 44 and over. The number of timeshare owners is forecast to grow from approximately three-quarters of a million in 1993 to around 1.5 million by the year 2000, with the German and Nordic markets having the greatest potential. Another potential area of growth lies in the provision of suitable other accommodation for the disabled. According to a recent report for Tourism for All in Europe, there is potential demand for some 8 million people travelling abroad and 15 million taking domestic trips.

Over the next decade global demand for tourist accommodation will continue to grow at a moderate pace. Increased leisure time and disposable income coupled with more diverse products will lead to an overall increase in demand. How non-hotel subsectors will fare is less predictable. Growth in short breaks will adversely affect accommodation primarily designed for good weather conditions (camping, caravanning, chalets etc.) but, will boost integrated resort developments. Growing demand from East Europe will favour less costly forms of accommodation and trends towards rural and mountain tourism will have a positive impact. Student travel will also continue to grow. The general movement away from traditional resort holidays may adversely affect some subsectors of the industry, but increased growth will result from the shift towards more independent holidays and the demand for more adventurous holidays.

The shift towards new, higher quality and year round products is likely to continue. The use of CRS and the development of activity and theme holidays around non-hotel accommodation packages will attract new clientele and ensure that value for money is maintained without a loss in quality. Growth in guest nights in the medium term will be strengthened by improved economic conditions.

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# Recreation parks

*The recreation parks sector covers a wide range of tourist and leisure attractions with overlap between subsectors increasing. This monograph mainly applies to amusement parks. Based on comparisons with North America, the European market for amusement parks has not yet reached maturity and there is considerable growth potential. Potential demand in Northern Europe has been stimulated by the arrival of EuroDisney and there are also strong prospects for growth in the "all weather" parks in southern Member States. Ownership of large parks is consolidating as a number of firms grow through acquisition, including through the expansion of USA firms. Large parks may harm the environment in a variety of ways, from noise pollution and scenic intrusion to attracting a high volume of motorised transport. The impact of technological developments such as virtual reality are currently uncertain, but in the medium term attendance numbers and revenues should continue to increase.*

## INDUSTRY PROFILE

### Description of the sector

The recreation parks sector includes a wide variety of establishments in terms of size, style and services offered. They vary from theme parks, other amusement parks and water parks, through holiday camps, to zoological gardens and safari parks. Taken literally, municipal parks and nature reserves would be included within the definition also. An important element of the recreation parks sector is non-permanent or travelling "enterprises" which often offer many of the same attractions as those available at permanent sites. Holiday camps, such as those operated by Pontins in the United Kingdom, and indoor resorts, like Centre Parcs, will not be addressed in this monograph, but are discussed under NACE 667, "Other accommodation."

Variety in scale and orientation among individual operations reflects the constant evolution which takes place within the industry due to changing technology and consumer tastes. A number of key characteristics can be identified which distinguish recreation parks from other facilities. A recreation park constitutes a visitor destination in its own right and offers a range of attractions which are often, but not always, for a single standard admission fee. Many recreation parks close in off-peak periods, although this is becoming less the norm. Zoos, however, usually remain open year round.

The level of overlap with other tourism sectors depends on the size of the operation. Non-admission revenue sources such as restaurants and retail outlets are estimated to account for approximately 45 % of the total revenue of large theme parks and amusement parks. Only a few large parks operate hotels or other forms of accommodation (caravan parks, self-catering, etc.). At the other end of the market, smaller parks do not provide accommodation and generate a smaller proportion of revenue from non-admission sources. Nevertheless, receipts from restaurants and retailing, particularly of park-related merchandise, are still important to the smaller parks. Considerable overlap is evident in the case of EuroDisney. EuroDisney is now the largest restaurant owner in France, with sales of over 30 million meals a year; and, if developed as planned, the site will have a third as many hotel rooms as the area surrounding Paris.

The geographic distribution of the industry is influenced by park size, with large parks generally located a small distance from major urban concentrations and smaller parks providing an important part of flanking attractions, which are increasingly required in traditional resorts; particularly seaside des-

tinations. While recreation parks are to be found in all EU Member States, the largest parks are situated in France, Germany, Belgium, the Netherlands and the United Kingdom.

It is difficult to obtain reliable data on the recreation parks sector, even though it generates very substantial levels of turnover and employment. As of yet, no official statistics exist. The information that does exist is patchy, and is unlikely to cover more than a particular segment of the recreation parks sector.

In 1991, approximately 300 zoos and aquaria were members of regional and/or national zoo associations in Europe (including non-EU states and some former Soviet Union states) and zoo attendance was estimated at 125 million, approximately one fifth of total global attendance. Of the EU Member States, zoo attendance is much more popular in Germany than in the other eleven countries.

Membership of organisations such as Europarks (European Federation of Leisure Parks) and IAAPA (International Association of Amusement Parks and Attractions) provides some data on major theme parks. However, little data exists on smaller theme and amusement parks. Overall, Europarks estimates annual attendance at all parks was around 120 million in 1990, while employment was estimated to be between 30 000 and 50 000. These estimates pre-date the opening of EuroDisney which is likely to have added a further 10 % to these figures. Including EuroDisney and the smaller parks, total revenue is likely to have been nearly 1.5 billion ECU in 1992.

### Recent trends

The popularity of zoos and safari parks among day trippers has fallen considerably in most EU countries over the past decade. Consequently, some have experienced financial difficulties, shut downs (particularly in the UK and to a lesser extent in Germany) or diversified. In the United Kingdom, for example, Windsor Safari Park was rescued from receivership by Legoland (DK), the London Zoo was hit by financial difficulties, while Chessington World of Adventure (UK) and Flamingoland (UK) developed from zoo-based attractions into theme parks.

However, there are examples of successful zoos (notably in the Netherlands) which adapted to the new market situation - by changing their formula or theme - and which could record a growth of attendance.

In general, the number of major amusement parks in the EU and the average size of parks have increased in the last five years. In particular, American style theme parks are enjoying a boom period. Despite the recession, IAAPA data indicates

**Table 1: Recreation parks**  
**Paid attendance at EAZA member zoos and aquaria, 1990**

(millions)	Total attendance (1)
Belgique/België	1.4
Danmark	1.6
BR Deutschland	24.5
España	2.6
France	5.5
Ireland	0.5
Italia	0.7
Nederland	5.2
Portugal	0.9
United Kingdom	9.8

(1) Does not include those who paid an annual membership fee.  
Source: EAZA

**Table 2: Recreation parks**  
**Attendance at major European theme parks (1)**

	Year opened	Attendance (thousands)			Original	Size (hectares)	
		1985	1990	1994 (2)		1986	1992
Alton Towers (UK)	1 924	1 834	1 900	3 000	324	202	202
Bellewaerde (B)	1 969	610	810	950	6	50	54
Bobbejaanland (B)	1 962	600	880	950	30	30	30
De Efteling (NL)	1 951	2 300	2 500	2 550	65	72	72
Duinrell (NL)	1 035	1 100	N/A	1 250	101	110	N/A
Europa Park (D)	1 975	1 400	1 800	2 450	20	40	60
HeidePark (D)	1 978	950	N/A	1 900	35	94	134
Meli Park (B)	1 935	700	N/A	600	1	30	N/A
Panorama Park (D)	1 962	350	425	N/A	80	80	80
Thorpe Park (UK)	1 979	1 100	974	1 000	230	230	230
Walibi Wavre (B)	1 975	900	1 200	1 200	36	52	57

(1) Survey-based, therefore it excludes some major parks

(2) Europarks estimated data

Source: EIU supplemented by Europarks data

a 5.6 % rise in visitor numbers to Western European theme parks over the 1991-93 period. Similarly, a survey by the Economist Intelligence Unit (EIU) indicates attendances at major European parks rose by 32 % between 1985 and 1992. Coupled with the increase in the number of parks, it is evident that there has been growth in the industry. The arrival of EuroDisney also gave a boost to theme park attendances without a substantial adverse impact to rival theme parks. On the contrary, the EIU analysis indicated many parks prospered through the raising of the sector's public profile.

In 1994, however, most parks in the EU were confronted with a loss, as attendance fell (varying from 3 % to 15 %) following a cold spring and an unusually hot summer. At the same time, most parks reported an increase in visitors' per capita spending.

Large scale amusement parks have existed in Europe for many years. Tivoli Gardens (DK) in Copenhagen, for instance, was opened in 1843 and remains one of Europe's largest recreation parks. The opening of Disneyland (USA) in California in 1955, however, marked a departure in the kind of product on offer. Since then, theme parks have spread rapidly throughout the developed world. In Europe, a number of new developments came about in the late 1980s, particularly in France. The most prominent was EuroDisney (USA), whose advent has had a considerable impact on the size and structure of the sector.

In 1994, France proved to be a special case. EuroDisney attendance fell by some 10 %, while on the other hand the other French parks seemed to recover from the arrival of EuroDisney to regain their previous attendance levels: Parc Asterix went up by 30 % and Futuroscope by 35 %.

### International comparison

The standard reference point for international comparisons of recreational parks and, especially theme parks, is the North

American market, which is the largest in the world. There was a major boom in theme park attendance in the United States during the 1970s, with the market growing at a lower, but steady rate in the 1980s. During the latter period a number of major operating companies moved out of the market, with control of major theme parks passing to a smaller number of large companies. In the USA, new initiatives have tended to either concentrate on smaller parks serving niche markets, such as waterparks, or extensions or variations to existing products; particularly the addition of new high-profile attractions.

Theme parks are a very important element of the USA domestic and international tourism product. Around one in four North Americans visited a theme park in 1993, many of them more than once, and total visitor numbers exceeded those of all major sports events. Growth in attendances in the USA fell slightly (1.5 %) in 1992 but increased substantially (61 %) in 1993. In Europe, the proportion of visitors is much lower as are expenditures per capita in amusement parks.

Admission revenues accounted for over half of all revenues, excluding accommodation, in major European amusement parks in 1993, compared to under 40 % in other world regions surveyed by IAAPA. The difference reflects both higher admission charges in Europe and a greater reliance on a "pay-one-price" (pop) admission, whereafter all rides are free of charge. However, while European general admission prices are the highest they have much more price differentiation in off-peak periods. There is also a lower expenditure on ancillary products in European theme parks, a fact which has contributed to EuroDisney's well-publicised difficulties.

The Japanese experience of sharp growth in the 1980s closely reflects that of Europe. Disney, for example, opened a park in Tokyo in 1983, and a number of other major theme parks were opened in the late 1980s. As in Europe, the Japanese and other Pacific Rim markets are not yet regarded as having

**Table 3: Recreation parks**  
**Average year-end attendance by world region (1)**

(thousands)	1991	1992	1993
Western Europe	708.7	727.0	748.5
USA	366.1	360.7	582.6
Pacific Rim	N/A	1551.6	1508.3
Americas	319.9	357.9	418.7

(1) Covers parks participating in IAAPA survey

Source: IAAPA



matured. They experienced strong attendance growth in 1992, but witnessed a 2.8 % decline in 1993.

### Foreign trade

Recreation parks are primarily a tourist product, where domestic tourists are more important than their international counterparts. However, the international attraction potential of recreation parks does differ significantly. A number of such parks, EuroDisney being the most obvious example, are international attractions which generate substantial cross-border tourism in their own right. Other major recreation parks could be classified as flagship attractions, meaning that they form an integral part of a group of tourism products which attract tourists to a particular country or area. In many cases these recreation parks also attract international excursionists, particularly in northern Europe. A trend enhanced by the abolition of border controls in 1993, reveals that consumers are increasingly willing to make cross-border trips to attend recreation parks. Smaller types of recreation parks are more common as flanking attractions and are becoming more important at traditional seaside resorts frequented by international tourists.

USA theme parks are important in attracting European tourists. In particular, utilising the major flagship attraction of Disneyworld (USA), Florida has developed a critical mass of theme parks and other attractions to draw visitors. Many holiday packages to Florida include a week at a beach resort and a week in Orlando, where many of Florida's main attractions are centred. Disneyworld estimates that United Kingdom visitors to their park outnumbered those from the state of Florida in 1991. Anheuser-Busch (USA) also plans to expand their reach into Europe with sales missions to Germany and the United Kingdom during 1993.

The majority of owners in the European recreation parks industry operate a single park. Cross-border expansions and joint ventures are, however, becoming more common. The scale of investment required for a theme park in the 1990s means that most investments are now financed by large operators and conglomerates who are less adverse to direct foreign investment than the traditional family owners who were prominent in the sector in the past. Reflecting the popularity of USA-style theme parks, the largest recent inward investment to the EU has been Walt Disney's EuroDisney park outside of Paris. In addition, a major park is currently being constructed outside Barcelona as part of a joint venture involving Spanish, UK and USA partners. Also, Warner Bros. plans to open a film theme park in Germany which will open in 1996.

in particular, have changed substantially since the beginning of the 1980s. Although demand has stabilised, and in some cases has grown, zoos have lost considerable market share in recent decades. Similarly, attendance at safari parks has plunged since the 1970s when they were very popular. Pleasant weather is generally good news for recreation parks as most of their attractions are outdoors, even though it also increases the popularity of beaches, scenic areas, public monuments and other less expensive leisure pursuits. However, 1994 proved that sunny weather is not at all the best for parks: at least in northern Europe, light cloudy weather seems to be preferred for visits to parks.

Poor economic conditions adversely affect all leisure expenditure, especially the higher priced amusement parks which compete with much cheaper, and often free, competitors such as beaches and scenery. In addition, ancillary expenditure within the "pay-one-price" parks falls during recessions. However, a counterbalancing effect of poor economic conditions is that people tend to skip long distance holidays in favour of short breaks or day trips in the surrounding regions (which increases park attendance).

Traditionally amusement parks were either a day trip attraction or part of an overall package of attractions for visitors at resort destinations, particularly seaside resorts. Factors influencing demand for day trips include: the distance which the customer has to travel; alternatives such as seaside resorts and national monuments; consumer preferences; children's desire to visit a park; climate; and cost. The most important demand determinants are: proximity; fun-rides; little waiting-time; weather; cost; and family atmosphere. Proximity is particularly important. The catchment area of a park is usually considered to lie within a 150-200 kilometres (maximum 2 hours of travel) radius of the park itself. Major theme park developments in recent years have located at non-resort destinations with catchment population as a key determinant. The rule of thumb suggested by the English Tourist Board for a park hoping to attract around 1 million visitors annually is a "two hour drive of 12 million residents or one hour drive of a major holiday destination and also two hours of 5-6 million residents". The private car is by far the most significant mode of transport in this sector and the abolition of border controls in 1993 has increased the willingness of consumers to take day trips outside their own Member State.

More recently, demand has broadened beyond the day trip market. Following the USA example, a number of theme parks are marketing themselves as short break destinations. Short breaks represent major growth areas within the overall tourist market. Helped by EuroDisney's boost to their profile, major European theme parks are exploiting the short break market. For example, De Efteling (NL) has opened a hotel in 1993 and is building self-catering accommodation and a golf course; Alton Towers (UK) is planning hotel accommodation nearby; Europa Park (D) is constructing an Andalucian style hotel in its new Spanish-theme area; and Parc Asterix (F) and Fu-

## MARKET FORCES

### Demand

Consumer demand for recreation parks is volatile. Major factors contributing to this volatility are changing consumer tastes, the weather and economic conditions. Consumer tastes,

**Table 4: Recreation parks**  
**Average admission charges by world region, 1993 (1)**

	General admission charge (ECU)		Parks charging an admission fee (%)	Admission fees as share of gross revenues (%)	Revenues generated per visitor (ECU) (2)
	Child	Adult			
Western Europe	8.2	9.7	87	55	8.9
USA	6.4	8.1	55	35	5.6
Pacific Rim	5.6	9.5	88	38	13.9
Americas	5.5	8.8	48	38	6.5

(1) Covers parks participating in IAAPA survey

(2) Excluding admission price

Source: IAAPA



troscope (F) promote their parks as short break destinations alongside EuroDisney.

The central elements of any amusement park are the number, quality and variety of attractions it offers. These attractions are generally united by a common theme or set of themes. Variety is extremely important as clients vary from young children to adolescents through to senior citizens, and there must be a sufficient range to hold the attention of each group throughout the day. The perception that theme parks are primarily for children is somewhat misplaced, although family groups do form the backbone of demand. The proportion of children to adults varies widely across different parks. Parks are also increasingly attracting groups through organised tours ranging from school trips to business conferences. The average stay at a European park tends to be around 6 hours, although this figure varies widely. In the case of EuroDisney the aim is to provide sufficient attractions to entertain for more than a day and hence attract short break and repeat visitors.

Ancillary factors contributing to visitor satisfaction are becoming increasingly important as tourists become more sophisticated and demanding in relation to quality. These include: landscaping of sites, absence of litter, cleanliness of toilets and other facilities, maintenance of gardens and green areas, simplicity and clarity of information, attitudes and friendliness of staff, and ample provision of rest and picnic areas. EuroDisney's attention to quality factors has put increasing pressure on major European parks to do likewise.

As demographics change and the European population ages, the emphasis is shifting from white-knuckle (meaning frightening) rides towards more family oriented entertainment. Nevertheless, constantly updating rides and attractions with more recent and more thrilling replacements remains the primary, and increasingly costly, method of freshening the appeal of theme parks. The UK industry for example, marketed 1994 as "the year of the roller coaster," highlighting a range of new high profile attractions introduced at various theme parks.

In the USA, but also in Europe, there is an ongoing change which combines entertainment and education through themes such as dinosaurs, simulations such as earthquakes or participative rides such as a traffic school. Customer participation and education are two major themes which zoos have been focusing upon in recent years. As a result, they have become important centres for environmental education, which helps distinguish them from other recreation or theme parks.

European amusement parks experience sharp seasonal variations in demand, although they are still among the most visited of tourist attractions. EuroDisney attracted substantially more visitors than any other attraction in the EU during 1993. Similarly, Alton Towers (UK) and Blackpool Pleasure Beach (UK) were the most visited United Kingdom attractions charging admission and not charging admission, respectively.

### Supply and competition

The number of recreation parks in Europe has increased over the last decade. Indeed, some of the demand for theme parks has been supply driven as evidenced at a macro level by the strong net impact of EuroDisney and at a micro level by the strong promotion of new state-of-the-art rides. However, expansion has not been uniform and amusement parks have enjoyed far greater growth than zoos, aquaria and safari parks. In fact, there have been a small number of closures in the latter subsectors, although their prospects have improved with better marketing and infrastructure improvements, such as restaurants, shops, and, in particular, the presentation of animals. A number of new amusement parks have opened in recent years, especially in France, with most incorporating specific themes. The advent of EuroDisney raised the profile of amusement parks and encouraged better product quality, particularly in presentation. This is especially the case in the United Kingdom, Germany, Denmark and the Benelux countries where

an already high concentration of parks leaves little room for greenfield investment.

Greenfield investment in amusement parks is a relatively high risk activity. The capital costs of investment are high and demand is difficult to predict. Factors which contribute to demand uncertainty include: the specialised nature of the amusement park business, the wide range of lower priced leisure attractions, the seasonality and weather sensitivity of demand, and the varied age profiles of consumers to whom it must appeal. A recent addition to the associated risks is environmental pressure which increases the difficulties and delays in obtaining planning permission.

Reflecting these risks there have been a number of high-profile failures in recent years, the publicised financial difficulties of EuroDisney being the most well known. The operating performance of some of the recently opened French and Dutch parks has been below expectations and a number have closed or changed hands. Part of the problem is that the operation of these parks is seasonal with little consideration in their design for all-weather attractions. Weather proofing amusement parks is very costly. Thus, investments from private sources and from financial institutions have been difficult to attract and may become more difficult for the next few years.

The recreation park sector is both land and capital intensive. In addition to the land required for the recreation park itself, space is required for parking. This has also contributed to environmental problems with greenfield investments. The capital costs of building new parks makes the acquisition and expansion of existing parks more attractive for companies seeking to enter the market or to expand their base of operations. This is already leading to mergers and take-overs with older operators selling out to new theme park owners. For example, the Walibi (B) has expanded considerably in recent years through the acquisition of new parks in France and the Netherlands, the Tussaud (UK) group has grown substantially in the United Kingdom and is now entering the Spanish market, and Lego (UK) is establishing in the United Kingdom. Overall, there is a trend towards consolidation, although the strength and tight ownership control of many parks suggests that consolidation will not reach the levels currently pertaining in the USA.

### Production process

Given the diversity of packages offered to the consumer, the production process varies greatly, depending on the type of park involved. As such there are a wide variety of different ride types, varying from kiddie rides through roller coasters to simulators, live entertainment and mini golf. The majority of parks also rely on return visits, so there is a constant need to update and renew the attractions available. Parks whose main focus is white-knuckle rides and similar attractions are generally obliged to invest in new equipment on a regular basis, usually every two to three years. Another approach is to bring in attractions from other operators for a limited period.

Technological progress will effect major changes in the production process over the remainder of the 1990s. Virtual reality machines, which give participants a heightened sensual awareness of a fantasy environment, represent a potential threat to the industry's current structure. These products are considerably cheaper than conventional rides and, once installed, can be readily changed and developed at a lower cost to the park. This could conceivably lead to more parks being built at a lower cost, or the addition of high quality excitement to attractions offered by smaller parks.

Recreation parks are important employers of both skilled and unskilled workers. Permanent core staff are generally well qualified. They include administrative and marketing staff and skilled workers such as carpenters, painters, electricians, mechanics and specialised designers. In the case of zoos and aquaria the requisite qualifications are even higher. A high

**Table 5: Recreation parks  
Amusement mix by world region, 1993 (1)**

(%)	Western Europe	USA	Pacific Rim	Americas	Global average
Sit-down restaurant	91	27	88	56	66
Snack bar	78	66	52	68	66
Children's rides	80	44	72	56	63
Carousel	60	30	64	48	51
Adult rides	64	26	68	40	50
Roller coasters	67	25	64	28	46
Live entertainment	69	30	64	36	42
Other water rides	53	20	64	24	40
Ferris wheel	36	25	48	48	39
Miniature golf	33	60	16	48	39
Bumper cars	36	24	44	40	36
Go-garts	29	32	52	32	36
Waterslide	47	19	48	16	33
Bumper boats	16	22	32	32	26
Dark ride	33	11	28	28	25
Animal activity	40	13	20	24	24
Animal show	22	7	28	16	18
Wave pool	11	6	32	12	15
Batting cages	2	27	4	20	13
Other	44	56	52	80	58

(1) Covers parks participating in IAAPA survey  
Source: IAAPA

proportion of seasonal staff are, however, relatively unskilled. According to a recent report in the German trade magazine, "Amusement Industrie," the ratio of permanent to seasonal staff is around 1:4 to 1:5. A limited 1993 survey conducted for the Economist Intelligence Unit indicates a variation around a similar ratio. IAAPA estimates for world regions indicates a slightly lower ratio with the average park in its survey employing 265 seasonal staff compared to 84 full-time. Reflecting capital intensity of leisure park operations, the "Amusement Industrie" report suggested that, in 1989, the average capital spent per full-time employee was around 70 000 ECU.

Professionalism and good park management are also very important elements in the overall mix of factors which produce the recreation park service. With increased emphasis on satisfying more demanding and sophisticated customers the need for an appropriately good management response will increase.

## INDUSTRY STRUCTURE

### Companies

In the European recreation parks sector, unlike the USA, comparatively few park owners control more than one park and most companies are family-owned and controlled. However, this is changing. In the United Kingdom, the Tussaud (Pearson), Granada and Gibb groups continue to expand, while in France, investments in the late 1980s were primarily financed and driven by conglomerates of large leisure companies. Elsewhere in Europe, firms expanding through the acquisition of existing parks or through new construction include Walibi (B), Tivoli (DK), Lego (DK) and some of the major USA companies. While Tivoli Gardens (DK) in Copenhagen differs from most theme parks, the company has expanded across Europe using a mixture of more traditional amusement attractions and its original formula, emphasising music and flowers. Tivoli is involved in: a Rhine side Park near Düsseldorf, a Hans Christen Andersen fairy tale theme park in Odense Denmark and a project in Japan.

It is still uncertain whether Europe will follow the USA structure where, although there are a large number of smaller parks, the major theme parks are primarily controlled by four large firms; Disney, Anheuser Busch, KECO, and Six Flags. However, with the North American market regarded as saturated, USA companies are now focusing on Europe. For example, EuroDisney is already in operation with ambitious and well publicised expansion plans. Anheuser Busch (USA) is involved in a joint venture to build a new theme park near Barcelona. Six Flags (USA) is said to be considering a theme park in Marbella in southern Spain, and Time-Warner (USA) plans a major park in Germany. The link between film and other media and the development of parks is noteworthy for firms holding property rights to leisure "icons" (Disney, Paramount, Time, Warner and Universal Studios) which are all becoming involved in the industry.

The availability of European Regional Development Fund (ERDF) money through Structural Funds is boosting investment in smaller scale recreation parks in some areas of the EU. Countries such as Greece, Portugal and Ireland do not have the population density or the required transport infrastructures to justify major theme parks, but have made considerable use of ERDF money to leverage investment for small scale developments. For example, Celtworld in the seaside resort of Tramore in the south of Ireland is regarded as a flagship attraction but is very small in comparison to the major theme parks discussed in this report. The Irish also have provision in their Operational Programme for Tourism for expenditure on "flagship" projects with a theme park as one of the targets.

### Strategies

As with the European tourism market in general, the recreation parks industry is being shaped by advances in communications and changes in consumer tastes. Some of the older recreation park types such as zoos, safari parks and traditional holiday camps have experienced mixed fortunes during the post-war period. These attractions have adapted to changed circumstances and are currently retaining their market share. Many zoos, for example, are currently expanding marketing activities

and enjoying improved visitor numbers as a result. Others have diversified their appeal through the addition of shows and rides, while a number have gone further and re-emerged as full-fledged amusement parks.

At present, most parks are idle throughout the winter; although the increasing popularity of indoor and water-based attractions has widened the possibilities for extending the season. This development is both demand and supply driven. Increased demand for short breaks in the off-season is a recent feature of the tourism sector, coinciding with the aim of park operators to increase levels of utilisation of their investment. In addition to extending the season, some parks have tested the market with Christmas and New Year opening periods. Also, many recreation parks are increasingly turning to the corporate sector to boost demand during off-peak periods.

The advent of EuroDisney and the impact which it is likely to have on raising standards will require investment in software areas such as staff training and presentation formats. Theme parks will need to concentrate on improving the less desirable aspects of their product like: adverse environmental effects, misinformation or confused facts relating to themes and staff attitudes to customers.

### Impact of the Single Market

Overall, the impact of the Single Market to date has been negligible as those measures which would have had the greatest impact on the recreation parks sector remain largely unimplemented. These include fiscal harmonisation, safety regulations and movements towards a single currency. Freer movement of people and goods across borders has helped, in particular in those Member States where crossborder travel to recreation parks is most important - Belgium, France, Germany and the Netherlands - and where the barriers were largely eliminated through the Schengen agreement. Developments

in labour legislation, particularly in relation to atypical workers, is a major concern in the sector as a very substantial proportion of those employed are temporary or part-time workers. Some of the larger park companies have expanded across the EU, but this is more reflective of an overall trend towards international expansion than a direct consequence of the Internal Market programme.

### REGIONAL DISTRIBUTION

While smaller operations are located throughout the EU, larger parks are located in northern Europe near the major population centres. Unlike the USA, European parks are rarely located in traditional holiday areas. However, this is less true of the United Kingdom where traditional resorts such as Blackpool, Margate, Skegness, Southsea and Great Yarmouth all have large recreation parks, while other major parks such as Alton Towers, Thorpe Park and Chessington World of Adventure are located in non-resort sites.

Attempts have been made to capitalise on the more suitable climate of southern Europe, with the development of a number of smaller parks; especially water parks. The use of ERDF money is contributing to such developments. With the exception of EuroDisney, recent and planned major greenfield investments in amusement parks are in southern Member States. Rural areas are also attracting smaller, culture-based theme parks often with relatively less importance on rides and more emphasis on shows or activities with audience participation.

### ENVIRONMENT

The size of most large theme parks and the volumes of car visitors which they attract can have negative environmental

**Table 6: Recreation parks  
Employment in major European theme parks, 1992**

	Full-time	Number of employees Seasonal	Of which part-time	Full-time/seasonal visitors (thousands)	Share (%)
Alton Towers (UK)	250	1 100	N/A	2 500	23
ParcAsterix (F)	130	700	200	1 000	18
Bobbejaanland (B)	100	400	N/A	950	25
Bellewaerde (B)	107	170	136	790	63
Burgers' Zoo Bush Safari (NL)	100	65	N/A	1 160	N/A
Blackpool Pleasure Beach (UK)	300	700	200	6 500	42
Chessington World of Adventure (UK)	250	750	0	1 170	33
Efteling (NL)	230	1 200	200	(1) 2 523	19
EuroDisney (F)	12 000	6 000	0	(2) 11 000	200
Europa Park (D)	150	700	N/A	2 100	21
Flamingo Land (UK)	100	500	N/A	991	20
Frontier Land (UK)	27	190	10	1 300	14
Futuroscope (F)	300	700	N/A	1 300	42
Holiday Park, Hassloch (D)	120	600	N/A	1 250	20
Lego World (DK)	75	600	N/A	1 187	13
Meli Park (B)	52	170	N/A	800	31
Noorder Deerenpark (NL)	120	180	60	1 700	86
Phantasialand (D)	230	650	N/A	2 100	35
Panorama Park (D)	24	110	0	498	22
Pleasure Island (UK)	15	140	N/A	(3) 250	11
Pleasureland (UK)	35	270	70	1 750	13
Thorpe Park (UK)	54	790	525	1 020	7
Walibi Wavre (B)	140	350	0	1 450	40

(1) Of whom 208 000 were non-paying guests

(2) Year to April 1993

(3) May-September 1993 (opened in 1993)

Source: Europarks supplemented by EIU

consequences for the areas in which they locate. For large land areas there is a trade-off between sites which impact on residential areas and those which are located in green belt areas and may have an adverse impact on natural habitats, local woodlands etc. Similarly, there may be opposition on the basis that large scale man-made attractions are a blight on the landscape and have detrimental effects on local communities in terms of traffic problems, litter, noise and loss of privacy.

Following EU regulations, such developments require Environmental Impact Assessments, although it is also in the interests of major parks to consider the relationship between their park and the local environment. In a market which is increasingly sensitive to quality and environmental factors, the advantage of a sympathetic landscape in surrounding areas and on approach roads is important. The parks themselves, and their representative organisation, Europarks, are very aware of the adverse impact which heavy reliance on car based visitors can have on the environment. Thus, Europarks has endeavoured to cooperate with national governments to improve accessibility by public transport to their member parks.

While nature themes are common among theme parks in Europe, in particular those which have evolved from zoos or safari parks, strict ecological or environmental themes are not common in major theme parks. This may be an area for future development. This trend is currently visible in the indoor resort sector, with environmental friendliness and harmony with nature being an important feature of Center Parcs' resorts.

Greater concern for the environmental impact of major theme parks, particularly greenfield operations, has pushed outward the time required to move from planning to completion. Extensions of existing theme parks can also be delayed. Indeed, to the extent that some theme parks have evolved through a sequence of smaller planning applications, the environmental problems of sequential increases in the volume of intrusive noise and traffic congestion are greater upon residential areas which were previously unthreatened by the initial small development plans.

## REGULATIONS

All theme parks are the subject of national legislation in relation to safety and local planning laws. As all major parks are also involved in ancillary activities, such as food service, they are subject to relevant legislation in the areas of hygiene, certification by health authorities and, in some cases, licences to sell alcohol. Employment legislation is also particularly important. Developments at the EU level in a number of these areas and in the areas of environmental policy, consumer protection and competition policy are also relevant. In the area of food hygiene, the EU adopted the Directive on the Hygiene of Foodstuffs (93/43 EEC) in June 1993 and Member States are required to incorporate its provisions by January 1996.

Concerning zoos, there exists a Commission proposal for husbandry standards in zoos (COM (91) 0177 final) laying down minimum standards for the accommodation and care of animals in zoos.

EU regulations in relation to employment are viewed as particularly important. The general thrust of EU-based proposals has been to improve conditions of work for employees and, in particular, to equalise the entitlements of part-time and temporary workers with their full-time counterparts. In a number of northern Member States work conditions for recreation park employees are already relatively high and there is little concern about the impact of existing and proposed EU legislation, or the principles of the Social Chapter of the Treaty of Maastricht. However, this is not the case in all Member States, particularly in southern Europe and in the United Kingdom.

The Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC) which came into effect in January 1993, is of considerable relevance to those recreation parks which rely on coach tours and other forms of organised travel. This Directive is also significant to EuroDisney and parks whose expansion plans include addition of accommodation facilities. However, with most recreation parks relying on independently organised day trips the impact of the Package Holiday Directive will not be as far-reaching as it is for hotels, travel agents and tour operators.

Recreation parks are included on the list of products and services which Member States can levy a reduced rate of VAT. French and Belgian theme parks benefit from relatively low rates of VAT, 5.5 % and 6 % respectively, in comparison to competitors in Germany, the Netherlands and the United Kingdom, which are all over 15 %. Rates in Spain, Portugal, Greece and Italy are also relatively low, but their distance from the high VAT northern Member States reduces distortive trade impacts.

Safety regulations are dealt with at state or regional levels, although the EU has considered introducing a Directive in this area. However, Member States such as the Netherlands, France and Belgium generally already follow German standards, particularly in the manufacture of machinery. Thus, reasonably uniform standards already exist in northern Europe. Recreation parks will be affected if the draft Directive on product liability in services, which shifts the burden of proof in "service" liability cases from the consumer to the producer, is adopted. Disputes will arise because it will be up to the supplier of services to ensure that reasonable precautions have been taken to prevent damage or injury to the consumer or his or her property. Another Directive that might influence this sector is the draft Directive on distance selling.

## OUTLOOK

Given the diversity of the recreation parks sector, its prospects for growth are best analysed in terms of its constituent sub-sectors. As suggested above, the outlook for zoos and safari parks has improved, at least in the sense that they are no longer declining rapidly and that operators are coming up with fresh ideas to enhance their products. They are also making good use of ancillary attractions and shows to enhance their appeal. In addition, the combination of environmental education and recreation has stimulated public interest in zoos.

The amusement park market in Europe is generally regarded as not yet mature. Visits to amusement parks per capita in the USA are estimated to be over twice that of Europe. Continued investment in additional facilities by major parks and the building of new parks suggests the industry agrees with this assessment. That EuroDisney's overall impact has, on average, benefited other recreation parks is also supportive of this thesis. Attendances are estimated to have fallen at most parks during 1994 (4 % overall); however, expansion is expected in the medium term. Economic recovery in Europe should also lead to accelerated growth in the short-term.

The cost of admission to parks varies widely across the EU and also differs within Member States, depending on the overall quality of particular theme parks. Pressure on admission prices should be mitigated by further demand growth resulting from a trend increase and the economic recovery. However, encouraged by high admission prices at EuroDisney, some parks will seek to improve their quality and increase their admission prices. Others will maintain or reduce existing prices to provide affordable family entertainment. Almost all parks will seek to increase revenue through ancillary activities.

The overlap between zoos, aquaria, safari parks and theme parks is likely to increase. However, while the trend in recent years has been to expand or re-orient their operations into theme parks, over the medium term, changes are likely to

occur in the other direction. Nature themes in attractions will increase together with the emphasis on education and customer participation. This will be apparent through growth in "shows" featuring animals, more children's zoos and botanical gardens. However, EAZA and its members do not support this trend as they require high husbandry standards for zoological collections. A report on theme parks in the 21st Century in "Parkworld" magazine suggests that as competition for theme park visitors will come from zoos, aquaria and museums, parks will adopt these types of attractions as an integral part of their product. Thus, exhibits of art, live craft demonstrations, dance theatres and other cultural-based attractions will become more common. These changes in emphasis will help attract a greater proportion of older visitors, an important consideration in the EU where family sizes have contracted and the population structure is ageing.

Extending opening hours and incorporating more evening and night time attractions is also likely to become more common as parks tailor their product to suit demographic trends. Reflecting a more sophisticated and demanding consumer, a greater awareness of environmental considerations, landscaping and improved staff attitudes towards customers will occur. While theme parks will increasingly educate as well as entertain, the latter will remain their primary function.

The impact of technology as a key determinant of the future of theme parks is more difficult to envisage. Virtual reality and simulation technologies are increasingly directed at leisure applications, reflecting a fall-off in demand from military sources. These technologies provide experiences which impact through visual, aural, touch and smell sensations, placing "riders" in a "virtual world" where imaginary adventures closely approximate reality. The potential for revamping the appeal of theme parks through improved attractions will expand as new technologies contribute to equally thrilling but cheaper attractions. Some of the existing appeal of the larger theme parks is based on the high capital cost of the most thrilling rides and there is a danger that falling prices, as a result of technological advances, may reduce this competitive advantage. Experimental virtual reality arcades have opened in Japan and North America, while SEGA (USA) has announced plans for 50 such arcades. Smaller and cheaper, but equally exciting, rides will also make it increasingly easy for other leisure emporia such as family entertainment centres (FECs) attached to shopping malls and other recreation centres to incorporate theme park style attractions. Technological developments do raise the threat that the theme park bubble will burst but this is unlikely in the foreseeable future.

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# Travel services

## NACE 771

*The emergence from recession of most EU Member States during 1993 and into 1994 provided a welcome turning point for the travel services' branch of the travel and tourism industry (although the effects of recession have been less negative than in most other industries). Recovery in demand for tourist travel is evident and medium term growth will remain strong, driven by an improved international economic environment and increased outbound travel in southern European Member States. As travellers become more sophisticated in their demands, the inclusive tour package (IT) is losing favour to individually tailored products, although this shift in the nature of demand is not leading to any significant bypassing of the travel services sector. The demand for tailored and modular travel products is, on the other hand, leading a number of groups in related services, such as hotels, airlines and ferry companies, to compete with the travel services business more directly than in the past. IT is also leading to growth in acquisitions and mergers as travel service businesses integrate with related services. Cross-border expansion within the EU and into central Europe is also increasing. In both the business and leisure travel markets, value for money is the overriding demand factor, but customers are not prepared to sacrifice quality. On the contrary, quality expectations are rising.*

### INDUSTRY PROFILE

#### Description of the sector

The distinction between the various activities of the travel and tourism industry is often blurred. Operations and activities of the travel services branch are indistinguishable from other related sectors of the industry; e.g. retail travel agencies, tour operators, ground handling services and even car rentals. Since car rental is covered in another monograph, it will only be briefly discussed in this chapter. There is considerable vertical integration in the European travel industry. Hotels, airlines and other transportation companies can and do have their own tour operating subsidiaries, developing either fully inclusive tour packages or partial package arrangements to help fill airline seats or hotel rooms. Travel agencies are being integrated with hotel operations, particularly where the target is the business travel market. In the leisure market, tour operators are increasingly vertically integrated with travel agencies and leisure airlines.

Moreover, the majority of travellers, whether business or leisure, do not use the services of tour operators or travel agents to make their travel arrangements. They either book their transportation directly with airlines and other suppliers, or travel by private car; the dominant mode of transportation in Europe. A significant share of hotel and other accommodation reservations are also made directly. In addition, other organisations provide part of the services available from companies in the travel services' branch. These include motoring associations, tourist offices and non-profit bodies, such as trade unions, clubs, company staff associations and media groups. In some EU states, there are "social tourism" organisations which provide low cost holidays.

Difficulties in evaluating the core sector activities are compounded by the fact that many companies do not release operating figures, let alone consolidated results. The level of disclosure is improving, although comparisons should still be treated with caution because of underlying differences in accounting principles. Figures on the number of packages sold, of passengers, tickets issued or volume of sales, number of employees or number of agency outlets are all sometimes

used as measures of the level of activity, but all have shortcomings. For example, passenger figures in relation to travel agency sales cannot be readily equated with the number of holidays sold by travel agents, since the real value of the agent's sale is only the commission. Employment poses further problems, since employment in the tour operating and ground handling service sectors is highly seasonal and, therefore, fluctuates widely with no common conversion factors for part-time to full-time jobs.

The distinction between business and leisure travellers has always been difficult to identify and is becoming increasingly muted with the disappearance of border controls. Balance of payments data are generally used to measure the currency flows generated by travel and tourism, but provide an inaccurate measure since data collection methodology and analysis vary widely from country to country. With ongoing liberalisation of exchange controls, it is even less useful.

Profiles of the leading travel and tourism groups in the travel services sector illustrates that the industry is not built on a combination of the three sectors (tour operating, retail travel and ground handling) nor even with an emphasis on one or two of them. In fact, only one of the top ten groups in the industry, in the EU, is wholly focused on this sector. On a Member State basis the density of travel agencies is highest in Germany and lowest in France.

#### Recent trends

According to some estimates, in 1993 half of outbound trips involved some kind of booking through the travel trade. About 25 % were fully inclusive tour packages (ITs), usually off-the-shelf programmes developed by tour operators and 23 % were trips involving either part package arrangements, transportation and/or accommodation booked through a retail travel agent. An additional 18 % were arrangements for transportation or accommodation booked directly with suppliers. The remainder were fully independent trips with no pre-booked arrangements.

Relative market share varies widely but, in general, the share of fully inclusive package tour arrangements has been declining since the late-1980s; in favour of partly booked trips. However, this trend appears to have been arrested. The Mediterranean Member States are regaining market share, as are inclusive package tour holidays. The major reason for this has been the devaluation of both the Spanish peseta and of the Italian lira, which had a significant impact on sales of tour packages to these destinations. Also, this could well be a blip in long-term trends as people return to tried and tested destinations closer to home in times of economic recession, rather than further afield for their holidays.

Airline ticket sales channelled through IATA's (International Air Transport Organisation) Bank Settlement Plan (BSP) also provide an indication of the use of travel agents. The net sales volume of airline tickets issued by the BSP around the world in 1993 was 49.5 billion ECU. In Europe countries generating the highest sales volume through BSP were the United Kingdom and Germany. The decision by IATA to broaden the customer base of the BSPs and to encourage participation by other travel industry service suppliers such as railways, shipping lines, car rental companies, etc. means the figures are not totally reflective of travel agency sales alone.

European Community Travel Agency Association (ECTAA) data on turnover in travel agencies and tour operating enterprises, indicates that turnover was highest in Denmark and Germany between 1991 and 1993, while turnover in Belgium, the Netherlands and United Kingdom declined. Given the stagnant demand in the travel services industry the results cast some doubt on year to year consistency, possibly arising from changes in membership of national associations.



**Table 1: Travel services**  
**Sales through IATA's BSP in Europe, 1993 (1)**

	Number of approved locations (2)	Number of participating airlines	Net sales volume 1993 (million ECU)	Change 1992/93 (%)
Belgique/Luxembourg	451	67	673	9.6
BR Deutschland	3 688	102	5 296	5.3
Hellas	310	43	295	-10.6
España	(3) 2 408	61	1 820	-6.5
France	2 657	91	2 334	-10.3
Ireland	304	32	218	-8.3
Italia	(3) 2 398	71	2 322	10.2
Nederland	411	70	1 026	-1.2
Portugal	457	33	282	-13.9
United Kingdom	(3) 3 968	101	5 988	-5.9
Österreich	226	65	359	-9.7
Suomi/Finland	231	34	266	1.3
Scandinavia/Island	1 081	60	2 342	-4.4
Schweiz/Suisse	701	72	1 207	11
Turkey	167	37	174	8.5

(1) IATA = International Air Transport Association

(2) At mid-year

(3) Includes other agents accredited for domestic air transport sales only.

Source: IATA

Data on travel agency operations do not always distinguish between wholesaling and retailing activities. Figures released by ECTAA indicate that the retail travel agency sector is slowly expanding, although the trend in some Member States suggests inconsistencies in year to year figures.

Analysis of travel agency sales of airline tickets indicates growth both in the value and the number of locations in the majority of EU Member States. The apparent increase in the number of travel agencies has been accompanied by growth in employment in some Member States. Again, however, inconsistencies in the data and their variance from trends in overall tourist and business travel demand in recent years suggest institutional and organisational changes may be responsible for the some of the trends.

The economic uncertainties, and associated loss of consumer confidence, which marked 1991 and 1992 started to dissipate in 1993 and are being virtually eradicated in 1994. World-wide, 1993 was a relatively successful year for the travel and tourism industry with international arrivals up 4 %, and tourism receipts up 9 %, on 1992. However, performance varied sharply from one market and one destination to another and growth was not as evident in Europe throughout 1993, although demand for travel started to pick-up in the latter stages of the year. While the leisure market sector recovered in the United Kingdom and is reviving in mainland Europe, it was still a difficult year for the industry given low yields and the loss of buying power in major source markets. However, 1994 is providing the turning point the industry had hoped for.

While leisure travel has grown, greater confidence in the economic outlook has not fully translated to resurgent business travel demand. A continuing excess of airline seat capacity made pricing competitive and has flowed back into some increase in demand for travel services. Indications from the travel trade suggest that businesses are reducing trip duration's, sometimes to day-return trips to save on costs. A "book your own" trend is emerging in some large corporations, while more stringent travel budgeting policies are being introduced in others and altered arrangements with travel agents such as a management fee approach are cutting business travel costs and travel service commissions.

## International comparison

Europe attracted 59.3 % of world-wide international visitor arrivals in 1993, or 296.5 million, up 2 % on 1992. International tourist receipts rose by 6 % over the same period to 139 billion ECU, equivalent to 50 % of the world total. EU countries recorded a fall in receipts and in guest nights. EFTA countries, in contrast, showed modest rises in both receipts and guest nights but a slight fall in international arrivals. While East Europe showed strong increases in arrivals and overnight stays, receipts stagnated.

Despite continued growth in arrivals and revenues, Europe's relative share of world tourism has been declining since the early 1960s. While data from the World Tourism Organisation (WTO) indicates that western Europe's share rose between 1980 and 1985, it fell back rapidly over the latter half of the decade. In the 1990s, Europe's share of international arrivals and receipts continues to fall steadily. The main reason for the decline in the EU market share is the rapid increase in tourism from the pacific region, which inevitably benefits that region more than the more distant Europe.

## MARKET FORCES

### Demand

Final consumers of travel service products are those who take holidays, visit friends and relatives or who travel on business (although there can be intermediaries, such as clubs and associations, or corporations).

Each year 60 % of Europeans take at least one trip a year away from home. The level of trip-taking varies widely from country to country, ranging from as high as 87 % in Iceland to 51 % in Portugal, and still lower in the countries of East Europe. The proportion of Europeans who take a leisure or business trip abroad (inter-EU) tends to be considerably lower. The average share of all Europeans who travel abroad is around 26 %, although the level of travel abroad is actually higher than domestic travel in some markets, notably Belgium, Luxembourg, the Netherlands and Germany. Domestic travel tends to decline in favour of foreign travel as the market becomes more travel experienced.



**Table 2: Travel services  
Turnover**

(million ECU)	1991	1992	1993	(1) 1994
Belgique/België	2 476	2 371	988	1 112
Danmark	528	1 087	1 185	1 212
BR Deutschland	8 048	14 742	17 042	18 632
Hellas	N/A	N/A	N/A	N/A
España	8 449	7 429	7 712	7 554
France	8 683	9 993	10 749	11 065
Irland	N/A	696	619	656
Italia	8 600	N/A	8 147	9 125
Luxembourg	N/A	N/A	272	297
Nederland	N/A	2 163	1 471	1 655
Portugal	933	1 667	1 356	N/A
United Kingdom	16 901	15 815	12 179	12 051

(1) Estimate

Source: ECTAA

The level of trip-taking is very much affected by income, age, education and social status. When incomes rise travelling tends not to be limited to just one trip per year. In addition, business travel is usually much more frequent than leisure travel. In the less mature European markets, the cost of travel is also an important deterrent to foreign holidays, especially for markets located great distances from popular holiday destinations, like Greece and Portugal.

Most business travellers use the services of the travel trade, at least for airline travel, though it is fairly common for corporations to deal directly with hotel chains when they can get a better deal for room accommodation, and with the railways and car rental companies for ground transportation. New technology is opening up the tourism industry, as well as improving communications. This has both negative and positive effects. As it becomes easier for people to book their own travel directly with airlines, hotels and other suppliers the impact on travel service firms is generally negative. Access via-Minitel-type systems not only to airline reservations but also to hotel accommodation and increasing applications for "smart cards" are examples of how technology facilitates access for consumers. Video-conferencing and at-airport automated ticket issue are other technology-driven innovations which impact negatively on the sector. Examples of positive impacts of technological developments include: travel agents are better able to respond to the increasing demand for tailor-made products; multimedia presentations enhance sales promotions; in-agency terminals for customers to buy their own tickets improve efficiency; and CRS developments enable the issue of immediate tickets, rather than vouchers, for entertainment events. While dedicated software enables access to information on travel and accommodation only travel agents and airlines can issue tickets. This has helped maintain the role of travel agents in the face of technological developments but, in the medium term, there may be pressure for allowing large corporations access to blank tickets.

Use of a travel agent depends heavily on how clients plan to travel, what type of accommodation they will use and whether they speak the language and/or are familiar with the destination country. The majority of domestic holidays bypass the travel services branch completely, with people travelling by car to their destination and staying with family, friends, in their own or rented holiday accommodation.

The crucial variables affecting demand for travel and for travel services are price, security, health standards and economic trends. The on-going economic recovery through the EU will crucially influence both expenditure and destination choice over the next few years. The different taxes on travel, notably

on air travel, and exchange rate fluctuations are also important influences.

Increased airline liberalisation theoretically allows greater access to markets by a greater number of carriers and should put downward pressure on fares. However, on many routes it is difficult to see fares falling substantially. The increasing liberalisation of air transport in Europe has been reflected in sharp passenger traffic growth since the mid 1980s. The effects of this growth, and the competitive fares which helped drive it, are apparent in the financial strain on some airlines and in delays at airports. Current indications are that flight delays are reducing, a trend helped by major airport upgrades and increased capacity.

Health risks and environmental damage are also examples of factors affecting tourism demand. There have been increasing concerns over dirty beaches and polluted bathing waters in the Mediterranean and other popular tourist resort areas. Some travellers (particularly in Germany, where environmental sensitivity is high) have shunned tour operators and destinations that have received bad publicity over their environmental record. High investment in water and sanitary services in Mediterranean Member States (co-financed by the EU's Structural Funds and the Cohesion Fund) is improving matters. The importance of "quality" factors in general and the environment in particular has increased considerably in recent years.

A wide range of new products and programmes have been introduced on the market over the last few years in Europe. These have helped to stimulate travel and tourism to less developed regions and to encourage a better off-season utilisation of facilities. However, most new products are targeted at people who already travel at least once a year away from home for holidays or other leisure purposes. Few have addressed the issue of people not travelling at all and the proportion of Europe's population that does not travel has changed very little. Fast growth in short breaks, trips of one to three nights, evident in the late 1980s slowed during the early 1990s. This reflects the impact of the economic downturn and a cut back on travel frequency and concentration on main annual holidays. However, there are signs of a pick-up in this market in 1994. The bulk of short break travel does not use the travel services' branch, but there has been strong growth in the commercial sector. Tour operators, airlines and hotel groups have all launched their own programmes. Rural and urban tourism have also registered above average growth in the last couple of years, both in domestic and international markets. In general, travellers are becoming more adventurous and activity oriented.

**Table 3: Travel services  
Number of enterprises (1)**

(units)	1989	1990	1991	1992	1993	(2) 1994
Belgique/België	1 030	1 050	1 068	1 700	1 286	1 300
Danmark	400	360	400	479	479	(3) 600
BR Deutschland	9 250	9 800	9 500	7 200	7 850	8 200
Heïlas	N/A	N/A	N/A	N/A	4 990	5 313
España	1 900	1 800	2 270	2 435	2 546	2 603
France	2 157	2 300	2 316	2 587	2 400	2 500
Ireland	318	330	N/A	277	296	304
Italia	4 682	4 890	4 980	N/A	5 900	5 900
Luxembourg	25	25	N/A	45	65	67
Nederland	647	672	N/A	600	550	580
Portugal	N/A	666	683	691	692	706
United Kingdom	N/A	4 302	6 093	(2) 5 271	(4) 3 038	(4) 3 093
EU	N/A	N/A	N/A	N/A	30 092	31 166

(1) Total of travel agencies and tour operators.

(2) Estimate

(3) Including also hotels, evening schools, free-lancers, etc. which act as tour operators.

(4) Companies operating as travel agencies as well as tour operators are doublecounted.

Source: ECTAA

### Supply and competition

Supply is in general more than adequate to meet demand. The suppliers of the travel and tourism industry, e.g. airlines, hotels, etc., are cyclical industries and this can have repercussions on the availability of seats and rooms, particularly at peak seasons. Consumers are in a buyer's market and this is reflected in price-setting and margins.

Demand for travel services is met by tour operators and/or retail travel agents. Travel services can cover a wide range of products, not just transportation tickets and hotel reservations. Car rental, theatre and restaurant bookings, visas, the provision of travellers' cheques, travel insurance and foreign currency are all part of the package of services offered. Car rental bookings may be handled by travel agents or directly by suppliers. There is an increasing trend for major tour operators to have a preferential relationship with a single car rental company. The tour operator is effectively a wholesaler combining travel, accommodation and ground handling services in a single package. The increasing independence and sophistication of leisure travellers are reflected in the product range. There are also increasing expectations for these services, in terms of price advantages and quality. For corporate travellers, travel service firms also handle demand for travel to conferences, trade exhibitions and fairs, and incentive travel.

The travel and tourism industry is highly price sensitive in most EU states, though this appears to be less true in countries where the industry is more fragmented. Price/quality trade-offs are also not the same for all groups and all nationalities. Pressure on prices comes from the nature of the demand, but also from the nature of the production process. The industry gains pricing advantages from bulk buying. But, it has to ensure that once it has factored in its own operational costs, staffing, catalogue production, advertising, computer reservation systems, and travel agents' commissions the end result is a product which is still competitive with the product the consumer could put together on their own.

The conventional travel agency faces competition not only from new entrants, such as hotel chains and airlines, but also from tour operators who sell direct (by mail) and from clubs and associations acting as travel organisers where local legislation allows. These have been sources of competition for some time. As consumer knowledge of travel increases - and need for travel agency advice decreases, selling by mail order firms and through supermarkets is increasing.

Foreign competition is not really an issue, although there are an increasing number of examples of tour operators establishing themselves in the traveller's destination country. The Japanese in Europe are one example. Asian airlines have also introduced competitively priced products in European markets to their own destinations, but these are not a major source of competition.

There is an attempt by all operators to keep price increases to a minimum in a highly competitive market. They achieve this through bulk buying of seats and rooms, in some cases, owning several stages in the production process; and, by switching more capacity to, and promoting more heavily, lower cost destinations.

Vertical integration is particularly marked in the United Kingdom and Germany, but is found in all the other major countries as well. In the United Kingdom integration among the largest companies involves travel retailing, tour operating and leisure airline operation. In Germany, there are two models: travel retailing, tour operating and hotel operation or these three together plus airline operation. In France, these models co-exist with the retail travel and hotels model adopted by Accor and its strategic ally, Carlson (USA).

The United Kingdom and Germany are the only countries where the competition authorities have paid any consistent attention to the tourist industry. Concerns about the build-up of dominant positions by the major players have become a constraint on expansion in Germany. Exclusive distribution arrangements between tour operators and travel agents, which had been the subject of Cartel Office and court scrutiny, ceased in late 1994.

In the United Kingdom, on the other hand, no merger in this sector has ever been turned down or constrained, even though the market shares of the largest players are greater than those of any other European operator. The Office of Fair Trading in the UK looked at vertical integration of tour operators and travel agencies in 1993/94 and concluded that there were no grounds for concern. As of late 1994, it appeared this finding would be appealed to European Union authorities by smaller operators and agents.

### Production process

The main capital employed is access to computerised reservation systems (CRS), except in cases where the travel company owns its own aircraft or accommodation. The cost of

**Table 4: Travel services**  
**Number of travel agencies and tour operators**

(units)	1992	Travel agencies 1993	(1) 1994	1992	Tour operators 1993	(1) 1994
Belgique/België	1 600	1 145	1 150	100	141	150
Danmark	120	120	120	359	359	(2) 480
BR Deutschland	6 000	6 600	6 900	1 200	1 250	1 300
Hellas	N/A	N/A	N/A	N/A	N/A	N/A
España	2 364	2 470	2 507	71	76	96
France	(3) 4 900	1 900	1 900	(3) 340	500	600
Ireland	252	284	292	25	12	12
Italia	N/A	5 840	5 840	N/A	60	60
Luxembourg	43	63	N/A	2	2	N/A
Nederland	450	400	420	150	150	160
Portugal	N/A	684	698	N/A	8	8
United Kingdom (4)	(1) 4 600	2 614	2 482	(1) 1 000	662	611

(1) Estimate

(2) Including also hotels, evening schools, free-lancers, etc. which act as tour operators.

(3) Number of outlets

(4) For 1993-94, enterprises operating as travel agencies as well as tour operators are doublecounted.

Source: ECTAA

these can range from a few thousand ECU to tens of millions, depending on the solution adopted. There is constant pressure to upgrade technology. Leading operators aim to provide real time connections with the consumer through travel agents (or their own sales outlets) with instant confirmation of bookings. In addition to the costs of CRS access, hardware costs and expenses for dedicated data lines, travel agencies in some Member States also require substantial finance for government "loading" schemes.

Investment in automation from the outset is essential, but relative to other industries the cost of tooling-up is still low and many start-up operations are run single-handed. Thus, barriers to entry are low in the travel services industry. Overall the industry is labour intensive despite the increasing need for large groups to invest heavily in computerisation. Franchising is increasingly being adopted by retail travel agents to minimise the cost of expansion.

Where travel services spill over into other sectors, they become more capital intensive. This is true where travel service providers enter the hotel/hospitality industry which requires investment in land and buildings (though here too franchising is growing). In addition, hotel sector operations are increasingly capital-intensive with, in extreme cases, fully automated check-in and staff on duty only a few hours a day at some budget hotels.

When tour operators become their own transport operators, particularly in aviation, the industry becomes capital intensive and the needs of the airline often dominate the strategy of the tour operator.

The industry requires a range of technical skills. These vary across the sector from familiarity with the information technology applications for counter staff through to language skills for tour representatives in destination markets. Customer care skills are required throughout the sector, while quality management is as crucial as in other industries. The industry attracts labour because of its glamorous image and the perceived possibility of free or low cost foreign travel. Labour turnover tends to be high as this perception is not realised, or the realisation is not sufficient to compensate for the disadvantages of the job. Major travel agencies train their own staff, however much training is either on the job, through familiarisation trips to destinations or on courses run by tour operators. There is, however, a growing recognition of the need for higher standards of service, and several initiatives are being undertaken by tourism training establishments, national tourist of-

fices and the EU to raise awareness of the issue and to provide more comprehensive customer-orientated training programmes.

Product innovation in the business travel sector takes the form of products which, above all, improve comfort, speed of service and of travel, and flexibility at competitive prices. One significant development in the industry in the last five years has been the formation of networks among business travel specialists as an alternative route to international expansion. EU travel agents are prominent members of these. Among these are Business Travel International (BTI), Internet, Global Travel Management, First Travel Management International, the Woodside Travel Trust and World Independent Network (WIN).

Innovations in the leisure sector product (through tour operators and travel agencies) are broadly similar, i.e. improvements in relative levels of comfort, speed of service and travel and of flexibility, although leisure travellers are more willing to trade these off for the sake of a competitive price. There is constant innovation through the addition of new accommodation, new destinations and new products, such as short breaks, one-day plane trips, new theme parks, sporting and cultural events. Similar product innovation approaches apply to the incentive and conference segments of the business travel market. Frequent flyer programmes for business travellers, air mile programmes for business and leisure travellers, tour operator-issued credit cards and credit facilities for leisure travellers are all product innovations which are growing in importance.

## INDUSTRY STRUCTURE

### Companies

There are no composite figures on the turnover of the travel services branch, nor on employment or number of companies. It is clear, however, that the sector is growing in the EU as a whole. Recession is now receding. This was felt in 1993 and again in a strong recovery (in part exchange-rate induced), in major destination markets, such as Italy and Spain, in the summer of 1994. Growth in outbound leisure travel from these two countries and from the former East Germany, all of which are emerging outbound origins, has contributed to the EU-wide expansion. Expansion into central Europe, particularly by German and French travel service firms, has also contributed significantly to the industry's growth. A further factor in ex-

**Table 5: Travel services**  
**Number of persons employed**

(units)	1989	1990	1991	1992	1993	(1) 1994
Belgique/België	5 500	5 600	4 800	6 000	5 000	5 000
Danmark	5 000	4 900	4 800	4 600	4 550	4 000
BR Deutschland	45 000	47 000	48 000	53 000	55 000	57 000
Hellas	N/A	N/A	N/A	N/A	13 500	15 000
España	29 000	31 500	34 650	32 650	30 000	32 000
France	N/A	24 700	26 300	26 920	30 000	30 000
Irland	N/A	2 500	N/A	2 600	2 450	2 610
Italia	23 878	24 920	29 400	N/A	30 000	30 000
Luxembourg	100	100	N/A	320	190	180
Nederland	7 500	7 500	N/A	7 000	7 500	7 650
Portugal	5 100	5 490	5 560	5 023	4 774	4 858
United Kingdom	30 000	N/A	N/A	80 000	N/A	35 000

(1) Estimate  
Source: ECTAA

pansion is the recovery in business travel as economies pick up. However, the corporate travel market has become more price-sensitive and has been trading down to economy air fares and less luxurious accommodation.

Travel agencies and many tour operators are members of trade associations, but travel agency membership may be by branch or by parent company, so the figures are not homogenous. The EU travel agents' association, ECTAA, is formed by national associations. The European Tour Operators Association (ETOA) represents mainly inbound interests, and the International Federation of Tour Operators (IFTO), represents entirely outbound interests.

There has been a marked concentration at the top of the European travel and tourism industry in the last five years. The pace of mergers and acquisitions has been rapid in virtually every EU country and cross-border acquisitions are on the increase. Over the last decade, there has been a clear move in the retail travel industry to regard leisure and business travel as separate markets and for companies to handle either one or the other. Major developments in 1993 and 1994 (first nine months) included: acquisition of a significant stake in TUI (D) by the WestLB bank which is the majority shareholder in LTU (D), Thomas Cook and a significant shareholder in First Choice (UK); restructuring of DER's (D) holdings in the ABR and Rominger travel agencies to make it one agency and to give it a greater stake in TUI; the forging of a retail travel alliance between Wagonlits, part of the Accor Group (F), and Carlson the largest US retail travel agency; the takeover of SAS Leisure (S), the number three Scandinavian travel business, by Airtours (UK); and, the sale of the business travel divisions of Thomas Cook to American Express (US).

Concentration has not necessarily meant increased concentration in individual national market segments. Frequently, it is the result of creating an integrated business. The response of middle-level and niche players to this concentration, increasing vertical integration and strategic alliances has been to explore forms of cooperation, e.g. franchising, trademark licensing, pooled purchasing or European interest groupings. Their goal is to retain their independence but still achieve economies of scale. The international networks of the business travel companies are a similar response to the global challenge of the largest international groups.

The leading companies generally sell all types of travel, subject to their chosen specialisation in business or leisure. But there are a number of specialists in the middle reaches of the industry selling solely to specific markets; e.g. 55-plus age group, young people and students, religious travel, long haul destinations, short breaks or cultural travel. There are also a number

of non-profit organisations which are significant players in package travel. The largest of these is Villages Vacances Familiales (VVF) in France. Others are the Deutsches Familienwerk in Germany, Loisirs et Vacances in Belgium and IGS in Spain.

A number of the major travel companies are directly or ultimately owned or controlled by public sector enterprises. The largest are DER (owned by the German railways), the DSB travel agency chain (owned by the Danish railways) and CIT in Italy (owned by the Italian Railways). As most European airlines are still state-controlled, the public sector ultimately has an interest in leisure tourism through these as well. Air France (F), Iberia (E), Lufthansa (D), Sabena (B), Luxair (L), Olympic (GR) TAP (P) and Alitalia (I) all have significant tour operating interests and/or travel agency interests. The picture of who chooses to invest in this sector of the industry is also varied. TUI is controlled by a group of travel agencies (including DER); Wagonlits is owned by a hotel group (Accor); Thomson and Havas Tourisme are owned by media-related operations; and NUR is owned by retailing chain Karstadt (which also has its own travel agency chain). In addition, ITS is owned by the retailer Kaufhof and Hotelplan is owned by the retailer Migros. Retailers find synergies through the travel agency side of the tourism business. Publicly-quoted companies are few, with Club Méditerranée, Airtours and First Choice.

### Strategies

With the relatively constant pattern of concentration, there has been considerable change at the top in the travel service industry over the last five years. This has largely been as a result of acquisitions, many of them cross-border. Viajes El Corte Ingles is the only company in the top twenty not to have made a major acquisition nor to have had any significant change in its shareholder make-up or strike a material strategic alliance over the last decade. There has been no consensus on strategies, however. Of the top 20 travel and tourism companies in Table 7, nineteen combine tour operating and retail travel agency businesses. But, the relative emphasis placed on one or the other varies. For some companies, the two arms do not work as an integrated structure in which one supports the other. A second emerging trend is to work through a combination of owned agencies or 50 %-owned agencies with an owner-manager and/or franchising. The strategy is even more varied when it comes to hotel and airline ownership. Eleven of the top twenty have an airline as an integral part of their operation or have a shareholder connection. Thirteen own destination hotels on a significant scale.

**Table 6: Travel services**  
**Tourist arrivals in Europe from overseas markets**

(thousands)	1990	1991	1992	1993	1992/93	Change (%) 1990/93
USA	7 530	6 290	7 200	7 600	5	1
Canada	1 513	1 352	1 500	2 300	53	52
Japan	972	1 219	1 350	1 430	6	47
Latin America	N/A	N/A	1 100	1 200	9	N/A
Australia	N/A	436	468	480	-3	N/A

Source: European Travel Commission

Outside of Germany and southern Europe, growth in the domestic markets of the leading companies has been slowing, particularly for tour operators. This has only been partially compensated for by an increase in the number of short-break holidays. The slowdown has been both in growth in tourism numbers and in spending. Both business and leisure travellers have become more cost-conscious and sales figures are also under pressure from price competition. Consequently, companies are seeking productivity gains, opportunities in the growth markets, particularly Spain, and synergies in neighbouring markets or markets with a cultural or linguistic affinity. This is true of German companies in Benelux, Austria and the rest of central Europe; of French companies moving into Spain (in particular Wagonlit through the strengthening of its position in Viajes Ecuador); of Belgian companies operating in France, the Netherlands and the United Kingdom; Dutch companies moving into Belgium; United Kingdom companies crossing the channel, the North and Irish Seas; and, the leading Spanish company exploiting the synergies of being a major destination for United Kingdom and Irish tourists by operating out of the United Kingdom and Irish leisure markets.

In Italy, on the other hand, successful expansion has essentially been organic and domestic-based, with fresh injections of capital coming from domestic sources. However, even though north European firms have been moving south, several firms in south Europe have been expanding so rapidly that they seem likely to number among the leading European companies in the near future. Grupo Viajes Iberia of Spain and Alpitour of Italy are among them. The industry remains dominated by European companies. American Express is the key exception to the rule.

The vertical and horizontal integration which characterises the travel services sector has been ongoing for nearly a decade and has accelerated over the last five years. That a number of companies are operating as tour operators, retail travel agencies and ground handling agents (inbound operators) in a number of Member States highlights the fact that regulation is not a barrier to entry. However, a key difficulty facing cross-border expansion is cultural barriers which complicate the transplanting of the travel product between some Member States. Local preferences to be considered are: language, tastes in food, eating hours, accommodation standard and type, transport mix and quality. These are highly variable from country to country. Significantly, travel agencies, who allow the consumer to select their product, have expanded across EU borders much faster than tour operators.

### Impact of the Single Market

The Package Travel Directive is the single piece of legislation that had the most impact on the operating environment for travel services. A globally positive assessment of the creation of the Single Market on the travel services sector is, however, partly offset by difficulties in selling travel packages to consumers outside the EU who are worried about the compliance costs of consumer protection legislation. On the other hand, transport liberalisation, both for air and for coach travel and

the free movement of people, have been beneficial to this sector. Further dismantling of barriers in this area is seen as a priority.

Surviving differences in VAT rates are felt to be a source of distortion. High levels of indirect taxation, not just VAT but also local taxes on tourism, are seen as negative incentives stifling the development of the industry, while zero-rating of export sales favours non-EU destinations. A single currency would be very beneficial not just for the operators but for their customers.

Future priorities include a level playing field for airlines, (i.e. close scrutiny of state aids), dismantling of restrictive practices affecting the industry, (e.g. in ground handling at airports), hotel safety and infrastructure improvements allied with an environmentally sound approach.

### REGIONAL DISTRIBUTION

Travel agencies are invariably located in urban areas, both small and large but with a higher density in larger cities. On the other hand, inbound tour operators are generally found in major cities, while ground handling operations tend to be located at gateway cities and major tourist resorts.

Many of the medium sized firms only have a regional catchment area. Specialists in some segments, such as coach holidays, can operate profitably from a local base. The products of the industry are available throughout the EU. Although there are areas where the density of travel agencies is lower, this is not a major issue. Many tour operator products are available by mail and bookings can be made directly by phone and through view data systems. This method of distribution is especially popular in France and is expected to become more widespread as view data ownership expands throughout the EU.

### ENVIRONMENT

There is evidence that consumers are becoming increasingly sensitive to the impact of travel and tourism on the environment, although this is not yet true in all countries. In Germany, where the package travel markets are well developed and consumers are particularly eco-conscious, it is now common for large companies to appoint executives responsible for environmental policy and for monitoring of the destination hotels' energy conservation and environmental practices. Hotels which do not comply with basic minimum standards can be struck off a tour operator's hotel listing. In addition, the pressure on a number of Mediterranean resorts to improve their ancillary services and infra-structure represented a mixture of direct pressure from stagnating demand and encouragement from tour operators.

Although travellers are more aware of the impact of tourism on the destinations they visit, this has not yet translated into apparent concern over the type of transportation chosen to

**Table 7: Travel services**  
**Leading travel and tourism companies in the EU according to turnover**

Company	Country	Group sales (million ECU) (1)
TUI	D	(2) 3 325.0
DER	D	2 668.6
Karstadt (Neckerman & Karstadt)	D	2 192.0
Thomson Travel Group	UK	1 818.3
LTU (2)	D	1 600.3
Kaufhof (ITS, Holland International&Kouni) (3)	UK	1 537.5
Club Méditerranée	F	1 236.3
Owners Abroad	UK	942.5
Nouvelles Frontières	F	846.7
Airtours	UK	(3) 837.0
Thomas Cook	UK	810.0
Accor (travel division, incl. Wagonlits)	F	685.6
Group Viajes Iberia	E	502.0
Air France travel division (Jet Tours/Visit France)	F	500.0
Viajes El Corte Ingles	E	(4) 445.0
Frantour	F	415.0
Spies	DK	410.0
Arke Reizen	N	396.5
Fram	F	364.0
Alpitour	I	324.0

(1) Worldwide sales of all companies in group. The groups' own consolidation practices are used. These in some instances include associates in which the group has a minority stake, but management control. Financial reporting practices are not always consistent, particularly among travel agencies. Some of these only disclose total value of sales rather than turnover as such. Some companies include VAT in sales; some do not. Country is the country of incorporation of the group, except in the case of Thomas Cook, which is UK-incorporated but German-owned.

(2) Includes pro rata element for Arke Reizen and Jet Tours (Air France) in which TUI has minority stakes.

(3) Exclusive of SAS Leisure, purchased in 1993.

(4) 1992

Source: Fitzpatrick Associates

travel on holiday. Tour operators may also supply clients with guidelines on preserving and protecting the local environment at holiday destinations.

Major tour operators also work behind the scenes, particularly in developing countries, to help local authorities plan sustainable resort development. Thomson has also been heavily involved in encouraging the restructuring of some of the Balearic islands' mature resorts. IFTO is involved in the ECO-MOST project, which aims at developing sustainable tourism. The main regulatory pressures inside the EU come from environmental impact assessment or land use requirements for tourism developments. Regulations on night flying also affect the industry.

Trade associations are also becoming increasingly active in the environmental field. The new Green Globe concept launched during 1994 by the WTTC (World Travel and Tourism Council) has already attracted widespread support from industry associations and tourism companies. It will provide a universally recognised insignia displayed by tourism enterprises in all industry sectors which become part of the scheme. The aim of the scheme is to raise awareness of environmental issues and to provide advice and training.

## REGULATIONS

There are major regulatory differences in areas such as consumer protection, conditions of market access, competition

policy, availability of state aid, and attitudes to monopolies and mergers. The EU is addressing a number of these issues through the Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC). This Directive came into force on January 1, 1993, but its impact was only starting to make itself felt in 1994. The effects will impact EU companies differently, reflecting variation in national laws prior to implementation. The Directive is intended as a start towards harmonising the varying national situations, while leaving the Member States discretion in the implementation process.

Other potentially important issues are the future of duty-free sales on intra-EU flights and ships and the imposition of VAT on the industry's products. Implementation of the former has been postponed until July 1999. It is still not clear what the eventual outcome will be in relation to indirect taxes, in particular in relation to VAT on intra-EU travel. Airline deregulation/liberalisation has a potentially beneficial impact, at least in theory. However, practical problems exist including the weak financial position of many of Europe's major airlines. An array of other regulations ranging from environmental limits on resort developments to other aspects of transport policy also have implications for the travel trade and are discussed more fully in the overview chapter.

As a result of the diversity of the tourism industry, a wide range of EU directives and regulations, including many which are not specifically tourism-orientated, affect day-to-day operations of companies. These include technical specifications (e.g. CO<sub>2</sub> emissions), consumer legislation, transport policy, social legislation, indirect taxation, etc.

## OUTLOOK

The average holidaymaker's yearning for sunshine and an inexpensive vacation will ensure the traditional Mediterranean resorts continue to top the popularity lists. Yet the two- to three-week inclusive package holiday (IT) geared to lying on a beach in the sun will not be enough to satisfy the market's increasingly sophisticated demands. This holiday will have its place, provided destinations remain abreast of demands for higher quality, greater environmental awareness and flanking attractions and activities. Recognising changing tastes, many traditional resort areas have restructured and re-packaged their product and this investment will have to continue, indeed accelerate. Rural tourism will be a major beneficiary of the search for new and less crowded destinations and for self-catering rather than all-inclusive holidays. The increasing demand for self-catering holidays reflects both growing independence on the part of the average holidaymaker and a way of keeping down costs.

IT sales to the EU leisure traveller will continue to grow through the addition of new destinations and through strong growth in long-haul destinations, city breaks and travel by the 55-plus age group. The ageing of the population in most EU member states will have a significant impact on travel demand, particularly in countries where this market segment already has the holiday habit. Some of the greatest changes in the market are likely to be not so much demographic as psychological in nature. Personal values, such as having fun, relaxation and self-fulfilment, are becoming more important. New products and programmes introduced in response to changing demographics, social patterns and tastes may stimulate travel to less developed regions and encourage better off-season utilisation of facilities. Member States, helped by the European Regional Development Fund (ERDF) and European Agriculture Guarantee and Guidance Fund (EAGGF) incentives, are increasingly developing the tourism potential of non-traditional tourism areas.

Choice of destination will also be influenced by capacity restraints and bottlenecks in destination countries and on transport routes. This will be mitigated to some extent by pricing,

**Table 8**  
**Travel services**  
**Density of travel services (1)**

	1989	1990	1991	1992	1993	(2) 1994
Belgique/België	10.4	10.6	10.7	17	12.8	12.9
Danmark	7.8	7	7.8	9.3	9.2	(3) 11.5
BR Deutschland	11.8	12.4	11.9	9	9.7	10.1
Hellas	N/A	N/A	N/A	N/A	48.2	51.1
España	4.9	4.6	5.8	6.2	6.5	6.6
France	3.8	4.1	4.1	4.5	4.2	4.3
Ireland	9	9.4	N/A	7.8	8.3	8.5
Italia	8.1	8.5	8.6	N/A	10.4	10.3
Luxembourg	6.7	6.6	N/A	11.5	16.4	16.7
Nederland	4.4	4.5	N/A	4	3.6	3.8
Portugal	N/A	6.7	6.9	7	7	7.2
United Kingdom	N/A	7.5	10.6	9.1	(4) 5.7	(4) 5.3
EU	N/A	N/A	N/A	N/A	8.7	8.9

(1) Number of travel services' enterprises per 100 000 inhabitants.

(2) Estimates

(3) Including also hotels, evening schools, free-lancers, etc. which act as tour operators.

(4) Companies operating as travel agencies as well as tour operators are doublecounted.

Source: ECTAA, Eurostat

**Table 9**  
**Travel services**  
**Expected average annual growth rates**

(%)	1994-95	1994-98
Turnover	5.0	4.0
Employment	2.0	2.0

Source: Fitzpatrick Associates

which encourages travellers to take their trip off-season, and by major infrastructure projects, such as the Channel Tunnel and the Trans-European Networks. A constraint will arise in some destinations from fears about capacity in terms of environmental impact and local population reaction. There will also be a trend on the part of these destinations to target only high yield visitors.

Increasing leisure time, due to a shorter work week, more part-time employment and more flexible working hours, will stimulate demand for travel and use of the travel services' sector. Increased traffic through Europe's regional airports shows that air travel is finally starting to filter down to the masses. However, there is still an estimated 40 % of Europeans who do not travel at all. A significant share of non-travellers probably would like to travel if there were no economic or timetable constraints. A number of new products need to be developed and measures taken, either by local or national governments, to stimulate this sector of the population. There is, however, a potential conflict between this objective and environmental considerations.

The future success of individual companies in the sector will depend largely on their ability to meet the need for new products, as well as changing demands from increasingly sophisticated European travellers. This, in turn, is likely to be linked to their ability to stay ahead of technological developments in the field and strengthen their presence throughout the EU by acquisitions, mergers and other collaborative ventures. Concentration within the industry will continue in order to achieve economies of scale and to exploit air traffic deregulation to the maximum. The division between business and leisure travel specialisation will accentuate. Small and medium-sized businesses will concentrate on niche markets and alliances with

like-minded businesses both horizontally and vertically, developing distinct market positions based on service and market knowledge rather than price. Business travellers and, in particular, corporate travel departments will also become more discerning in a search to cut costs. Some will look at bypassing travel agencies and dealing directly with suppliers. They will also make increasing use of non-travel alternatives, e.g. video-conferencing, e-mail and voice mail. Greater scrutiny of traditional forms of business travel will, to some extent, be compensated for by the growing globalisation of business and growth in incentive travel.

Market demand is becoming more difficult for the travel services sector to meet. Well-informed travellers seeking greater value for money, more variety and greater flexibility expect travel agents to improve on what they can package themselves. Technological advancements are increasingly enabling consumers to bypass travel agents and book their holidays directly with airlines or large suppliers of tourism services.

Growth in 1994 was quite strong as EU countries began to emerge out of recession. Ongoing strengthening of the international economic environment during 1995 will lead to further growth in tourism expenditure in the medium-term. Overall, average annual growth of 4 % in turnover is expected over the 1994-98 period. Employment growth will be somewhat lower, because like other tourism sectors travel service workers are poorly paid, and new inducements to retain and attract quality staff are required.

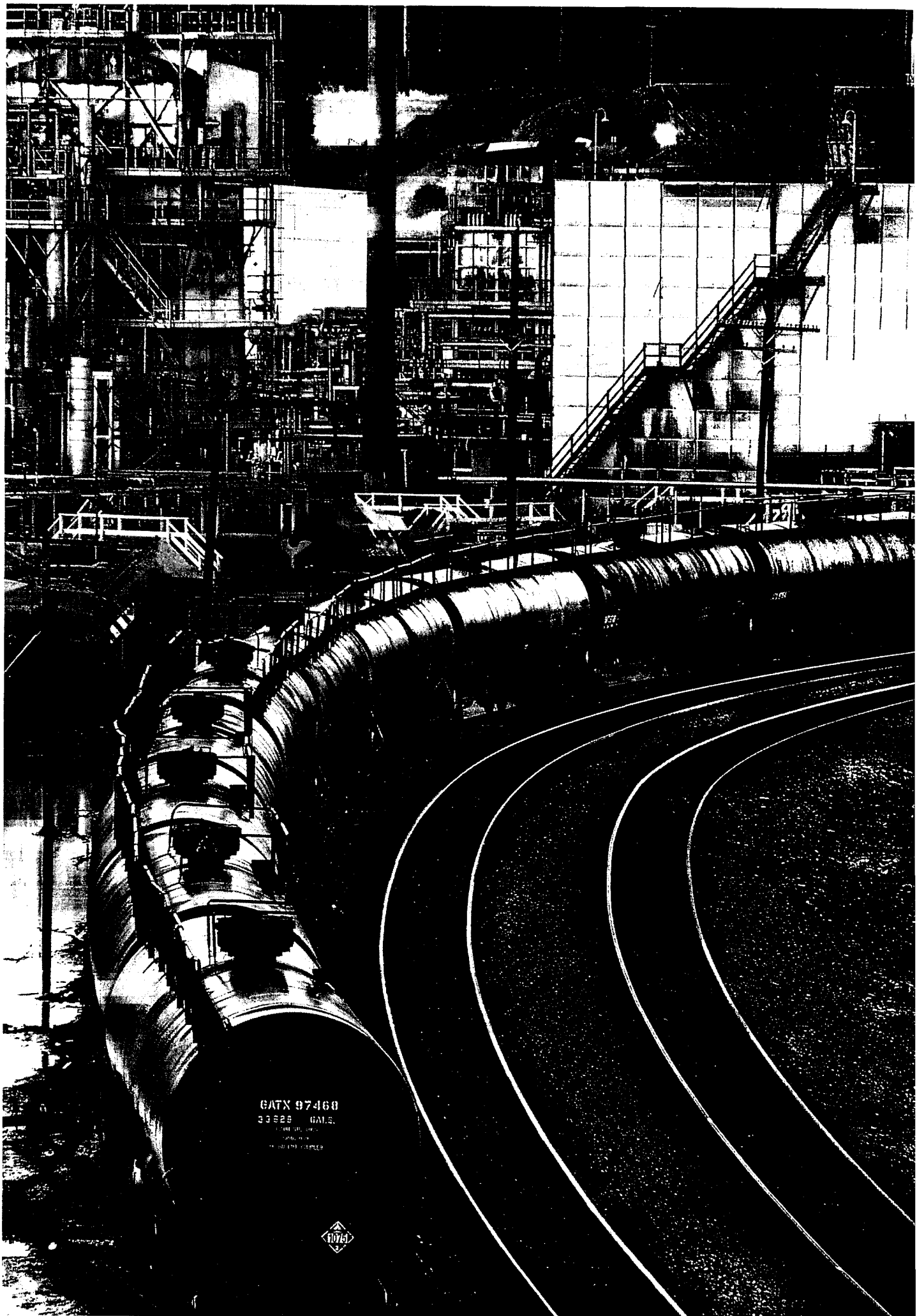
Written by: Fitzpatrick Associates

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International Federation of Tour Operators (IFTO). Address: 170 High Street, Lewes, East Sussex BN7 1YE, United Kingdom; tel: (44 273) 477 722; fax: (44 273) 483 746;

European Tour Operators Association (ETOA). Address: 26-28 Paradise Road, Richmond, Surrey TW9 1SE, United Kingdom; tel: (44 181) 322 0014; fax: (44 181) 784 2808.





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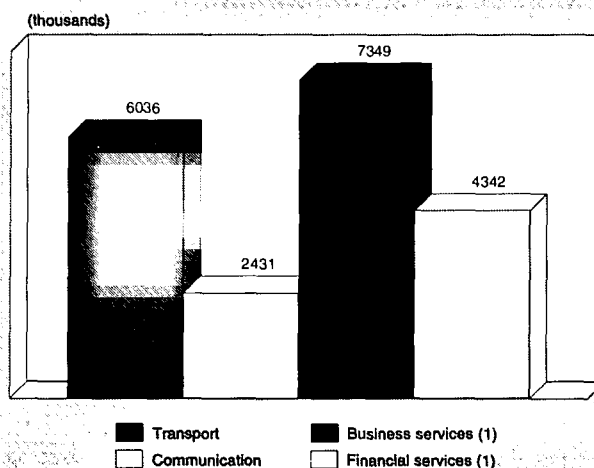


## Overview

### NACE 7

The transport sector faces good medium term prospects due to the progressive recovery of European economies. Increasing European integration will lead to more interaction between the economies of the Member States and thus to more demand for transport services. Common policies for transport will help create and maintain a competitive environment, but at the same time will encourage an increasing number of merger and alliances as firms strive to maintain their competitive positions. Expansion of various networks is continuing but large investments are still required to alleviate congestion problems in some major corridors. These investments, provided that they actually materialise, will create the conditions and opportunities for integration, a modal shift and the emergence of new services, including value added services based on transport telematics. In the short term, however, growth in transport will continue to be unbalanced as road will continue to gain market shares at the expense of other inland transport modes, both for passengers and freight.

**Figure 1: Transport services**  
Number of persons employed compared to selected sectors, 1992



(1) Auxiliary activities to financial services are included under business services.  
Source: Eurostat: Labour force survey

## INDUSTRY PROFILE

### Description of the sector

The transport services industry is primarily engaged in the conveyance of goods and passengers either directly or indirectly. Direct involvement relates to the actual conveyance of goods and passengers by various modes of transport. Indirect involvement relates to such services as handling when changing modes, traffic guidance, travel arrangement, freight brokerage, storage, etc.

NACE 7, the transport and communications industry, comprises the following two-digit classes:

- NACE 71: railway transport;
- NACE 72: other land transport, including urban transport, road transport and pipeline transport;

- NACE 73: inland waterway transport;
- NACE 74: sea transport and coastal shipping;
- NACE 75: air transport;
- NACE 76: supporting services to transport, including inland waterway ports, sea ports and airports;
- NACE 77: travel agents, freight brokers, storage and warehousing;
- NACE 79: communications, including postal and telecommunication services.

**Table 1: Transport services**  
Main indicators of the EU transport sector

	1980	1985	1986	1987	1988	1989	1990	1991	1992
Gross value added at market prices (million ECU) (1)	91 179	131 155	139 878	152 648	163 777	178 689	190 250	201 154	211 743
Number of persons employed (thousands) (2)	N/A	(3) 4 702	(4) 5 125	5 526	5 606	5 787	5 883	5 872	6 036
Goods transport by road (million tonne-kms) (5)	N/A	399 239	424 693	449 263	496 483	519 109	525 823	547 347 (6)	534 238
Goods transport by rail (million tonne-kms)	195 392	178 771	171 188	171 081	173 721	176 461	174 613	176 393	165 370
Goods transport by inland waterways (7) (million tonne-kms)	N/A	94 634	99 941	96 381	101 558	101 977	103 773 (8)	48 617 (8)	47 517

(1) Estimate

(2) BR Deutschland 1983 and Italy 1983-1991 including also communication

(3) Excluding E and P

(4) Excluding NL

(5) Only B, DK, D, GR, F, IRL, NL and UK

(6) Excluding B and IRL

(7) Including countries with international or transit traffic of more than million tonnes in 1992, i.e. B, D, F, L and NL

(8) Excluding D

Source: Eurostat: National Accounts, Labour force survey, Carriage of goods; UIC



**Table 2: Transport services**  
**Transport as a share of GDP at market prices**

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	6.6	6.5	5.9	6.1	6.5	6.5	6.6	6.7	6.6
Danmark	6.6	6.3	6.1	6.2	6.6	6.7	6.8	7.0	7.0
BR Deutschland	3.5	3.4	3.2	3.7	3.2	3.3	3.2	3.2	N/A
Hellas (1)	6.1	5.6	5.5	5.5	5.4	5.3	5.3	5.2	N/A
España	4.2	3.7	3.8	3.9	3.9	3.7	3.5	N/A	N/A
France	4.2	4.1	4.0	3.9	4.0	3.9	3.9	3.9	4.0
Ireland	3.5	3.0	3.2	3.4	3.4	3.0	2.8	2.7	N/A
Italia	4.1	4.0	4.3	4.2	4.3	4.4	4.3	4.4	4.5
Luxembourg	3.5	3.1	3.4	3.4	3.7	4.0	4.0	4.1	N/A
Nederland	4.7	4.4	4.6	4.6	4.7	4.6	4.5	N/A	N/A
Portugal	3.8	5.2	5.2	5.1	4.9	4.7	3.3	N/A	N/A
United Kingdom	4.4	4.2	4.4	4.7	4.8	4.8	4.9	4.8	4.8
EU (1)	4.2	4.0	4.1	4.2	4.2	4.2	4.1	4.1	4.1

(1) Estimate

Source: Eurostat: National Accounts

Note that it is important to distinguish statistics related to the transport industry (e.g. value added or employment) from statistics related to transport traffic (generally measured in tonne/km or passenger/km). Statistics related to the transport industry capture transport services marketed to third parties but generally exclude transport services produced by economic units for their own consumption. By contrast, statistics measuring transport traffic in physical units usually cover both types of activity. In the case of road transport, own account is far from negligible. For example, companies active in manufacturing regularly transport on their own account, as they do not want to rely on external transport services and own account represents about a third of road freight traffic in tonne/km. Similarly, in family households, the use of the private car is not in itself an economic activity but it accounts for about 80 % of total EU passenger traffic in passenger/km.

Consequently, the interpretation of statistics can sometimes lead to paradoxical results, and the problem should be kept in mind.

Of the subsector telecommunications and postal services (NACE 79), only postal and express services are covered in this chapter, telecommunications being covered in another chapter. However, statistics on communications provided in this monograph cover telecommunications as well and postal and express services.

### Recent trends

Total gross value added at market prices generated by the EU transport industry amounted to 212 billion ECU in 1992, which is 4.1 % of EU GDP (communications and own account transport not included). This share has remained relatively stable since the early 1980s. In real terms, annual growth in value added has averaged 2.5 % since the beginning of the 1980s, which is slightly faster than growth in real GDP (2.3 %). Spurred by progressive liberalisation and the completion of the Internal Market, the sector experienced particularly fast growth during the late 1980s. The situation deteriorated progressively in the early 1990s, reaching a bottom in 1993 with a slight decrease in real production.

Depending on geographical factors, but also on structural factors such as the degree of liberalisation or the share of own account, the importance of the transport sector varies considerably by Member State (Table 2). In Germany, Spain, France, Ireland and Portugal transport's share of GDP is below the EU average, whilst for Belgium, the Netherlands, Denmark and Greece the share in national GDP is substantially larger than the EU average.

Turning to employment, the transport services sector accounted for 4.3 % of the EU labour force in 1992, which represents slightly more than 6 million jobs. In addition, employment in telecom and postal services totalled 2.4 million. Employment in transport services increased moderately during most of the late 1980s and early 1990s, but this progression owes much to the rapid growth in value added observed over the period which more than outweighed sustained productivity gains. The transport sector has consistently improved productivity since the beginning of the 1980s. Productivity gains have fluctuated considerably from one year to the other, generally following the business cycle, i.e. increasing faster during expansion periods. However, the long term trend is toward a more than 2 % annual increase in real productivity, which is quite high compared to most of the other service sectors and which leaves limited room for increases in employment given the sector's long term growth. Consequently, the transport sector though it does generate employment, has a much poorer record in terms of job creation than most of the other service sectors.

Inland transport services, the total of rail, road and inland waterways, account for 65.4 % of total employment in transport alone (i.e. excluding communications). Sea and air transport take a share of 8.6 %. Indirect transport services, the supporting services and other auxiliary services have a share in the sector's total employment of 26 %.

The trend in national and urban/suburban passenger transport has favoured the private car, which has become the primary mode of transport. Since the early 1970s, traffic by private cars has increased continuously, on average by more than 3 % annually. This mode now accounts for 83 % of total inland traffic, leaving the balance to railways (about 7 %) and buses and coaches (about 10 %). The continuous loss of market shares from rail and busses to private cars is presenting a number of problems for the environment, particularly congestion and atmospheric pollution. Public transport - rail and bus - tends to compete poorly with the mobility advantages of the private car (except in densely populated and congested areas), and suffers from a competitive disadvantage on the price front, insofar as the cost of using a car poorly reflects the environmental and social costs linked to that transport mode.

For international long distance passenger transport, air transport has become the most important mode for both business travel and tourism, particularly as the time wasted on travel represents a very real opportunity cost to the business traveller and as the demand for leisure has favoured longer distances.

In spite of a dramatic slump in 1991, passenger traffic by EU airlines has surged by more than 7.5 % annually over the past seven years. Fast growth has caused congestion problems in the airways and at airports, which are currently being addressed Community-wide within the EU. However high speed rail services are becoming very competitive for medium range distances (around 300-500 kilometres).

The bulk of freight transport is road haulage. Based on 1990 data, road accounts for 74 % of total inland traffic measured in tonne/km, the rest being shipped by rail (16 %) and inland waterways (10 %). Maritime transport accounts for about 30 % of goods movements between Member States. Road haulage has benefited significantly from increasing integration within the Union. Since it is highly flexible, it can quickly take advantage of changes in industrial structure and new demand requirements. New forms of production organisation, such as just-in-time, are particularly demanding in terms of transport flexibility and have considerably favoured road haulage. Furthermore, rail and inland waterways have suffered from the sluggish growth of their core activity, the transport of bulk goods. These two modes do have opportunities, however, in unitised cargo (containers).

Another trend is the increasing importance of air freight transport services, albeit its overall market share remains low. Especially in the field of high value goods and perishable goods, air transport has a competitive advantage with its high speed of conveyance. This service is currently being integrated more and more with express service companies.

### International comparison

Table 3 provides a comparison of value added in transport and communications in the EU, the USA and Japan. The contribution of transport and communications to GDP is fairly similar in the three regions, at about 6 %, though the absence of recent data in the case of the US makes such a comparison a little awkward. In 1992, value added in the sector totalled 316 billion ECU in the EU, a considerably higher level than in Japan (177 billion). However, in per capita terms the value added is far higher in Japan (1 427 ECU) than in the EU (910 ECU).

## MARKET FORCES

### Demand

The demand for transport depends on economic and social developments within the Community. Growth in transport demand tends to depend on growth in GDP, albeit disproportionately, hence accelerating GDP growth does have a more than proportionate effect on transport activity and vice versa for decelerating GDP growth rates.

In addition to the general level of economic activity, demand for transport also depends on other factors such as structural changes in the manufacturing sector, the completion of the Internal Market, changes in living modes and liberalisation. The relocation of manufacturing (usually to non-urban areas) and the dispersal of economic activity has had a concomitant effect on good and passenger movements. The trend towards very flexible production methods (JIT) have led to lower stocks which in turn have required more frequent deliveries and lower volumes. The rapid growth in the services sector has multiplied the demand for professional mobility over all distances. The completion of the Internal Market, by spurring intra-EU trade and by allowing the restructuring of manufacturing production around larger production units, has also contributed to increased demand for freight transport. As to passenger transport, the urban spread and the development of mega-cities have boosted the demand for commuting whereas leisure transport has benefited from continuous reduction in barriers to mobility in the Union.

Demand for transport is usually decomposed by transport modes both for passenger and freight movements. Over the past twenty years, growth in these various segments has been far from uniform. Since the early 1970s, growth in passenger traffic has been slightly faster than growth in real GDP, averaging 3.2 % annually between 1970 and 1992. On the other hand, growth in freight traffic has been slightly slower than growth in GDP, averaging 2.0 % annually over the same period. Passenger transport is characterised by faster than average growth in traffic by private cars and particularly fast growth in air traffic. As to freight transport, road has increased its share of inland transport markedly at the expense of both rail and inland waterways. Rail has experienced an overall decline in traffic since the beginning of the 1970s while traffic in inland waterways has hardly increased over the same period.

The demand for road transport, both passenger and freight, has been dramatically affected by the demand for increased mobility and flexibility where the door to door concept has acted as competitive edge unmatched over shorter distances by any of the other modes. On longer distances, road transport for freight still allows for door to door delivery without transshipment that is usually required for rail and inland waterway freight. In addition, the competitiveness of road compared to other freight transport modes has largely benefited from the general liberalisation trend which has taken place in Europe and which has simultaneously improved efficiency and reduced prices in road haulage.

The development and the increasing complexity of transport and logistic operations have led many companies to outsource more of these activities to professional transport operators in order to minimise costs. As a result, the demand for professional transport services has been growing faster than total freight traffic which, as already explained above, also covers

**Table 3: Transport services**

**Gross value added at current market prices in transport and communication in the EU, USA and Japan**

	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Value added (billion ECU)</b>									
EU (1)	131	198	211	228	244	266	284	301	316
USA	124	327	267	238	N/A	N/A	N/A	N/A	N/A
Japan	47	108	133	128	160	173	148	172	177
<b>Share of GDP (%)</b>									
EU (1)	6.1	6.1	6.2	6.3	6.2	6.2	6.1	6.1	6.1
USA	6.4	6.3	6.3	6.1	N/A	N/A	N/A	N/A	N/A
Japan	6.2	6.6	6.5	6.6	6.5	6.6	6.4	6.3	6.3

(1) Estimate

Source: Eurostat: National Accounts; OECD: National Accounts Statistics



**Table 4: Transport services**  
**Number of persons employed by mode of transport, 1992 (1)**

(thousands)	Rail	Other land transport	Inland waterways	Sea	Air	Supporting services	Agents, brokers, storage	Communi-cations	Transport total	Share of total employment (%)
Belgique/België	40.2	79.5	3.2	4.6	14.5	29.2	27.8	70.1	269.1	7.1
Danmark	21.7	54.2	N/A	16.3	9.8	18.0	16.3	48.8	185.1	7.0
BR Deutschland	457.2	375.4	19.5	27.5	67.6	103.4	497.4	663.1	2 211.1	6.1
Hellas	12.9	105.5	0.1	31.7	6.4	20.1	25.9	47.8	250.4	6.8
España	57.7	388.8	N/A	16.9	30.5	39.3	45.1	156.2	734.5	5.9
France	196.7	423.1	2.5	17.6	50.2	39.3	151.2	465.2	1 345.8	6.1
Ireland	3.9	19.7	0.0	2.7	6.4	3.9	5.6	20.9	63.1	5.5
Italia	(2)	(2) 646.4	36.5	(3)	(3) 47.6	N/A	113.9	320.7	1 165.1	5.5
Luxembourg	3.1	2.7	0.1	0.1	1.7	0.1	0.2	3.3	11.3	6.9
Nederland	31.2	151.7	11.0	8.3	32.1	18.7	44.5	111.6	409.1	6.2
Portugal	23.3	82.2	1.5	7.8	18.3	19.2	13.1	54.3	219.7	4.9
United Kingdom	116.9	582.0	N/A	33.6	65.3	75.8	260.0	468.6	1 602.2	6.3
EU	964.8	2 911.2	74.4	166.9	350.3	366.8	1 201.2	2 430.5	8 466.5	6.0

(1) The figures might deviate from employment data derived from another source.

(2) Railways are included in other land transport.

(3) Sea transport is included under air transport.

Source: Eurostat: Labour force survey

own-account transport. Furthermore, professional transport operators are somewhat moving out of the simple transport function to supply more complex logistics and warehousing services, a trend which further raises the value added by the sector.

### Supply and competition

The major impacts on aggregate supply are changes in infrastructure, changes in equipment technology, policy measures to encourage one mode over another or with another, and liberalisation.

Infrastructure has impacts on all the various modes. For road transport, freight and passenger, quality and availability of roads are crucial, particularly on inter-city routes for freight and on inner city and urban congestion for both freight and passengers. For all rail, improvements in the network, including both network additions and the viability of high speed networks are key components. For air transport, congestion at some airports at peak loads is a serious problem, which coupled with an air traffic control system that requires substantial investment to operate efficiently, causes a real problem for the sector to supply services efficiently and cost effectively. For inland waterway, there is a real limit to infrastructure investment, although links to eastern Europe are slated for improvement. Overall, the supply of transport services is increasingly hampered by serious bottlenecks at some points of the European network. Recognising both the infrastructure shortage and the importance of an effective transport system for the EU economy, the EU Commission has proposed the development of a trans-European transport network covering all transport modes including combined transport. Corresponding infrastructure investments have been estimated at 400 billion ECU by the year 2010 (COM(94) 106 final).

Changes in equipment technology and infrastructures have had the most impact on air, road and rail transport. In air transport, vast strides have been made in supplying efficient air transport at a cost that has in real terms declined on aggregate over the last few years. For road freight, improvements in truck design and efficiency have allowed a real reduction in operating costs and higher volume per load movements. For passengers, the effect has been less noticeable as changes in technology have allowed some efficiency gains, but these latter have been outweighed by larger numbers of single oc-

cupancy movements. Investment in higher quality track and rolling stock for rail has allowed efficiency gains and also in some cases induced additional traffic, both passenger and freight - the drawback to freight still remains inflexibility and transshipment at point of loading and unloading.

Competition between modes has meant that overall road transport, specifically passenger cars and road freight, has gained share at the expense of other modes. In particular, cars have taken share from rail for short to medium length journeys and share from urban/suburban public transport for short journeys in and between urban and inner city areas. Road freight has taken share from rail, and to a lesser extent from inland waterway. Air travel for leisure and business has gained share from rail and coach for medium to long distances within the Union.

Several segments of the transport sector have traditionally been heavily regulated through price controls and entry restrictions. The increasing recognition of the ensuing losses in efficiency and high prices, together with the necessity to liberalise intra-EU international transport to complete the Internal Market, have fostered a general liberalisation trend which has however so far essentially affected road freight and air transport. By spurring efficiency and lessening prices of a given transport sector, liberalisation also shifts the relative competitiveness of transport modes.

Another issue, which could impact considerably the structure of the transport sector but which has so far translated in very few policy measures, is the mis-pricing of the various transport modes. Competition between modes is distorted by the fact that the prices of some modes, essentially road, do not fully reflect their environmental and social costs (air pollution, congestion etc.). The result is a loss of welfare for the community as a whole. However, the issue remains quite controversial insofar as no real consensus has so far emerged as to the magnitude of these environmental and social costs.

## INDUSTRY STRUCTURE

### Companies

The sector is characterised by large differences in the importance of state ownership depending on the transport mode considered. Road freight and private cars (including taxi serv-

**Table 5: Transport services  
Employment structure in transport and communication, 1992**

(%)	Share of female workers	Share of self-employed	Share of part-time workers
Belgique/België	17.8	4.9	4.1
Danmark	26.5	9.7	14.2
BR Deutschland	28.7	5.7	10.2
Hellas	11.8	27.4	1.7
España	12.9	27.3	2.1
France	27.4	6.0	8.1
Ireland	23.8	14.3	3.6
Italia	16.4	19.6	2.7
Luxembourg	19.5	3.5	3.5
Nederland	20.6	5.0	22.7
Portugal	22.1	9.8	2.0
United Kingdom	23.6	11.2	10.1
EU	23.0	11.4	8.1

Source: Eurostat: Labour force survey

ices) are completely dominated by private ownership, with only isolated case of concentration - typically in a geographical area - and by definition private cars are privately owned. Rail, including urban/suburban services, is dominated by public ownership. Air transport has been dominated by 'flag carrying' airlines that have tended to be owned by the state, and on balance most of the major airlines in the Community still remain in the hands of the state. However, there are numerous medium to small sized airlines that are privately (this includes quoted companies) owned and within this sub-sector there is a low degree of concentration. Inland waterways are dominated by small privately owned firms, often of one barge or ship. Maritime transport is largely privately owned.

### Strategies

Strategies developed by transport companies in the Union are largely dominated by the necessity to adapt to two major trends: increasing privatisation and enhanced competition. The degree of these trends strategies varies according to the sectors considered. In road transport, particularly road freight, the move has been to increase competition between firms in different Member States by deregulating intra-EU international transport, by gradually allowing cabotage and by liberalising domestic supply in most of the Member States. In air transport, the liberalisation of the market within the Community in 1993 and the lifting of all restrictions on cabotage by 1997 has meant that many of the flag carriers that still remain state owned will gradually be moved into the private sector and that competition will force more alliances and mergers and acquisitions as companies seek to minimise costs and maximise revenues, and expand their access to markets of critical size in order to compete effectively. Spearheaded by the United Kingdom, a limited number of Member States is progressively moving towards the privatisation of their rail operator. However, changes in the structure of the rail industry will generally take place only slowly as rail tends to be viewed as a quasi-public good as the supply of rail services is in the public interest. The EU has introduced limited open-access and the accounting separation of the provision of infrastructure services from the provision of rolling services. Nonetheless, for rail operators competition essentially stems from other transport modes rather than from other rail operators. As to inland waterways and maritime services, privatisation is a less important issue as these sectors are already largely privately owned. Further deregulation will take place in the coming years but this can only have limited impact as the two sectors have traditionally been quite competitive

### Impact of the Single Market

The completion of the Single Market had a major impact on the transport services sectors, both directly and indirectly. The elimination of controls at internal frontiers facilitated intra-EU movement of passengers and freight and reduced time wasted in administrative formalities. For several transport modes, the liberalisation of access and prices has considerably modified industry structure and brought about more efficient and cheaper services. Free access has generally fostered entry by start-up companies, but has also opened new perspectives for larger operators which have frequently reacted by increasing size through M&As and alliances. In general, liberalisation has allowed the sector to take more advantage of the main indirect benefit of the Internal Market, namely increased demand due to increased cross-border mobility, additional intra-EU trade and faster GDP growth in the EU economies. However, the 1992 programme has unevenly affected transport modes. Some of them were not really concerned from the beginning, either because they were already largely liberalised (inland waterways) or because most of their activity takes place extra-EU (maritime shipping). In other cases, mainly rail, the integration process has been much slower both in terms of liberalisation and in terms of technical harmonisation. The next priorities thus include a strengthening of the integration process for those modes which are still behind. Another remaining barrier is the lack of a level playing field in terms of inter-modal competition. Some transport modes benefit from an unfair competitive advantage insofar as their costs do not reflect the total social and environmental costs generated by their activity.

### TECHNOLOGICAL PROGRESS

In all subsectors of the transport and communications industry, progress in technology and possible economic and social benefits are substantial. It relates to the following items:

- the development of new information and communications technology ("telematics"), leading to new communication and value added services;
- the application of telematics enables considerable improvements in transport service quality. Key quality items such as vehicle monitoring, goods and parcel tracking, container handling, traffic management, travel information, route guidance, automatic fee collection, fleet management, driver assistance, etc. have improved due to advanced applications



**Table 6: Transport services**  
**Evolution of passenger transport in EU**

(million passenger-kms)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>Railways</b>										
Belgique/België	6 963	6 572	6 069	6 270	6 348	6 400	6 539	6 770	6 780	6 694
Danmark	4 314	4 716	4 876	4 860	4 850	4 733	4 855	4 710	4 600	4 596
BR Deutschland (1)	40 499	42 707	41 397	39 174	40 959	41 554	44 600	46 700	47 800	47 576
Hellas	1 464	1 732	1 950	1 973	1 963	2 020	2 051	2 000	1 994	1 726
España	14 826	17 066	16 866	16 601	16 959	15 999	16 711	16 360	17 630	15 457
France	54 660	62 070	59 860	59 970	63 290	64 490	63 960	62 300	62 870	58 177
Ireland	1 032	1 023	1 075	1 196	1 180	1 220	1 226	1 290	1 230	1 274
Italia	39 587	37 401	40 500	41 395	43 343	44 443	45 513	46 430	48 360	47 101
Luxembourg	246	229	224	216	223	224	208	230	220	262
Nederland	8 892	9 007	8 919	9 396	9 664	10 162	10 804	15 120	15 350	15 245
Portugal	6 076	5 725	5 803	5 907	6 036	5 908	5 664	5 690	5 690	6 397
United Kingdom	30 259	29 684	30 984	32 318	34 412	33 323	33 469	31 900	31 620	30 322
Osterreich	7 380	7 290	7 332	7 363	7 783	8 444	8 463	9 220	9 560	9 342
Suomi-Finland	3 216	3 224	3 170	3 106	3 201	3 208	3 331	3 230	3 060	3 007
Sverige	6 998	6 803	6 363	6 215	6 289	6 211	6 170	5 660	5 370	5 830
<b>EU</b>	<b>226 412</b>	<b>235 249</b>	<b>235 388</b>	<b>235 960</b>	<b>246 500</b>	<b>248 339</b>	<b>253 564</b>	<b>257 610</b>	<b>262 134</b>	<b>253 006</b>
<b>Buses and coaches</b>										
Belgique/België	9 075	8 965	9 309	9 964	10 239	10 509	10 850	11 200	11 560	N/A
Danmark	7 300	8 800	9 200	8 800	8 800	8 800	9 300	9 200	9 200	N/A
BR Deutschland (1)	65 600	54 000	53 500	52 900	52 424	53 000	55 500	58 200	59 100	60 300
Hellas	5 817	5 789	5 004	4 812	5 090	5 080	5 100	5 090	5 100	N/A
España	28 099	31 807	34 059	35 146	36 991	37 496	38 684	40 600	41 200	N/A
France	38 000	37 000	39 500	42 200	41 900	40 300	41 300	42 900	41 100	N/A
Ireland	3 010	2 630	2 560	2 495	2 430	2 750	2 570	2 440	2 840	N/A
Italia	57 836	68 080	70 811	72 742	74 394	79 840	84 000	84 690	87 750	N/A
Luxembourg	385	370	390	440	475	419	419	445	470	N/A
Nederland	13 200	13 000	12 900	12 800	12 800	12 800	13 000	14 000	14 500	N/A
Portugal	7 600	9 500	9 700	9 850	10 000	10 150	10 300	10 700	11 400	N/A
United Kingdom	52 000	49 000	48 000	48 000	48 000	48 000	46 000	45 000	44 000	N/A
Osterreich	12 450	12 808	12 679	12 844	12 901	13 331	13 620	13 690	13 700	N/A
Suomi-Finland	8 500	8 600	8 600	8 600	8 600	8 500	8 500	8 100	8 000	N/A
Sverige	7 300	9 000	9 000	9 000	9 000	9 000	9 000	9 300	9 300	N/A
<b>EU</b>	<b>316 172</b>	<b>319 349</b>	<b>325 212</b>	<b>330 593</b>	<b>334 044</b>	<b>339 975</b>	<b>348 143</b>	<b>355 555</b>	<b>359 220</b>	<b>N/A</b>

(1) Excluding East Germany

Source: DGVII/A/2 transport database

of information and communication technology and Electronic Data Interchange (EDI);

- several research programs, such as DRIVE (Dedicated Road Infrastructure for Vehicle safety in Europe), EURET (Research and Technological Development Programme in the field of Transport), both contained in the second Community RTD Framework Programme, telematics Applied to Transport of the third Framework programme as well as activities outside the Community framework such as the Prometheus (1989-94) EUREKA programme examining advanced telematic systems for the motor industry, and EATCHIP (European Air Traffic Control Harmonisation and Integration Programme) of Eurocontrol have been carried out with the purpose of improving traffic safety, the impact on the environment and integrating approaches to increase transport efficiency on an European basis;
- energy efficiency and reduction of exhaust emissions and to a lesser extent other forms of nuisance such as noise.

The potential of the application of these emerging innovative technologies on the creation of value added services and on the stimulation of economic growth is significant, as the various communications of the Commission on the information society and the two European Councils conclusions in Corfu and Essen have highlighted. In addition, the Commission in its communication on telematics applications for transport in

Europe (COM(91)469) has set an outline action plan for the best approach to re-deploy telematics systems.

## ENVIRONMENT

Transport is the dominant source for certain types of air pollutants: in particular, transport is estimated to be responsible for about 80 % of carbon monoxide emissions in the EC. For nitrogen oxides and hydrocarbons, estimates indicate that transport causes between 50 % and 60 % of all man-made emissions, and furthermore it produces 40 % of all emitted particulates. Another major pollutant is lead, which is discharged by internal combustion engines using leaded gasoline (dominated by cars and light vans).

In 1992 the European Commission published a Green Paper on The Impact of Transport on the Environment - a community strategy for sustainable mobility. This Green Paper was a milestone in attempting to look at the issues of the impact of transport on the environment from a global perspective taking into account the inter-relationship of transport and economic welfare and the relationships between the various transport modes. Although the Paper focused on atmospheric pollution, it also covered, in some depth, the other forms of pollution or nuisance that are often skated over in considerations of transport. In particular, it discussed the impact of

noise on the environment, water pollution (inland and maritime) from the effects of transport, soil impacts, vibration, land use and intrusion, congestion and the risks inherent in transporting dangerous goods.

In assessing the impacts of transport on the environment, the Paper concludes that operational pollution is the critical issue for all transport sectors, with the main culprits being the road, sea and air sectors. Land use and intrusion was ranked second in importance (particularly the one caused by the road and rail sectors). Congestion interestingly was ranked third although it restricts mobility and contributes to atmospheric pollution. This third place was largely due to congestion tending to be prevalent only in inner-city and densely populated urban areas and in terms of the whole picture had less impact. Bottom of the ranking was the transport of dangerous goods, although politically sensitive, due largely to the small quantities moved within the EU compared to the volumes of other goods.

The Paper also sought to provide possible measures and research programmes for discussion on a common strategy based on a global approach requiring different types of initiatives. The essence of the Paper is to ensure that transport continues to fulfil expectations in terms of its contribution to social welfare, economic cohesion and growth whilst minimising its impact on all aspects of the environment. Within this global approach to strategy were outlines of various approaches that could be made or adopted to achieve these ends.

## REGULATIONS

Most of the EU transport market is currently regulated on a national basis and therefore relatively fragmented. In 1985, a ruling of the European Court obliged the Council to work out a common transport policy along the same liberal lines that hold for the rest of the economy under the rules of the EC.

The implementation of the common transport policy involves two elements:

- freedom to provide services and eliminate competition distortions;
- improvement of infrastructure and production means.

The latter element relates to large investments in infrastructure and new innovations in means of transport as the Community contributes to a number of infrastructure-related projects, which are dominated by the high-speed rail network. However, the Community programme has limited funds, and there are a number of projects important to the Community that are not funded by the Community: e.g. the Channel Tunnel, the Trans-European Motorway, the construction of the Rhine-Main-Danube Canal and the Bælt Link in Denmark.

Innovation in transport is dominated by European R&D programmes aimed at traffic safety, reductions in energy consumption and in exhaust emissions and at adding new telematics-based services. Also, the harmonisation of technical standards continues as part of general harmonisation in the Single Market.

In terms of broad policy issues on transport in the Community, the Commission published a White Paper on The Future Development of the Common Transport Policy at the end of 1992 (COM(92)494). This communication from the Commission is a crucial tool in setting out the issues that need to be discussed as it seeks to set out a global approach to transport issues enabling due consideration of all views before the launch of particular initiatives. It recognises the importance of each transport mode in the global picture, and seeks to balance transport policy in terms of its impact on the environment with sustainable mobility for the Community as a whole. The communication enlarges on the major issues of modal dise-

quilibria, capacity constraints, system and network developments, environmental issues, safety, and social issues.

Whilst the desire to create a Common Transport Policy that maximises all requirements is existent, there are a number of regulations and policies that are mode specific and in general these are designed to tie into the master plan. The important regulations by mode are entered into more detail in the following relevant monographs. However some of the more important ones are summarised below. The major changes in regulations have been aimed at stimulating competition by removing artificial and regulatory barriers.

In terms of freedom to provide services and eliminate distortions of competition, the Commission has produced several communications on the establishment of the conditions for cabotage, with the most progress being achieved on intra-EU road transport. Bilateral authorisations for transport between countries were replaced by EU permits at the beginning of 1993 with an elimination of all quotas.

As to inland waterways, there is relatively unhindered competition on the Rhine River, but initiatives are being taken to extend this to other waterways. Initiatives have also been taken to allow cabotage: each ship with an EU-flag is allowed to provide services within other Member States. This will increase competition on the European waterways.

The railway directives of June 1991 and July 1994 aimed at giving limited access to the national railway networks. The directives were designed to encourage the national railway companies to form international alliances for both passenger and freight services under single management structures, and to allow a measure of free access to the entire EU railway system for private companies involved in combined transport.

As regards the shipping market, in December 1992 the transport ministers adopted a regulation liberalising maritime cabotage within the EU. The regulation entered into force January the 1st 1993, but includes several temporary exemptions such as island cabotage in the Mediterranean.

Since 1987, European airlines have been subject to a process of deregulation, which has taken place in three stages. The third stage became operational on the 1st January 1993. Although it is the most far-reaching package so far, the programme did not bring about a totally deregulated EU air transport market in 1993. It still includes some safeguards on issues such as free settlement of fares and also a transition period for the introduction of cabotage. Cabotage will only be introduced in April 1997. In the meantime conditional cabotage is allowed.

In the field of regulation aimed at environmental protection, measures concentrate on emissions of exhaust gases and particulates. The general aim is to reduce the burden for the environment caused by the transport sector. The standards for carbon monoxide (established in 1985) depend on engine size and became effective during the 1988 to 1993 period. One of the consequences of this policy is the use of three-way catalytic converters in gasoline-fuelled automobiles. Also, aeroplane engines will have to conform to Stage III regulations on noise and emissions by early next century.

Policies in passenger transport aim at reducing private car use to the benefit of public transport. This is being done to alleviate congestion problems on the networks in and between major conurbations in the EU. Additionally, it is beneficial to environmental protection initiatives.

## OUTLOOK

The prospects for the EU transport industry remain quite positive. Growth in demand for transport services is gathering speed as European economies progressively emerge from their worst post-war slump. A number of factors will act as additional

spur. Increasing European integration will continue to fuel transport demand, both in terms of the volumes of goods and passengers and in terms of the distances to be covered. Industries externalising their activities of transport and logistics in order to minimise costs will act as a fillip to the growth in professional transport services. The opening up of the East European economies will also contribute, although, during the initial period of economic restructuring, only marginal growth in transport demand may occur. Also, transport services suppliers from these countries will be limited in their ability to compete with EU companies.

Growth prospects differ depending on transport modes considered. Rail transport faces only moderate growth and will continue to lose market shares to road though passenger transport is expected to grow faster than freight transport. Road passenger transport is likely to exceed average growth rates as private car use and ownership has not yet reached a maximum. Road freight transport will grow much faster due to the liberalised market and new opportunities, although tighter environmental regulations will act as a counter force. Inland waterways transport will maintain its upward trend with small rates of growth. Seaborne trade is expected to grow slowly in the short term, but faster in the medium to long term: recovery in long-term depressed markets such as steel and iron will be very gradual. The outlook for air transport is very positive as advances in managing congestion through improvements in air traffic control and investment in additional airport capacity at the more congested airports takes place. Also the upward trend in real personal disposable incomes will act to buoy the trend.

Large investments in infrastructure are currently being undertaken or planned in order to extend the network capacity of the various transport modes, as some existing networks are operating at or above capacity level. This will create new transport possibilities which are necessary for the growing integration of the EU market. This effect can be increased by the deployment of transport telematics tolls and services.

The Common Transport Policy, which aims at liberalising and harmonising the EU transport market, will improve the industry's efficiency. This will enhance competition and improve the quality of service offered.

Written by: DRI Europe





# Railway transport

## NACE 71

Most of the European railway networks are controlled by single national operators, which precludes competition between individual railways companies and between railway companies and private firms. To increase competition and profitability, several countries have initiated more or less ambitious privatisation plans for their railway. In the framework of the Common Transport Policy, the competitiveness of the railway sector should be improved by the possibility of more accurate reflection of the real cost burdens the various modes impose. Also competitiveness will be enhanced by continuing investment in trans-European networks and the progressive emergence of an integrated European network, particularly for high-speed railways but also for combined transport and for conventional railways.

### INDUSTRY PROFILE

#### Description of the sector

This sector includes units that are exclusively or primarily engaged in the transport of passengers and goods by rail. It also includes the equipment and facilities required to provide this transport, including private railway lines.

However, it does not include: railway networks solely or primarily serving a single town or city (NACE 721.1); locomotive, carriage and wagon repair workshops (NACE 362.3); local units of railway enterprises which operate regular bus or motor coach services (NACE 721.2); and the operation of sleeping-car and dining-car services (NACE 666).

#### Recent trends

Rail passenger traffic has remained relatively constant during the 1980s, growing by hardly more than 1 % annually over the decade. Similar growth rates were registered in 1991 and 1992 at 1.8 %, but recessionary pressures in the EU took a heavy toll in 1993 causing a 3.1 % reduction in traffic to 234 billion passenger-kilometres.

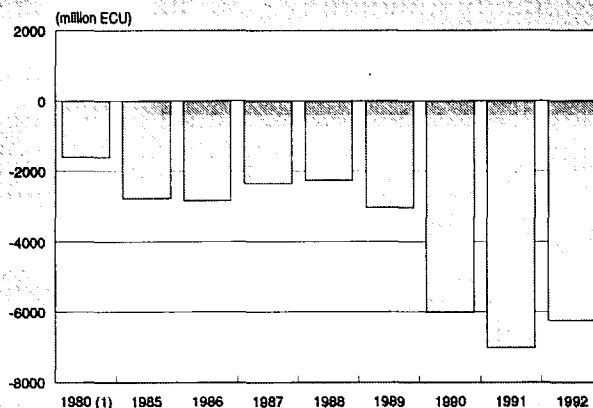
For the individual Member States, only Germany and Ireland reported growth in traffic (2.5 % and 3.9 % respectively) whilst a number of member States suffered serious drops in traffic, such as Greece (-13.9 %), France (-7.1 %), Spain (-5.5 %) or Portugal (-5.2 %).

Recent developments for freight traffic are still more gloomy. Traffic measured in tonne-kilometres declined by an average 1 % annually over the 1980s. The situation further deteriorated in 1992 and 1993, with a 6.2 % and a 7.9 % drop. However, the overall decline in traffic has been somewhat compensated by a partial structural shift in cargo carried away from low value added dense products to higher value products, often carried in containers or on road units (combined road/rail traffic). Estimates put the recent growth of this latter type of traffic at around 7.5 % per year and its share in total rail freight transport increased from 7.5 % in 1985 to about 13 % in 1992.

The only Member States to record freight traffic growth in 1993 was Luxembourg (+1.7 %). Two Member States reported double digit losses, Spain (-15.7 %) and United Kingdom (-11.2 %). Most of the others suffered from declines in traffic in the 5-9 % region.

Intra-EU rail freight traffic is dominated by four Member States, Belgium, Germany, France and Italy which between them account for over 80 % of intra-EU rail freight. The major intra-EU flows are between Italy and France, Belgium

Figure 1: Railways  
Development of financial result in EU railways



(1) Excluding España (RENFE)  
Source: UIC

and Luxembourg, Belgium and Germany, Germany and France, Germany and the Netherlands and between France and Belgium. These flows account for one-third of total intra-EU rail freight traffic.

Employment in European railways has declined continuously since the beginning of the 1980s, by close to 3 % annually, which corresponds to a reduction in workforce by close to one third between 1980 and 1993. The pruning process intensified in 1993 with a 4.2 % reduction in employment and a total labour force falling short of 880 000.

#### International comparison

Table 5 reveals the significant differences between the railways in the EU, Japan and the USA. Although the data for comparison is in some cases dated, it does enable a useful comparison. The US railway is heavily dominated by freight traffic, with only a relative small number of passenger-kilometres, as freight is moved over long distances in a country which is sparsely populated between the major cities or population centres. Japan by contrast is dominated by passenger traffic, due to the heavy population concentrations in many parts of the country and extreme road traffic congestion. Falling between the two is the EU with a fairly even divide between freight and passenger.

The approximate length of railway line available in the EU (excluding eastern Germany) is 121 000 kilometres, which is substantially more than Japan at 20 000 kilometres and half that of the USA at 243 000 kilometres. Given the different nature of the railways in these three countries, it is difficult to use a labour productivity measure, however, the comparison of the number of workers employed per kilometre of track shows that the differences in structure are enormous. The USA employs less than 1 worker per kilometre, the EU 7 and Japan almost 10. This confirms the strong correlation between employment and the type of traffic, i.e. the higher the passenger share of total traffic the more staff required.

### MARKET FORCES

#### Demand

Demand for rail services is divided into passenger and freight. Passenger demand is composed by leisure travel and business travel. The largest portion of business demand is daily com-

**Table 1: Railway transport  
Main Indicators for the EU**

	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
Volume of passenger transport (million passenger-kms)	208 069	217 005	216 774	218 575	227 530	228 455	233 029	237 097	241 375	233 868
Volume of goods transport (million tonne-kms)	195 392	178 771	171 188	171 081	173 721	176 461	174 613	176 393	165 370	152 346
Number of persons employed (thousand)	1 291.2	1 149.0	1 118.0	1 077.8	1 022.6	987.6	966.0	938.3	917.9	878.9
Electrified kms (%)	34	37	39	38	39	40	41	42	43	N/A

Source: UIC

muting between the workplace and home. The demand for commuting places peak load strains on the network services at the start and end of the working day. Leisure demand does not have the same daily peak impact, but does have seasonal peak impacts, for instance at Easter or Christmas. Within the two passenger demand segments are sub-segments that depend on the distance travelled. Typically, these subdivisions are split into three: intra-urban, inter-urban/city domestic and inter-urban/city international.

Freight demand does not have the same time sensitive profile as passenger, as freight trains can be run to meet demand during non-passenger peak times, which is often at night.

The industry in the EU has undergone a structural change away from the traditional intensive rail user industries such as coal and steel, on which rail was particularly dependant. This has affected the rail freight industry severely. Also, part of the changing structure has meant that technical and organisational developments in other industries (just-in-time stock management and sophisticated distribution networks) has accelerated demand for quick, flexible and predictable deliveries of relatively small quantities of cargoes. These developments have been detrimental to rail transport, because of its perceived relative inflexibility and high transshipment costs. Moreover, lack of integrated, inter-border co-ordination has not helped the demand for international rail transport, although, the advent of the Single Market has eased much of intra-EU border delays.

### Supply and competition

Rail competes with all other transport modes, road (car, truck and bus) for both long and short haul freight and passenger journeys, air for some passenger routes and inland waterway for some bulk freight. Increased private car ownership with the concomitant ability of car drivers and passengers being able to travel door to door without changing mode has affected passenger rail traffic negatively. Surveys of travellers have indicated that for business commuting, travelling speed and convenience are rated the most important factors in the mode choice decision. This priority is much less important for shorter distance (50 to 300 kilometres) leisure travel, where price comes higher up the list. Rail tends to win share in instances where it can complement other modes by providing almost seamless travel, for instance rail to metro, and where road traffic congestion is bad enough to negate the convenience factor of door to door travel.

In competing with air travel, the development of high-speed rail services has provided an opportunity to divert traffic from air to rail. Air traffic's comparative advantage over rail transport i.e. speed, is under pressure on some routes in the EU as over shorter distances the flight time is only a minor portion of total journey time which is compounded by increasing congestion in airports and air corridors. The train, which is traditionally less expensive than flying, can become particularly attractive for journeys between 300 and 600 kilometres.

For example, on the stretch Paris-Lyon, air traffic's share of passenger traffic on that route declined from 30 % to 9 % after the introduction of the TGV. Moreover, in some EU countries, policy is aimed at positively influencing the demand for rail transport. Current concern with congested roads, airports and airspace, as well as with pollution due to road and air traffic, are underlying this change in policy.

Passenger pricing for rail travel is usually worked on a per-kilometre basis and tends to be uniform in mainland EU, hence the longer the journey, the higher the price. However, prices from BR in the United Kingdom are not uniform, especially for the captive commuter belt surrounding London where prices are much higher than proportionate travel elsewhere in the UK.

For cargo, rail has the distinct advantage in its ability to move large volumes of freight in a single unit between specific points over short, medium and long distances. However, rail's share of freight traffic has declined over the last two decades. In the early 1970s the share of freight moved by rail was around 30 %, but by the end of the 1980s it had declined to just over 16 %. This loss of share is attributable to the increase in movement of freight by road, as road can move cargo from point to point, whereas rail freight requires modal symbiosis as the many cargoes need to be transported to and from rail freight terminals.

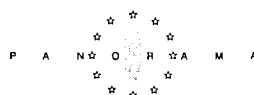
In 1992, the aggregate for labour costs in rail were over 60 % of total operating costs and subsidies came to close to 30 % of the operating revenue of the EU railways. At the same time, the EU railway companies suffered a joint loss of 6.3 billion ECU. The dominant contributors to this deficit were the German (west) and Italian railways with a combined loss of ECU 5.8 billion, or more than 90 %.

## INDUSTRY STRUCTURE

### Companies

The top four rail companies in terms of network length are the SNCF in France (33 400 kilometres of track), DB in western Germany (27 100 kilometres), BR in the United Kingdom (16 600) and FS in Italy (16 100). These four combined have 75 % of the available track in the EU. At the other end of the scale is CFL in Luxembourg with 270 kilometres and the next smallest is CIE in Ireland with just over 1 900 kilometres.

Most of the national EU railway networks are controlled by single national operators. Rail transport services in the Member States can be characterised, to varying extents, by state regulation, the importance of non-commercial obligations and political objectives. Large subsidies from the state generally cover operating losses and/or investment. The nature of the system has so far largely precluded competition between railway companies or free market across national boundaries.



**Table 2: Railway transport  
Traffic and employment by EU Member State, 1993**

Country	Company	Passenger- transport (million pass.-kms)	Freight transport (million tonne-kms)	Number of persons employed
Belgique/België	SNCB/NMBS	6 694	7 583	43 504
Danmark	DSB	4 596	1 797	19 392
BR Deutschland	DB	47 576	51 786	222 259
Hellas	CH	1 726	503	12 155
España	RENFE (1)	15 457	7 558	42 089
France	SNCF	58 177	45 033	192 090
Ireland	CIE	1 274	575	11 266
Italia	FS (1)	47 101	18 792	159 577
Luxembourg	CFL (1)	(2) 262	607	3 370
Nederland	NS	15 245	2 681	28 169
Portugal	CP	5 397	1 666	16 627
United Kingdom	BR	30 363	13 765	128 413
EU		233 868	152 346	878 911

(1) Including empty wagons of private individuals

(2) Estimate

Source: UIC

### Strategies

The various railway companies in the EU have been collaborating to improve both international passenger and freight services. The strategy for international passenger services has been to provide day-train services under the brand name of "EuroCity" in order to harmonise the service provided by the participating companies, and night services under the "EuroNight" banner, which are designed to provide uniform services with three categories of comfort. International freight services in containers (refrigerated and non-refrigerated) have come under the auspices of Intercontainer-Interfrigo (ICF), which provides the logistics and networks to move containers throughout Europe. ICF is owned by 27 railway companies in Europe.

In order to increase competition and profitability some Member States - Germany, the Netherlands and the UK - are in varying stages in the process of privatising their railways. In the UK, the unbundling of British Rail started in May 1994. Ultimately,

the break-up of the rail monopoly is expected to create a host of private companies including Railtrack the owner of the tracks and of the stations, Railfreight Distribution which will handle intermodal and international traffic, three freight operators, 25 franchisee supplying passenger services, three rolling stock companies as well as a number of rolling stock maintenance companies. The system will be capped by two regulatory bodies, a competition watchdog and an organisation in charge of awarding the franchises.

In the Netherlands, the plan is to privatise the Dutch Railways in 2000. The Dutch railways expect passenger traffic to double by the year 2010 and have been investing in equipment and infrastructure improvements to meet the current growth in demand and future requirements.

The privatisation plan of the German railways started in January 1994 with the transformation of Deutsche Bahn, a department of the German administration, into Deutsche Bahn AG a private-sector holding company. Within three years, the

**Table 3: Railway transport  
International goods transport by traffic relations, 1992 (1)**

(thousand tonnes) To	B	DK	GR	E	F	I	L	NL	P	UK	EU (2)	Third countries	Total (2)
From													
Belgique/België	.	33	4	129	6 135	2 068	4 456	2 035	0	6	14 866	2 114	16 980
Danmark	3	.	0	3	34	302	0	11	0	0	353	366	718
BR Deutschland	2 596	612	102	491	3 846	8 821	1 220	959	26	119	18 792	0	18 792
Hellas	5	0	.	0	2	0	0	0	0	0	8	1 622	1 629
España	148	4	0	.	165	91	0	29	331	0	767	70	837
France	5 136	132	11	676	.	6 444	288	322	24	236	13 270	1 829	15 098
Italia	1 112	199	6	39	1 410	.	7	480	7	61	3 322	2 770	6 092
Luxembourg	1 016	3	0	34	478	142	.	53	0	4	1 729	137	1 866
Nederland	629	8	2	8	1 683	686	7	.	0	45	3 069	1 040	4 109
Portugal	0	0	0	172	0	0	0	0	.	0	172	2	174
United Kingdom	35	0	0	0	80	248	5	5	0	.	372	31	403
EU (2)	10 680	991	125	1 552	13 832	18 802	5 984	3 893	388	472	56 720	9 980	66 700
Third countries	594	828	857	66	1 298	9 556	9	552	2	84	13 847	N/A	N/A
Total (2)	11 274	1 820	982	1 618	15 131	28 358	5 993	4 445	390	556	70 567	N/A	N/A

(1) International traffic between the Republic of Ireland and Northern Ireland are recorded by the former as national traffic.

(2) Excluding BR Deutschland

Source: Eurostat: Carriage of goods



**Table 4: Railway transport**  
**Financial result of EU railways by Member State, 1992**

Country	Company	Total operating revenue (million ECU)	Of which, subsidies (%)	Total operating cost (million ECU)	Of which, personnel (%)	Operating result (million ECU)
Belgique/België	SNCB/NMBS	2 642.6	41.9	2 853.4	68.5	-210.8
Danmark	DSB	1 368.6	25.0	1 143.7	49.1	224.9
BR Deutschland	DB	14 877.5	33.3	17 608.2	66.0	-2 730.8
Hellas	CH	116.4	38.5	290.0	61.1	-173.6
España	RENFE	2 451.6	12.8	3 015.8	49.0	-564.2
France	SNCF	11 883.6	15.2	11 581.6	55.3	302.0
Ireland	CIE	537.0	24.6	485.0	52.6	52.0
Italia	FS	8 340.9	47.8	11 394.6	62.5	-3 053.6
Luxembourg	CFL	268.6	81.2	270.3	79.6	-1.7
Nederland	NS	1 750.4	38.8	1 651.2	52.0	99.2
Portugal	CP	311.8	29.3	439.3	62.6	-127.4
United Kingdom	BR	5 577.9	17.9	5 669.9	66.3	-92.1
EU		50 126.9	29.3	56 403.0	61.5	-6 276.1

Source: UIC

activities of DB AG will be reorganised into three independent subsidiaries in charge of passenger services, freight services and infrastructure. The infrastructure company has started charging the passenger and freight operators for the use of the tracks and access to the network for independent companies is planned in the near future (in order to comply with Directive 91/440). However, the restructuring process of the German railway is only in a preliminary stage and privatisation remains a long term objective.

One of the major pressures on most of the EU rail companies is their historic debt burdens. Huge debts have been incurred as railways have invested in the infrastructure and equipment required to provide the levels of service demanded by both customers and the fulfilment of a public service obligation. High interest rates coupled with steep competition that reduced revenues has compounded the problems. Some of the EU railways have had their debt burdens substantially reduced (BR in the UK and DB AG in Germany) and/or rescheduled. However, the companies and their associations are lobbying for government commitment and assistance to reduce the debt burdens as there is still a long way to go in the EU before

many of the rail companies could be considered as 'going concerns'.

### Impact of the Single Market

So far, the impact of the Internal Market on rail transport remains somewhat mixed. The sector has benefited from the removal of border controls, as well as from renewed international transport as a result of increased cross-border mobility and a surge in intra-EU trade. Besides, the directives on public procurement are beginning to translate into some downward pressures on cost as competition between suppliers of rail equipment intensifies. On the negative side, the Internal Market has indirectly curtailed the competitiveness of rail compared to other transport modes. The liberalisation of air transport and road haulage has fostered the efficiency and curbed the cost of these two modes, thereby amplifying modal imbalances. In the long run, some of the handicaps of rail should be lifted once the Internal Market is fully implemented. As explained in more detail in the section on Regulations, the EU is progressively introducing a more liberalised framework for the supply of rail services which should ultimately lead to in-

**Table 5: Railway transport**  
**Main indicators for USA and Japan**

	1980	1985	1986	1987	1988	1989	1990	1991	1992
Volume of passenger transport (million passenger-kms)									
USA (1)	17 695	17 649	18 888	19 355	19 875	21 034	21 145	21 979	N/A
Japan (2)	193 143	197 463	198 299	204 679	217 584	222 670	237 551	247 031	249 603
Volume of goods transport (million tonne-kms)									
USA (1)	1 499 770	1 280 394	1 266 872	1 377 867	1 454 423	1 480 205	1 509 592	1 516 728	1 557 470
Japan (2)	36 483	21 383	19 945	20 100	23 117	24 752	26 803	26 770	26 219
Number of persons employed (units)									
USA (1)	458 300	324 000	315 300	290 200	279 800	248 200	236 800	226 400	221 519
Japan (2)	413 594	276 774	223 947	199 880	200 639	197 052	193 763	193 251	193 196
Electrified kms (%)									
USA (1)	1	1	1	1	1	1	1	1	1
Japan (2)	39	44	47	52	55	57	58	58	59

(1) AAR

(2) JR

Source: UIC

**Table 6: Railway transport**  
**Total and electrified kilometrage by EU Member State, 1991-1992**

Country	Company	Total kilometrage 1991 (kms)	Electrified, (%)	Electrified kilometrage 1992 (kms)
Belgique/België	SNCB/NMBS	2 291	66.8	2 291
Danmark	DSB	2 344	12.1	280
BR Deutschland	DB	27 079	45.4	12 149
Hellas	CH	2 484	N/A	N/A
España	RENFE	12 570	52.9	6 894
France	SNCF	33 446	39.7	12 986
Ireland	CIE	1 944	1.9	37
Italia	FS	16 066	61.7	9 936
Luxembourg	CFL	271	80.0	220
Nederland	NS	2 780	72.2	1 987
Portugal	CP	3 117	15.1	461
United Kingdom	BR	16 584	29.0	4 910
	EU	120 976	42.8	52 151

Source: UIC

creased efficiency. Another aspect is the lack of harmonisation of equipment and infrastructure across Europe, a problem which is solved only slowly, partly owing to the cost of the process. Last but not least, in the case of competition with road, rail suffers from an unfair handicap to the extent that the price of road transport does not reflect its true social and environmental costs. The competitiveness of rail therefore partly hinges on the future shape of the EU environmental policy.

## ENVIRONMENT

Rail impacts the environment principally through air pollution, noise and land-use. Pollution into the atmosphere is both direct caused by emissions from diesel engines, and indirect from the power stations that generate electricity for trains using electrified track. The impact of noise is particularly acute in urban areas, although track tends to be placed in areas of lowest population density. In addition, track that is forced to go through densely populated areas is often placed in a way that minimises the noise, for instance in cuttings.

Although rail does cause atmospheric pollution, it is the most environmental-friendly form of transport. At full capacity both rail and buses have the lowest consumption of energy per passenger-kilometre than other forms of transport. Intercity and urban trains consume in the region of 0.3 MJ of primary energy per passenger-kilometre at 100 % occupancy compared to between 0.6-1.1 MJ for cars. High speed trains consume around 0.7 MJ compared to almost 1.5 MJ for a Boeing 727. Even at low occupancy rates rail consumes less energy per passenger kilometre than most other forms of transport (the exception being bus). The difference for freight is not so marked, as bulk rail freight traffic is estimated to consume 0.6 MJ per tonne-kilometre, whereas the equivalent figure for an articulated truck at 100 % capacity utilisation is about 0.7 MJ. However, trucks rarely have 100 % capacity utilisation as this implies that both the outbound and inbound journeys are full. Hence, assuming a capacity utilisation for trucks of around 50-75 %, energy consumption is around 1-1.5 MJ per tonne-kilometre for an articulated vehicle.

Electric traction could also allow different energy sources to be used, for instance gas generation rather than coal, which would further reduce the impact of rail. In practice, however, railways tend to buy their electricity from national grids and hence cannot choose the method of generation.

## REGULATIONS

In July 1991, the EU Transport Ministers agreed upon a directive (91/440) setting some guidelines to improve the efficiency of the railways and encourage their adaptation to market conditions by widening access and separating infrastructure management from infrastructure usage as much as possible. In particular, national railway monopolies have to account separately for infrastructure and operating costs in order to allow transparent charging for infrastructure use by newcomers and to prohibit cross-subsidies between the two functions. The directive also includes limited open-access to the rail network by allowing international groupings of railway undertakings to use the network for international transport between the States of establishment of these undertakings. Individual railways undertakings are also allowed to have access to the networks of the other Member States but only for international combined transport operations.

In July 1994 the principles set out in the 1991 directive were put in concrete form with the adoption, by the European Council, of two new regulations setting out formal rules for the licensing of railway undertakings and for the allocation of infrastructure capacity and charging of infrastructure fees. On November 21, 1994 the Council has adopted a common position on both regulations. The two directives should be further examined by the Parliament early 1995.

The Commission's White Paper on The Future Development of the Common Transport Policy (COM(92)494), that was adopted by the Council in December 1992, has important implications for the rail industry, as one of its cornerstones is the ability to stimulate modal shifts. Policy instruments that encourage modal shifts tend to favour modes that are viewed as having the most favourable balance between positive economic development and minimal environmental impact. Rail is considered to be the most serious contender for meeting both objectives within a global transport plan. By 1st January 1995 the Commission has to report to the Council on further measures needed to develop railways in the Community.

In late 1989, the Union Internationale de Chemins de fer (UIC) launched the P.A.R.I.S. (Pricing, Accounting and Rolling Stock Interchange Simplification) in order to set about increasing international rail competitiveness and revenues in passenger traffic. Within the recommendations was the possibility to revamp the prevailing price structure. It is deemed as rigid, complex and unable to respond to specific market conditions and it also makes revenue accounting and settlement

slow and inefficient. Further rolling stock interchange rules would be simplified and more geared to market conditions. The programme consisted of two stages. The first stage ended in September 1990. Recommendations on pricing, accounting and international route management were submitted and ratified in October 1990. Then the second phase was launched, including the implementation of the recommendations from the first stage and to come to further recommendations.

## **THE TRANS-EUROPEAN TRANSPORT NETWORK**

The development of a Trans-European Network (TEN) in the area of transport constitutes the cornerstone of the European policy in terms of transport infrastructure. In 1990 the European Council gave a favourable reception to a master-plan for high speed railways. This was followed by the adoption of three new master-plans in October 1993, for combined transport, roads and inland waterways. The Maastricht Treaty, which came into force in November 1993, gave an additional impetus to the European policy with respect to transport infrastructure. Article 129 B of the Treaty states that "the Community shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructure". The importance of transport networks has also been reassessed in the White Paper on Growth, Competitiveness and Employment released in December 1993. In this context, the development of an efficient transport network is seen as a fundamental factor of Europe's competitiveness. The White Paper identifies 26 priority projects in the field of transport. These projects correspond to an estimated 82 billion ECU investment of which rail takes the lion's share (close to 54 billion ECU). In July 1994, the Commission proposed guidelines for the development of a trans-European transport network. Contrary to previous master-plans, these guidelines cover all transport modes.

There are now 22 projects, 10 of which are rail or rail & road transport projects. In the case of rail, the proposal sets out a 26 700 km network for high speed trains (including 12 500 km of new lines for speed exceeding 250 km/h and 12 500 km of upgraded lines for speed of about 200 km/h, together with 1 700 km of interconnection lines) which would provide a link between the main European cities. The proposed total rail network covers 70 000 km, including 47 000 km of conventional tracks of which 23 000 would be essentially used for combined transport services. Projects of interest would be those which remove bottlenecks in centrally-located countries and those which improve access to peripheral countries as well as to airports and seaports.

A recent event which is expected to rejuvenate the European rail network is the opening of the Channel Tunnel in 1994. The tunnel will allow rail to compete with other modes both for passengers and for freight. In the case of passengers, high speed trains will cut the journey time between Paris and London to about three hours and to a planned two and half hours by the beginning of next century when the high speed line connecting London to the tunnel is completed. In addition to the traditional leisure traffic, rail is therefore also expected to capture a large share of business travel across the Channel thereby competing both with ferries and airlines. As to freight, the connection of the British rail network to the continent spells renewed competitiveness for rail which, before that, was seriously hampered by the limited length of most of the freight journeys in the UK (road is a more economical mode for shorter trips). British Rail expects annual rail freight traffic to surge from the current two million tonnes to 9 million tonnes by about 2000.

## **OUTLOOK**

Rail's future share in the (growing) European transport services market will depend on its ability to meet customers requirements concerning speed and flexibility and the effects of the Common Transport Policy.

The prospects for rail passenger traffic are for positive growth of 2.5 % in the short to medium term. A breakdown of this figure among subsectors reveals that stronger growth is expected in urban rail transport and long-distance high speed rail services, while there should be a decline in the regional and inter-regional rail services, covering distances between 50 and 300 km. Improved railway services and increasing congestion in other modes will help favour rail transport. The high-profile high-speed rail services will continue to contribute to positive customer awareness as well as continuing to compete with air traffic on distances between 300 and 600 kilometres.

In the short and medium term, rail freight will continue to lose market share to road due to its relative inflexibility and as the modal relative cost structure favours road haulage, but in terms of volumes moved, rail will see some marginal growth. In the longer term, the integration of the European railway system and deregulation of the EU railway market will help garner some of the share back onto rail. Also, within the framework of the Common Transport Policy, measures that genuinely reflect the real costs of each mode will act as fillip to rail.

The entry of the three new Member States will not affect radically the present EU scenario for rail transport. One should nevertheless mention that the accession of Austria, which greatly favours rail transport versus road transport, might be marginally beneficial for the sector. Also, two of the Trans-European Network projects are of particular importance to Sweden and Finland - the Nordic Triangle and the Øresund fixed link.

Cost and debt pressures will continue to force rationalisation within the industry, which will have further negative implications for employment. The planned privatisations of the railways in Germany, the Netherlands and the UK will exacerbate the decline. Privatisation of the Bundesbahn is estimated to cause over 30 000 job losses.

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# Public transport

## NACE 721

Though the most recent statistics point to a weakening in the use of urban public transport in recent years, the sector's long term prospect remain good. Increasing environmental concern and increasing congestion are leading many countries to consider policies which favour public transport at the expense of the private car. Substantial investments continue to be made to improve public transport services, both in the provision of new equipment and infrastructure and in modernising and improving existing vehicles and infrastructure. The tendency to privatise particular segments of public transport will continue.

### INDUSTRY PROFILE

#### Description of the sector

Public transport (NACE 721) consists of city underground, surface and elevated railways; tramways, regular bus and motor coach services. The NACE classification distinguishes two subgroups:

- NACE 721.1 - city underground, surface and elevated railways, i.e. units exclusively or primarily engaged in the transport of passengers by electric rail services solely or primarily serving a single city or town.
- NACE 721.2 - tramway, regular bus and motor coach services, i.e. units exclusively or primarily engaged in the operation of city, suburban and inter-city tramways, bus and motor coach services insofar as they are operated as regular or special services.

Regular services provide for the regular transport of passengers on scheduled routes and follow a fixed timetable; they normally only pick up and set down passengers at stops marked on their routes. Special regular services cater for specific categories of persons to the exclusion of other passengers (e.g. workers, school children and air line passengers).

Public transport can be analysed either by mode (rail, tramways and buses) or by type of services (e.g. city centre, suburban,

park-and-ride services). It should be noted that inter-city rail and road services represent a quite different market. This monograph is therefore restricted to urban transport in a multi-modal approach. Inter-city services are covered in the monographs on rail and road passenger transport included in this chapter.

#### Recent trends

Reliable statistics for the sector are relatively sparse. The tables provided in this monograph are based on several sources. The International Union of Public Transport (UITP) collects traffic statistics on urban transport (all modes included) for the major urban areas in Europe. In addition, Eurostat provides a set of employment and turnover data. However, these data are based on NACE 721 and their coverage is therefore somewhat wider than urban public transport as inter-city regular bus and coach services are also included.

Based on Eurostat data, public transport accounts for about 10-15 % of the total labour force in the transport sector.

In 1992, the number of passenger journeys in major urban areas in Europe was just short of 25 billion. Germany had the greatest number of passenger journeys (close to 7.9 billion passenger journeys), followed by the UK (4.4 billion) and France (4.3 billion).

The relative importance of different modes in terms of the share of passenger trips and of the total vehicle fleet is indicated in Table 2. Bus services are the most widespread mode in public transport in the EU, and about 90 % of all transport systems. Measured in terms of fleet size, route length and number of routes, the larger operating bus systems are to be found in the large European cities like Paris, Athens, Rome, Madrid, and London.

### MARKET FORCES

#### Demand

The principal journey purposes for which public transport is used are:

- journeys to and from work;
- journeys between home and education;
- shopping;

**Table 1: Public transport**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	265	N/A	(6) 17 061
Danmark	(4) 401	N/A	(3, 6) 11 270
BR Deutschland (3)	3056	2808	N/A
Hellas (1)	(4) 320	N/A	30 250
España	1 143	2 137	44 825
France	192	2 476	74 546
Italia (2)	1 117	1 788	117 129
Luxembourg	3	(3) 5	581
Nederland	35	431	27 580
Portugal (3, 5)	85	432	27 878
United Kingdom	3 702	2 853	N/A

(1) 1988

(2) 1989

(3) 1990

(4) Number of local units

(5) Covers only enterprises with at least 5 employees

(6) Number of persons employed

Source: Eurostat; Mercure



**Table 2: Public transport**  
**Relative importance of different modes of public transport, 1993 (1)**

(%)	Proportion of passenger trips	Proportion of vehicles
Urban and suburban buses	60	59
Commuter rail and local train services	18	28
Underground railway	13	8
Light rail	7	3
Trolley bus	negligible	negligible

(1) Estimates  
 Source: UITP

- personal business;
- visiting friends and relatives.

The demand for public transport is dependent on the overall state of the economy, the availability and price of alternatives, its own price and service level and quality.

Over the past 30 years, increasing incomes have led to higher levels of private car ownership. Owing to its flexibility, the private car is a very strong competitor with public transport and many journeys which were previously made by public transport are now being made in the private car. It is likely that a large proportion of the loss in public transport patronage results from transfer to the car. The transfer to the private car, by necessitating reductions in service frequency and increasing traffic congestion (which has a disproportionate effect on the reliability and cost of bus operation) has created a vicious circle making public transport still less attractive. Furthermore, increasing personal mobility as a result of the private car has meant that many services and facilities are now located where they are easy to serve by car but not by public transport. This has created a captive market for the car which public transport finds difficult to penetrate. Counting both urban and non-urban transport, travel by private cars now represents more than 80 % of total inland surface travel (i.e. rail, buses and private cars) in terms of passenger kilometres travelled.

Increasing traffic congestion and, more recently, increasing concern with the environmental impact of traffic have led many countries to consider policies which would increase the use of public transport at the expense of the car. Policies adopted have varied from direct control of private car traffic (for example in some Italian cities) or the stringent control of parking through increased investment in public transport in order to expand supply and improve quality, subsidisation of public transport operating costs, and allocation of road space for the exclusive use of public transport vehicles. It is likely that these measures will continue throughout the EU and will in some countries be strengthened by direct charging for the use of road space which is already practised in Stockholm and Oslo. Overall, these measures will, over the next 10 to 20 years, lead to an increase in the demand for public transport.

As indicated in Table 3, the 120 million people living in the EU's largest cities completed close to 25 billion journeys in 1992. In providing an estimate for service coverage, Table 3 shows the ratio of passenger kilometres per head of population served in the various EU countries. These ratios should be viewed with some caution as local or national circumstances can influence the indicators substantially, but they nevertheless provide a useful broad overview of the level of demand. The ratios indicate that broadly the number of public transport passenger kilometres per head of population is fairly similar

across the EU, the exceptions being Belgium (low) and Portugal (high).

### Supply and competition

The supply of public transport is generally analysed by mode:

- bus and coach
- light rail/tramway
- heavy rail

Within each mode a number of distinctions can be made in relation to the type of vehicle and type of service provided. In general buses provide short distance urban services on which average journey length is quite short and peak hour passenger flows are high. Such services are usually operated with high capacity vehicles, with a large proportion of standing capacity (although sometimes - UK, Ireland and Berlin - double-deck vehicles may be used) and multiple entrances/exits.

The traditional street operating tramway with stops at similar distances to bus stops is now being supplemented by light rail services which can either run on segregated track like conventional railways or on-street. One of the main differences is that the light-rail services will often have much less frequent stations reflecting their affinity with longer-distance suburban rail services.

There is also a wide variety of heavy rail services. In many conurbations (for example London, Paris) there are extensive networks of specialist underground metro services. These operate high frequency services, vehicles with similar seating characteristics to bus services and which are confined to relatively short distance/suburban travel. As well as this there are many networks of surface railways conveying passengers for up to 100 kilometres distance from the major conurbation centres. These services are typically used by commuters and have highly peaked demand characteristics. On the longer distance routes the level of comfort and equipment in the trains may approach that offered by long distance trains.

Apart from the operation of the services themselves, two other aspects of service provision are critical for the marketing of public transport: information, and fare collection.

### Passenger information

Public transport operators have to convey information to existing and potential passengers about timetables and schedules. As buses and to a lesser extent tramways are susceptible to random variations and deviations from schedule as a result of traffic congestion, and for various reasons similar occurrences can happen on rail networks, there is a growing trend towards provision of real time information to passengers at stops and stations. This has been largely developed on rail systems but is now being extended to bus systems, particularly with the advent of geographical positioning systems which allow the location of individual buses to be accurately determined within a central computer system. There will be major developments within this area over the next 5 years. The rapid development of information technology - e.g. the anticipated connection of many homes and most offices to the information superhighway - should make radical improvements possible in the presentation and dissemination of information to potential customers.

### Fare collection

Other major developments concern fare collection systems. In most Member States the fare structure for urban services is very simple with a flat-fare or a series of zonal fares with substantial discounts for purchasing period passes or multi-journey tickets which are sold off the vehicle. In a number of instances, drivers have no direct involvement with fare collection or ticket checking. However, such systems can be prone to abuse and there is now a growing trend towards using forms of automatic ticket checking using either mag-





netically encoded tickets or, more recently, smart cards (i.e. cards with magnetic strips or micro-chips on which a number of "units" are stored). This will open up the possibility of pre-purchasing a given value of travel and using it up on service run by any of the operators subscribing to the scheme over a period of time. This will not only provide greater flexibility for the passenger but will allow operators to increase revenue by comparison with e.g. the yield from conventional (e.g. weekly or monthly) travel passes. Such a system has already been implemented in Hong Kong and is now being successfully tested in London and in Manchester in the UK. Both cities have taken the decision in principle to introduce system wide smart cards.

### Competition

The most effective and demanding competition for public transport has for a long period been provided by the private car. Within the sector, however - although there has to be a measure of competition between modes - operation has traditionally been tightly regulated, whether on the basis of direct provision by local or central government, or of an exclusive concession or contract being granted to an individual operator for a network of routes.

Public transport however is now being increasingly subjected to competition as a means of stimulating improvements in services and reductions in costs. Competitive arrangements may range from: (a), at the minimum, the contracting out of individual activities such as cleaning and maintenance, through (b) "management only" contracts, in which vehicles and installations remain the property of the authorities and (c) contracts under which the operator owns the vehicles and possibly other assets, and where different tenderers compete on the basis of the net or gross cost of providing the service to (d) to full "on-the-road" competition, where operators are left free to operate whatever services they wish, without public subsidy, subject only to limited restrictions in regard to e.g. safety. The number of firms capable of tendering depends both on the extent of the risk they are required to bear (e.g. the assets they require to deploy) and the scale of operation: it will be easier for small companies to bid for the operation of single routes, in particular an inter-city route, or to attempt to compete "on the road", than to take over the operation of a whole system.

Public transport's ability to compete with the private car, however, depends heavily on its ability to provide an effective network to try to minimise its disadvantages, compared with the car, which offers an "anytime, anywhere" service. This

demands an element of collaboration between routes and between modes in e.g. ensuring the maximum geographic coverage, in making the best use of the relative speed of rail and the accessibility offered by bus, in coordinating timetables to minimise waiting times, and in simplifying ticketing and information arrangements. Forms of competition which disrupt these facilities are likely to be counter-productive.

### Investment

The ability of public transport to continue to attract passengers and to fulfil its potential role in tackling the problems of congestion and environmental degradation due to the growth in private car use depend heavily on investment - investment in extending networks, in improving the quality of service, in carrying out the basic heavy renewal works which are essential to maintain services. Investment requirements are generally far greater for rail than for bus services.

Large investments continue to be made in public transportation. Total investments in urban rail systems (both underground and light rail) through the 1990s is expected to be around 30 billion ECU. Large programmes exist in France (e.g. extension of the RER network in Paris, new systems in Strasbourg and Rouen), Germany (integrating eastern German networks), United Kingdom (e.g. extension of the Jubilee Line in London and the Metrolink in Manchester, light rails in Birmingham, Sheffield and Bristol) and Italy (e.g. underground in Naples). Even in Greece and Portugal (Athens and Lisbon) major metro schemes largely funded by the EU are under way in a bid to reduce the problems of congestion and pollution.

### Supply of public transport

Table 3 presents some indications of supply of public transport in the EU Member States. For all modes in major urban areas, the number of vehicle-kilometres per capita served indicates a relatively high service provision in countries like Denmark, Ireland and the United Kingdom. The figures indicate that populations in major urban areas in these countries have over 40 vehicle-kilometres per annum per person. Relatively low service levels per capita occur in Germany, Italy and Portugal (the lowest). These figures do to some degree reflect differing population densities and should be viewed cautiously.

## INDUSTRY STRUCTURE

In general, the majority of public transport operations are in public sector ownership although there are a number of ex-

**Table 3: Public transport  
Production and demand indicators, 1992**

All modes in major urban areas

	Passenger journeys (million)	Vehicle kilometers (million)	Population served (million)	Passenger journeys per head of population served	Vehicle kilometers per head of population served
Belgique/België	304.3	90.4	2.8	107.2	31.8
Danmark	315.5	101.0	2.0	160.1	51.2
BR Deutschland	7 873.2	1 106.1	37.6	209.4	29.4
Hellas	667.8	118.0	3.6	185.5	32.8
España	2 168.4	322.6	9.8	220.7	32.8
France	4 316.1	628.0	18.5	233.8	34.0
Ireland	191.7	46.7	1.1	174.3	42.5
Italia	3 153.6	415.9	14.6	215.4	28.4
Luxembourg	18.3	3.8	.1	183.0	38.0
Nederland	390.4	76.0	2.4	162.3	31.6
Portugal	1 109.4	73.3	3.5	317.0	20.9
United Kingdom	4 374.1	1 070.8	23.4	186.8	45.7
EU	24 882.8	4 052.6	119.5	208.3	33.9

Source: UITP



**Table 4: Public transport  
Financing of EU bus operations, 1991 (1)**

	Fares (%)	Subsidies (%)
Belgique/België	33	67
Danmark	50	50
BR Deutschland	50	50
Hellas	N/A	N/A
España	60	40
France	N/A	N/A
Irland	N/A	N/A
Italia	19	81
Luxembourg	N/A	N/A
Nederland	23	77
Portugal	76	24
United Kingdom	83	17

(1) Fares and subsidies also cover tramway and metro operations where these are associated with bus operations

Source: *Le financement des transports collectifs urbains dans les pays développés, OEST, 1994*

ceptions - where services are provided by privately-owned companies working under contract either to public sector companies or direct to local authorities (as in France, and, to some extent, the UK).

This situation has arisen for a number of reasons, in particular the perceived need initially to control a de facto private monopoly and subsequently to maintain through the public purse a level of service and/or low fares which could not be offered without the intervention of the authorities. In some cities indeed comprehensive utility organisations have been created covering transport, gas, electricity and water supply.

Relations between the authorities and the providers of public transport services are now changing radically however with the prime object of reducing the costs to the taxpayer. The changes include:

- introducing or extending competition for the provision of services which is involving private sector operations,
- a more structured and formal contract between public authorities and transport operators which often means separating the latter into specific legal entities.

The situation in each country is as follows.

### Belgium

The responsibility for public transportation by bus lies with the three regional governments of Flanders, Brussels and Wallonia. The former national bus company and urban public transport companies are now organised into regional companies owned by the regional governments. In the Walloon region five local subsidiaries operate under four to six year management contracts. The regional authority decides fare levels and the allocation of subsidies to operating companies. It also co-ordinates various activities such as ordering vehicles, a common statute for personnel, common services between operating companies, etc. Operating companies determine timetables and can decide on subcontracting operations externally.

### Denmark

Danish county councils (except Aarhus and Fyn where the local authority is responsible) have created regional transport companies for the management of all regular public transport within the area. In general, these companies organise, plan and market the services offered. Operations are generally licensed out to (mostly private) companies. Revenues go to

the regional transport company; deficits are financed by the county council.

In the Capital Region (Copenhagen and surroundings) the situation is different. A new law came into force on January 1st, 1990 engaging the Capital Region Public Transport Company in general transport planning, the maintenance of the network and integration of fare structures with those of the railways. Currently it is putting bus services out to tender under long term contracts.

Other local rail services are operated under agreements with local authorities. Agreements relate to service levels to be provided and fares and subsidies to finance the services. A particular example is the metro service in Copenhagen.

### Germany

Local and regional authorities in Germany control and co-ordinate public transportation solely by determining routes and fare systems and deciding on the licensing of services to private companies. In practice companies active in this field cooperate extensively with each other. Licences can apply to all modes of transport, but the period of validity can vary. Subcontracting to other operators is allowed. In principle, fares must be set at a level which covers costs. Where this is not possible, subsidisation will be defined by the authorities. The Federal Government is investigating the possibility of deregulation.

Competition between bus and rail has always been strictly avoided. The Deutsche Bundesbahn itself operates various rural bus services through its subsidiary Geschäftsbereich Bahnbus (GBB; split in 25 regional companies) as a replacement for former rail services.

In former East Germany, public authorities were heavily involved in public transport operations. The situation is currently changing towards the present system in the western part of Germany.

### France

In the Ile de France area (Paris and the surrounding area) the Syndicat des Transport Parisiens governs the main operators (RATP and SNCF) together with a further 80 small operators. The STP defines policies, route coverage and revenue structure (fares versus subsidisation). Existing services cannot be transferred from one operator to another although operators are allowed to sub-contract services to other companies. For new services, operators are selected on the basis of a tendering process.

In urban areas outside Paris "conurbation authorities" are responsible for controlling local transport, determining routes, service pattern and fares levels, and granting a single operator the right to provide services throughout the area covered on a fixed term contract. Elsewhere, the provision of bus transport is the responsibility of the départements, which buy in services under contract from private operators.

In the past contracts were often renewed automatically, but they are now subject to competitive tender. Most of the operators on the market are owned by one of three major private or semi-private groups: Transexel, Transcet, and CGFTE.

Local railway services, although operated by the national operator SNCF, are in many cases now specified by the regions in which they run, although a proposal to create a corresponding regionally based financing system has not yet been implemented". for some pilot regions

### Greece

Greek regional and local bus transportation is controlled by the regional prefectures. They grant public transport licences to co-operative associations in the regions. A co-operative consists of individual bus owners providing buses and drivers, and revenue collection staff for fare collection. In Athens,

**Table 5: Public transport**  
**Local bus transport, 1992**

Country	City	Operator name	Vehicle km (million)	Passenger journeys (million)	Staff	Fleet	Route Length (km)	Number of routes
Belgique/België	Antwerp	VVM	6.9	18.5	1 726	124	228	22
	Brussels	STIB	20.8	52.4	1 193	530	200	41
	Brussels	TEC, DE LIJN	21.6	36.9		275	2 194	41
	Charleroi	TEC		21.9		221	560	52
	Gent	DE LIJN O-V	6.1			380	158	15
	Liège	TEC	35.0	81.6	1 650	572	3 500	187
Danmark	Aarhus	AS	14.7	45.5		226	817	41
	Copenhagen	HT	86.3	176.0	3 435	1 218	4 400	251
France	Bordeaux	CGFTE	21.9	64.0	1 708	547	939	63
	Grenoble	SEMITAG	11.1	27.9		251	245	17
	Lille-Roub.-Tourc.	TCC	15.2	41.3		409	864	63
	Lyon	TCL, SNCF	37.0	119.0		966	1 314	100
	Marseille	RTM	22.2	93.0		584	605	75
	Nancy	CGFTE	8.0	27.8		250	308	24
	Nantes	TAN	2.8	5.3		381	405	54
	Nice	ST2N, SNCF	8.3	37.8		209	278	34
	Paris	RATP	152.0	85.3	15 402	3 997	2 971	298
	Paris	PB		150.0		1 600	5 700	
	Rennes	SEMTCAR	9.4	36.8		231	410	36
	Rouen	TCAR	10.9	26.4		202	214	44
	St Etienne	STAS		7.4		184	217	40
	Strasbourg	CTS	11.2	42.7		345	225	30
	Toulouse	SEMVAT	20.2	39.1		495	2 023	73
	BR Deutschland	Aachen	ASEAG	17.0	56.2	921	330	886
Aachen		DKB		8.3				
Augsburg		VGA	7.2	27.0		154	192	25
Berlin		BVB	101.0	484.5		2 146	1 949	155
Berlin		BVG	9.1			60	137	
Bielefeld		VOW		4.2		102	358	
Bochum-Gelsenk.		BOGESTRA	17.1	52.4		328	964	69
Bonn (SWB/SSB)		SWB, SBS	11.3	27.4	493	229	450	34
Bremen		BSAG		16.3		368	497	39
Bremen		WEB						24
Chemnitz		CVAG	8.5	35.1	714	170	243	27
Düsseldorf		RB-DB	24.9			436	1 045	71
Dortmund		DS	10.5	42.3		179	447	41
Dresden		DVB, DB	12.9	35.4	489	179	268	27
Dresden		RVD		10.4		180		
Duisburg		DV, DB	10.3		830	270	284	27
Essen		EVAG		13.6	2 205	265	303	80
Frankfurt-am-Main		SF	11.1	35.7	642	254	277	44
Frankfurt-am-Main		VU	6.9	11.4		140	561	26
Frankfurt-am-Main		FKE	2.8	3.4		65	363	21
Halle		HAVAG	5.3	14.6	276	108	178	21
Hamburg (HHA)		HHA	52.1	213.6	2 485	958	1 472	122
Hamburg (VHH)		VHH	18.8	37.5	1 199	315	1 335	65
Hamburg (PVG)		PVG	1.5	5.8	500	168	59	7
Hamburg (KVG)		KVG	1.1	2.3		26		196
Hannover		DSTRA	13.6	33.9		243	409	42
Hannover		Bus, RVH, VB	43.6	51.4	62	936	4 102	81
Köln		KVB	19.9		1 117	342	526	32
Köln		RVK	27.1	39.9	615	600	4 059	
Köln		KWS	9.2	21.4	377	192	577	
Karlsruhe		VBK	4.5			106	157	26
Karlsruhe		AVG	1.1			21		
Krefeld		SWK, DB		7.0		135	502	23
Leipzig	LVB	7.0			197	28		
Leipzig	RL	6.1	5.9		85			
Mönchengladbach	MÖBUS	12.1	31.8	670	219	580	30	
München	SM	30.6	183.9	1 026	723	417	74	
München	DB	6.3	11.8			1 854	93	
München	RD	7.0	24.6	456	335	1 731	520	
Magdeburg	MVB, DB	3.0	15.3		69	65	18	
Mannheim-Ludw.	MVG	4.6	11.6		72	173	21	
Mannheim-Ludw.	VBL	2.9	19.9	490	58	120		

Country	City	Operator name	Vehicle km (million)	Passenger journeys (million)	Staff	Fleet	Route Length (km)	Number of routes
	Mannhein-Ludw.	HSB		4.4		91		163
	Mannhein-Ludw.	RHB	0.2			7		
	Mannhein-Ludw.	OEG	1.4			29	105	11
	Mannhein-Ludw.	BRN	17.6	25.5		363		
	Nürnberg	VAG	19.4	62.1		293	590	62
	Nürnberg	STWF	3.8	14.8		71	92	
	Nürnberg	ESTW	4.6	14.0				
	Nürnberg	W		0.7				6
	Nürnberg	OVF	6.4	6.6				
	Rhein-Ruhr	VRR	211.6				7 811	614
	Rhein-Ruhr	VESTRA	20.1	53.4		338	1 428	
	Rhein-Ruhr	BVR	12.6				1 728	66
	Stuttgart	SSB	14.8	53.9		300	425	57
	Stuttgart	RBS		15.0				41
	Wiesbaden	ESWE	12.7	58.1		219	547	34
	Wuppertal	DB	14.7		1 189	268	332	52
Hellas	Athens	EAS	106.7	469.3	8 796	1 824	4 143	326
	Athens	ILPAP	11.3	95.0	2 033	403	148	18
	Athens	ISAP		18.5	330	67		
Ireland	Dublin	SAC, DART	46.7	175.6	2 898	1 046	845	130
Italia	Bologna	ATC	17.0	115.3	1 234	463	355	30
	Catania	AMT	13.2	48.5	1 216	330	304	35
	Firenze	ATAF	20.1	80.4	1 810	481	565	63
	Genova	AMT, PS, FGC	43.0	209.6		1 056	1 598	174
	Milan	ATM	57.9	419.2		1 802	1 038	106
	Napoli	ATAN				750	559	147
	Napoli	SEPSA		3.7	242	65	146	11
	Napoli	CR				191	695	54
	Palermo	AMAT		100.0		436	800	63
	Rome	ATAC	121.4	740.0	12 104	2 566	1 977	228
	Rome	COTRAL		85.0	5 520	1 985		
	Torino	TT-ATM	45.3			1 060	768	73
	Torino	TT-SATM	15.6	17.7		388	3 802	89
	Venezia	ACTV	32.6	90.6		567	1718	88
Luxembourg	Luxembourg	STC	3.8	18.3			465	21
Nederland	Amsterdam	GVB	21.5	57.0	2 065	290	395	46
	Den Haag	HTM, NS	9.3	30.2		199	148	12
	Rotterdam (RET)	RET	16.3	41.9	901	284	412	37
	Utrecht	GVU	8.6	34.6		187	223	19
Portugal	Lisbon (Carris)	CARRIS	43.8	389.0	4 260	812	566	88
	Porto	STCP	29.5	275.0		611	397	60
España	Barcelona (TMB)	TMB	36.3	200.9	2 710	792	651	78
	Bilbao	TC	18.0	146.0		300	134	39
	Bilbao	ET		3.7				
	Madrid (EMT)	EMT	81.9	441.0		1 777	1 277	159
	Sevilla	TUSSAM	15.4	100.4		318	420	38
	Valencia	EMT	21.3	111.2		486	742	51
	Zaragoza	TU	15.0	101.9		264	204	24
United Kingdom	Aberdeen	Grampian	10.9	27.2	572	194	170	18
	Aberdeen	Bluebird				260		
	Belfast	CITYBUS	11.7	24.3	765	285	180	
	Birmingham	WMT	107.0	365.4	5 623	1 706	5 742	659
	Birmingham	MRW				360		
	Birmingham	YB				127		12
	Birmingham	MH				48		12
	Birmingham	CHASE				44		25
	Birmingham	CRS			196			
	Bristol	CITY LINE	21.6	38.1		337	1 000	48
	Bristol	BADGERUNE					361	
	Cardiff	CB, BR	15.6	30.3		296	420	158
	Edinburg	LRT	32.2	98.7	1 907	572	1 300	75
	Edinburg	SMT-BR	26.4	36.8	1 120	378		
	Glasgow	SB			2 462	864	1 713	105
	Glasgow	KC			1 600	550		
	Hull	KHCT	7.9	17.7		155	777	50
	Hull	EY	11.8	13.5	680	343		170

Country	City	Operator name	Vehicle km (million)	Passenger journeys (million)	Staff	Fleet	Route Length (km)	Number of routes
	Leads-Bradford	YR	65.0	183.0		1 085	2 700	370
	Leads-Bradford	WRYW				367		167
	Leads-Bradford	M	25.0	242.0				
	Leicester	CB	10.5	25.3	540	224	800	55
	Leicester	MF	23.0	27.0	950	386	1 170	125
	Liverpool	MERSEYBUS	46.0	134.0	2 490	937	651	110
	Liverpool	NORTH W.			800	342		120
	Liverpool	CROSVILLE				100		
	Liverpool	FAREWAY			240	85		7
	Liverpool	LIVERLINE			150	51		7
	Liverpool	LIVERBUS				53		8
	Liverpool	CRM				48		10
	Liverpool	LB	261.0	663.0	16 668	4 833		495
	London	TBD	133.0	464.0	46	2 990		299
	Manchester	GM BUSES	80.2	187.0		1 734	2 350	385
	Manchester	BLB			350	150		
	Manchester	TT			235	99		
	Manchester	RB			900	388		
	Manchester	M				62		
	Manchester	C				61		
	Manchester	F			55	48		33
	Manchester	W				35		
	Middlesbrough-Teeside	CT		19.4	350	150	388	71
	Newcastle-upon-Tyne	BUSWAYS	24.7	85.3		587	1 480	110
	Newcastle-upon-Tyne	GAGAN	50.7	113.0		700		
	Newcastle-upon-Tyne	N				390		
	Newcastle-upon-Tyne	OKT				184		
	Newcastle-upon-Tyne	W				38		
	Nottingham	NT				450	284	100
	Sheffield	M	50.0	101.0		891	980	300
	Sheffield	YT				94		24
	Sheffield	SO				82		22
	Sheffield	YT				358		318
	Southampton	SCB		16.9		141	488	35
	Southampton	SBL + OO				98		18
	Stoke-on-Trent	PMT				499	907	153

Source: UITP

three government-owned bus companies run the public transportation services within the city under the control of the separate public body OAS. Thessaloniki and Rhodes have systems slightly different from the prevailing system in the country. In Thessaloniki, a private operator has a licence of 21 years duration to operate services; in Rhodes city a municipal operator runs the services in the city proper under the supervision of the prefecture.

### Spain

Spanish authorities, usually the municipal council, grant concessions of between 8 and at maximum 20 years for the operation of a network of scheduled local bus services. The authorities determine the route structure and fare levels. Special regular services are allowed on condition that they do not compete with scheduled services.

Urban transport is provided by 185 companies, of which 28 are municipally owned and three are labour co-operatives. Private companies also operate in 129 of the 134 small sized towns (less than 100 000 inhabitants). In four of the five large cities (population above 0.5 million) the municipalities operate public transport themselves.

In inter-urban bus services, regional authorities grant concession rights to private operators. In cases the service crosses the regional boundary, the concession is granted by the national government. Concession conditions are generally the same as those for urban transport.

Passenger services by rail are mainly provided by the state railways RENFE. In some regions, however, the regional government owns the network. Sometimes services are provided by way of a concession to a private operator using this network. Metro services (Barcelona, Madrid and Valencia) are provided by either state owned or municipally-owned organisations.

### Ireland

Irish public transport is operated by the state-owned holding company CIE. This company owns three subsidiaries: Dublin Buses for bus services in the Dublin city region, Provincial Buses (Bus Eireann) for inter-urban and rural services and local services in the two major towns outside Dublin, and the Railways for all rail services including the rapid transit line in Dublin. The government is currently considering introducing competition in the provision of transport services. A new authority is likely to be created for putting individual services out to tender and issuing licences.

### Italy

Public transport in Italy is governed by a concession system. In general, concessions are granted for long periods under monopoly conditions. In larger cities, the concession usually goes to the (generally municipally-owned) local public transport company. Regional authorities let long term franchises for longer-distance services and services in rural areas. In some cases, national authorities issue concessions for inter-regional and other long-distance services. These concessions

can be granted to any operator, either private or publicly owned. The body issuing the concession usually determines services, timetables and fares.

### Luxembourg

In Luxembourg four networks exist in public transportation. These are:

- Luxembourg City Buses (AVL) for local and out of town services in the city of Luxembourg under the control of the city government;
- RGTR: a number of private operators providing bus services under the control of the Ministry of Transport;
- bus networks in the cantons of Esch-sur-Alzette under the control of a syndicate of cantonal authorities;
- CFL: the railway company provides not only rail services but also bus services on former railway links and on routes determined by the Ministry of Transport.

The controlling body is the Ministry of Transport. It determines fares, timetables and services, co-ordinates the provision of

services throughout the country and grants 10-year concessions to operators with automatic renewal.

### Portugal

Most public transport in Portugal is provided by public sector companies. Some local and regional bus services are in private hands under a concession agreement granted by national or local government. In 1990, a law was passed to deregulate public transportation.

In Lisbon, Oporto and Coimbra, services are provided by companies owned by the municipality. For Lisbon and Oporto committees have been established to control the implementation of a public transport plan designed to regulate the public transport system in the area.

In the rest of the country, the government strives for complete deregulation by imposing only qualitative restrictions in licences for operators. Control over maximum fares is retained. Local authorities are authorised to supplement the network with subsidised services.

**Table 6: Public transport  
Urban rail systems, 1994 (4)**

	City	Metro	Tram & light	Railcommuter/rail
Belgique/België	Antwerpen		X (1)	X
	Brussels	X	X (1)	X
	Charleroi	X	X (1)	X
	Gent		X (1)	X
	Liège			X
	Oostende			X (3)
Danmark	Copenhagen			X
France	Bordeaux	UC		
	Grenoble		X (2)	
	Lille-Roubaix-Tourcoing	X	X(3)	X
	Lyon	X		X
	Marseille	X	X(3)	X
	Nantes		X (2)	
	Nice			X
	Paris	X	X (2)	X
	Rennes	UC		
	St Etienne		X(3)	
	Rouen		UC	
	St Denis-Bobigny		UC	
	Saint Etienne		X (1)	
	Strasbourg		UC	
	Toulouse	X		X
BR Deutschland	Aachen			X
	Augsburg		X (3)	X
	Berlin	X	X (3)	X
	Bielefeld		X	
	Bochum-Gelsenkirchen		X (1)	
	Bonn		X	
	Braunschweig		X (1)	
	Bremen		X(3)	X
	Bad Schandau		(T)	
	Brandenburg		X (1)	
	Chemnitz		X (3)	
	Cottbus		X (1)	
	Darmstadt		X	
	Dessau		X (1)	
	Dresden		X (1)	X
	Dortmund		X (1)	X
	Duisburg		X (1)	X
	Düsseldorf		X (1)	X
	Erfurt		X (1)	
Essen		X (1)	X	

	City	Metro	Tram & light	Railcommuter/rail
	Frankfurt-am-Main	X	X (1)	X
	Frankfurt an der Oder		X (1)	
	Freiburg im Breisgau		X (1)	
	Gera		X (1)	
	Gotha		X	
	Görlitz		X (1)	
	Halberstadt		X (3)	
	Halle		X (3)	X
	Hamburg	X		X
	Hannover		X (1)	X
	Heidelberg		X (1)	
	Jena		X (3)	
	Karlsruhe		X (1)	X
	Kassel		X (1)	
	Köln	X	X (1)	X
	Krefeld		X (3)	X
	Leipzig		X(3)	X
	Ludwigshafen		X	
	Magdeburg		X(3)	X
	Mainz		X (1)	
	Mannheim		X (3)	
	Mönchengladbach			X
	Mühlheim/Ruhr		X (1)	
	München	X	X (3)	X
	Naumburg		X (3)	
	Nordhausen		X (1)	
	Nürnberg-Fürth	X		
	Plauen		X (1)	
	Potsdam		X (1)	
	Rhein-Ruhr	X	X (3)	X
	Rostock		X (1)	
	Schöneiche		X	
	Schwerin		X	
	Strausberg		X	
	Stuttgart		X (1)	X
	Ulm		X	
	Wiesbaden			X
	Woltersdorf		X (3)	
	Wuppertal			X
	Würzburg		X (1)	
	Zwickau		X (1)	
Hellas	Athens	X		X
Ireland	Dublin			X
Italia	Bologna			X
	Bolzano		X	
	Catania			X
	Firenze			X
	Genova		X (1)	X
	Milano	X	X (3)	X
	Napoli	UC	X (3)	X
	Roma	X	X (3)	X
	Trieste		X	
	Torino		X (1)	X
	Venezia			X
Luxembourg	Luxembourg			X
Nederland	Amsterdam	X	X (1)	X
	Den Haag		X (1)	X
	Rotterdam	X	X (1)	X
	Utrecht		X (2)	X
Portugal	Lisboa	X	X (3)	X
	Porto			X
	Sintra		X	
España	Barcelona	X	(T)	X
	Bilbao	UC		X
	Madrid	X		X
	Malaga			X
	Sevilla			X
	Soller		X	
	Valencia		X (2)	X
United Kingdom	Aberdeen			X

City	Metro	Tram & light	Railcommuter/rail
Belfast			X
Birmingham			X
Blackpool		X	
Bristol			X
Cardiff			X
Douglas		(T)	
Edinburgh			X
Glasgow	X		X
Leeds/Bradford			X
Leicester			X
Liverpool			X
London	X	X (2)	X
Manchester		X (1)	
Middlesbrough-Teeside			X
Newcastle-Upon-Tyne	X		X
Nottingham			X
Sheffield		X (2)	X
Southampton			X
Stoke-on-Trent			X

(1) Indicates a system extending or extended (includes subways)  
(2) Indicates a system built new since 1978  
(3) Indicates a system with no light rail features  
(4) List of systems in major EU cities not comprehensive  
(x) In operation  
UC under construction or in design  
(T) Indicates a heritage tramway operated for tourist purposes  
Source: UITP/Jane's

## Netherlands

In the Netherlands public transport has until now been generally provided by operators who have been granted exclusive rights under the Passenger Transport Act. Seven major cities operate their own bus services. As an experiment however two further cities have invited tenders for the operation of their networks, as a result of which their systems are now being operated by an American company under 5-year contract. In 4 other cities, services are provided by 80 %-owned regional subsidiaries of the state-owned holding company VSN, working under 10-year contracts which are automatically renewed. These regional subsidiaries also provide inter-urban and regional transport, under the control of the Ministry of Transport.

Since 1988 private operators have had the right to compete on inter-urban services - although this has led to the establishment of only a handful of new routes, none of which competes directly with existing routes.

Although the Ministry of Transport is persisting with its policy of encouraging the development of public transport, it is seeking to increase efficiency and reduce subsidies by increasing resort to competition. Proposals are at present being considered to create 35 areas covering the whole country, the operation of public transport in each area being subject to competitive tender."

## United Kingdom

The UK is unusual in that, outside London and Northern Ireland, most bus services are provided by privately owned companies competing freely on the road with no intervention from the authorities apart from ensuring basic safety standards and that the rules of competition are observed. There is no control over fares or networks and services. Where however the county authorities (or in the major conurbations the Passenger Transport Executives) consider that the resulting services do not adequately meet social needs - e.g., at the extreme ends of the day, or in rural areas they may buy in services from private operators following a tendering process. In London, services are operated as part of a co-ordinated network

with individual private sector operators competing for contracts to operate individual routes or sometimes groups of routes for periods of 3 to 5 years. Similar arrangements have been adopted in Northern Ireland.

Rail services are also in the process of privatisation. A separate track authority has been formed and the operations of British Rail has now been split into 25 separate operating companies. The franchises to operate the services provided by these companies will be let by a competitive tendering process over the next 2-3 years. Meanwhile such supporting activities as track and signal maintenance and the leasing and maintenance of rolling stock are being put out to tender.

## Impact of the Single Market

As a result of the opening up of public procurement (see section on regulations), the Single Market has begun to spur cross-border competition between operators of public transport, which is modifying the structure of the industry. In a number of places there has already been increased competition, which has been accompanied by restructuring. This in turn has led to an increase in company size and in concentration, while subsequent productivity gains have negatively affected employment. This process can be expected to continue progressively across the Union. Decline of public transport has particularly affected those types of employment (local jobs, "proximity" less qualified employment) targeted by the Delors report.

On the other hand, whereas the completion of the Internal Market has significantly modified competition within the public transport sector, it has also intensified existing imbalances in competition between transport modes. Compared to its more direct competitor, i.e. private car, public transport suffers from a serious competitive disadvantage to the extent that the actual cost of usage of private car is far lower than its true social and environmental cost. These costs should include use of scarce urban land (for moving vehicles and for parking), cost of road accidents to society, health effects of exhaust gases particularly in urban areas, increase in CO2 levels in the at-



mosphere and disruption of urban quality of life by automobile related infrastructures and activity. The EU environmental policy has so far failed to correct the situation. Other measures of the Internal Market, such as the harmonisation of taxes on private cars, have brought about a strain on the pro-public transport policies of Member States such as Denmark which had put serious fiscal disincentives on the use of private cars. Finally, the too timid internationalisation of rail services has further accentuated the imbalances.

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## ENVIRONMENT

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In urban and inner-city areas, the congestion and environmental degradation - pollution, noise, visual intrusion - caused by the use of motor vehicles are now recognised as major problems. Increasingly public transport is seen as the most cost-effective means of combating these problems. National and regional government and the European Commission are all developing strategies to reduce the environment impact of traffic, and in most cases those policies include the increased use of public transport. Policies to discourage private transport use include increasing the tax burden on cars and fuel (yielding revenues which could be used for subsidising public transportation operations and investment), providing park-and-ride schemes, charging increased premiums for parking in inner-city areas and allowing only residential parking in suburban areas. Close attention is also being given to the possibility of introducing road pricing.

Although a comparison on a per vehicle basis between buses and private cars shows that a bus produces more NO<sub>x</sub>, HC, CO<sub>2</sub>, SO<sub>2</sub> and particulates (but less CO) than the average petrol-engined car, in terms of emissions and energy consumption per passenger and per passenger kilometre the bus is considered the most environmentally friendly transport mode. A bus carrying 25 passengers will produce, per passenger kilometre, only 67 % of the NO<sub>x</sub>, 8 % of the hydrocarbons, and 16 % of the CO<sub>2</sub> emissions produced per passenger kilometre for a car carrying a single passenger. Suburban electrical rail services are estimated to consume substantially less primary energy per passenger-kilometre, at any occupancy over 25 %, than private cars but marginally more than a bus. In addition, if transfer of traffic to buses can be achieved in such a way - as with most park and ride schemes - as to reduce traffic congestion, then the remaining vehicles will be able to operate more efficiently, leading to a further reduction in emissions and in fuel consumption.

In its Green Paper on the Urban Environment the European Commission has suggested the following actions:

- encourage city authorities to incorporate public transport and road construction into their plans for land use and transportation;
- promote innovation in public transport, environmental-friendly vehicles and advanced traffic management systems by way of contributing to the cost of pilot projects and monitoring their effects;
- encourage EU-wide exchange of information in urban traffic management to maximise the benefits of a wide range of experiences;
- consider in detail the potential for using economic instruments in private car transport such as road pricing and pay-tolls for the right to enter city centres.

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## REGULATIONS

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As a major employer in a labour-intensive business, public transport is heavily affected by the wide variety of legislation regarding health and safety and employees' rights which have been passed in recent years by the institutions of the EU. It is also strongly affected by legislation regarding consumer

rights (e.g. the Unfair Contract Terms Directive, which in many cases outlaws clauses restricting the operator's liability in the case of accident). Legislation on the protection of the environment - in particular emissions from motor vehicles - is also having an important impact. The recent individual pieces of EU legislation which are having a marked effect on public transport operators include the Procurement Directive for Utilities (93/38/EEC) and the Directive on the Development of Railways (91/440).

The Procurement Directive for Utilities has obliged all operators in the public sector to seek tenders Europe-wide for works (over 5m ECU), and supplies and services (over 0.4m ECU), leading - albeit at some cost in additional administration - to the prospect of increased competition in the supply of goods and services consumed. At the same time the legislation on services means that the placing of contracts for public transport services must themselves be the subject of a Europe-wide tendering process, leading to an opening up of an increasing number of services to competition between operators.

The legislation also makes it obligatory for operators to refer to European standards, where available, in specifying goods and services purchased. Notwithstanding the commercial advantages of standardisation, this holds out the possibility of difficulties in specifying vehicles and equipment required for specific services with non-standard infrastructure or unusual physical or market requirements.

The Directive on the Development of Railways separates the accounting of main line rail infrastructure and operations. In those countries which choose to include local rail systems within the scope of this directive, and where inter-working is physically possible, it could present new opportunities for working local rail services over main line systems - although with the drawback that existing services operated in this manner could find themselves in increased competition for paths with longer distance services.

New legislation currently progressing through the EU institutions is likely however to have a much more marked effect on public transport. Directives which are likely to have a major impact include the Working Hours Directive, new directives on vehicle dimensions and bus construction and interoperability for high speed and conventional rail.

If the general Working Hours Directive (93/104) were extended to public transport in its present form, the costs of meeting such features as a minimum 11-hour daily rest period could result in additional labour costs of up to 5 % for many public transport operators (source: UITP).

Current proposals in the area vehicle of type approval could place serious restrictions on flexibility in bus design and operation, making it impracticable e.g. to use double-deck vehicles or small minibuses, or to obtain multi-purpose vehicles suitable for operation on routes which combine city, suburban and inter-urban characteristics.

Increased railway interoperability potentially offers new possibilities for the expansion of local rail services over main line systems in the long-term. Whether this is practicable depends however on the specifications adopted. If high speed specifications are extended to tracks currently used by local rail services, very heavy expenditure would be required to adapt local rail services so that even existing inter-working can be maintained.

The White Paper produced by the Commission at the end of 1992 on The Future Development of the Common Transport Policy (COM 92/494) has initiated a global approach and hence providing a framework for policy that integrates all modes. The White Paper is one of the most important documents from the Commission on transport issues and the discussions and negotiations that it has started will have far reaching impact on all modes of transport in the Community.

One result of the White Paper in the long run is likely to be to substantially encourage public transport.

The 1993 "Delors" White Paper on Growth, Competitiveness, and Employment is also of profound importance for public transport: the paper highlights in particular the urgent need to improve the operation of labour markets, to tackle social exclusion, to combat environmental degradation and develop a new pattern of sustainable development. Almost all these problems are pre-eminently urban phenomena, and the development of urban public transport is essential if these challenges are to be met.

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## OUTLOOK

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Despite improvements in the private car (e.g. reduced emissions, electronic control) which are likely to reduce emissions and to increase road capacity, the car will continue to pose mounting problems for society: the delays and waste caused by congestion; the increasing social exclusion of those without access to a car (who are likely to increase in number with the rising average age of the population), the unpleasantness and danger of urban areas in which the car dominates, growing suburban sprawl coupled with decaying city centres.

There is moreover a mounting groundswell of opinion in favour of the environment and against new road building, to the extent that in many major cities new road construction has become politically impossible. This is coupled with a growing recognition among the public and planners that improved public transport is essential if cities are to become habitable again.

The problem, however, is how to make it attractive to the individual traveller to choose public transport in preference to the private car - and thus how to fund the public transport improvements which are required.

The introduction of road pricing - now being pursued in a number of EU states, as well as in EU-wide research programmes - provides the most promising long-term solution. It would both reduce congestion (allowing buses to offer a more attractive service and reducing their operating costs) and permit fares to be increased to cover a larger share of costs as well as providing a large source of direct income which could be reinvested in public transport. Many of the benefits of road pricing (which still presents considerable technical and political difficulties) could however be achieved simply by controlling and increasing the price of parking in urban areas.

Increasing taxes on motor fuel, coupled with the allocation of some of the proceeds (as in Germany) to funding public transport, could achieve some of the benefits of road pricing. Meanwhile other sources of funding can draw on the benefits which public transport creates for third parties, in particular employers (note the Versement Transport paid by employers in French cities) and property owners (note the tax proposed by the City of London to fund public transport improvements). Meanwhile even direct investment by government is likely to be self-financing if viewed globally, taking account of the effect of transport improvements on earnings, unemployment, and rents, and the corresponding impact on tax revenue.

At the same time major steps are being taken to improve the management of public transport to improve the quality of service and reduce its costs, in particular through the rapidly spreading practice of tendering bus services (which can result in savings exceeding 20 %). This will complement the impact of new investment, as an increasing number of cities are turning to new light rail and metro systems, and existing systems are being upgraded with faster and more comfortable rolling stock and modernised stations. Particularly important will be the further integration of public transport systems with other modes of transport through e.g. park and ride and new links to airports, coupled with radical improvements in information and simplified systems of payment.

Essentially, Europe now faces a clear choice: either to allow its cities to continue to develop along American lines. Or to seek to revive its city centres and urban life. This can only be achieved through greater use of public transport. The techniques now exist to provide ease of mobility in cities with a greatly reduced impact on the environment. It is a question only of political will as to whether the right turning will be taken.

Written by: UITP and DRI Europe

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# Road passenger transport

The road passenger transport sector is composed of regular and occasional bus services. This monograph focuses on inter-city services whereas urban bus services are covered in the monograph on public transport. The private car remains the most important competitor for this mode for short and long distances, followed by rail and air for medium to long distances. Enterprises in the coach sector are continuing to invest in upgrading equipment in order to attract new business and maintain existing business.

## INDUSTRY PROFILE

### Description of the sector

In general, road passenger transport refers to bus and coach services provided both within urban areas and between cities. However, urban and non-urban road transport correspond to distinct services, satisfying different consumption needs. Hence, given that urban bus services are covered in the monograph on public transport, the present monograph will be, as much as possible, restricted to inter-city bus and coach services.

Inter-city bus and coach services cover basically regular and occasional services. Following the more refined distinction made by the European Commission, the sector may be broken down into the three following segments:

- regular services whereby passengers are picked up and set down at specified intervals and at predetermined stopping points,
- shuttle services whereby groups of passengers assembled in advance are carried from a single area of departure to a single area of destination and are carried back to the place of departure,
- and occasional services, which cover all the services which are neither regular nor shuttle services.

Regular services also include special services such as the carriage of workers between home and work place, the carriage of pupils between home and school etc. Occasional services essentially fulfil tourist needs whereas shuttle services constitute an intermediate category depending on whether ac-

commodation is included or not. Shuttle services with accommodation are essentially tourism services and therefore close to occasional services whereas shuttle services without accommodation are closer to regular services.

The NACE classification handles the road transport sector in a somewhat unsatisfactory way. NACE 722 covers all forms of road passenger transport except regular bus services and so includes occasional motor coach services but also taxis services and chauffeur-driven hire cars. NACE 721.2 covers regular services but makes no distinction between urban and inter-city services and also includes tramway services. In short, the NACE classification distinguishes between regular and non-regular services but not between urban and inter-city services. In addition, bus services are systematically merged in larger categories including additional services such as taxis, tramways etc.

### Recent trends

The analysis of road passenger transport suffers from an inadequate statistical coverage. At the EU level, two types of statistics are available. Eurostat supplies some industry data based on the NACE classification whose shortcomings have been highlighted above. These data also remain somewhat difficult to compare across countries and have therefore not been used hereafter. The European conference of Ministers of Transports (ECMT) releases statistics in physical units (passenger/km or number of buses) which, however, do not break down total bus services into urban and inter-city services. The analysis of recent trends in traffic, carried out hereafter, is based on ECMT data and therefore covers both urban and inter-city bus and coach services.

Between 1986 and 1992, estimated growth in total EU traffic by bus and coaches (i.e. including urban services) averaged 2 % annually, a relatively modest increase compared to total passenger traffic (i.e. rail, road and private cars) which is estimated to have expanded by more than 3.5 % annually over the same period. During the second half of the 1980s the development of bus and coach transport differed significantly from country to country. Portugal, Italy, Spain, and the Netherlands have all reported growth rates exceeding 3 % between 1986 and 1992. Past trends were much less positive in countries such as Denmark and France which reported quasi-stagnation in traffic (less than 1 % average annual growth) over the same period, and even quite dismal in the case of countries such as the United Kingdom which suffered an actual decline in traffic.

**Table 1: Road passenger transport**  
**Passenger transport by buses and coaches**

(billion passenger-kms)	1980	1986	1987	1988	1989	1990	1991	1992
Belgique/België	9.1	9.5	10.0	10.2	10.5	N/A	N/A	N/A
Danmark	7.3	9.1	9.2	9.2	9.2	9.3	9.2	9.2
BR Deutschland	65.6	53.1	53.0	53.2	53.0	56.7	72.2	N/A
Hellas	5.8	5.0	4.8	5.1	N/A	N/A	N/A	N/A
España	28.1	33.5	35.2	37.5	37.5	40.2	40.6	41.2
France	38.0	39.4	42.0	41.8	40.2	41.3	42.9	41.1
Italia	57.8	70.5	72.7	77.2	79.8	84.0	84.7	87.7
Nederland	13.2	12.1	12.8	12.8	12.8	13.0	14.0	14.5
Portugal	7.8	8.3	10.0	10.0	10.1	10.3	10.7	11.4
United Kingdom	52.0	47.0	47.0	46.0	47.0	46.0	45.0	44.0
EU (1)	284.7	287.5	296.7	303.0	N/A	N/A	N/A	N/A
Japan (2)	110.4	101.6	102.9	107.2	109.1	110.4	108.2	106.6

(1) Excluding IRL and L

(2) Only buses

Source: ECMT



**Table 2: Road passenger transport  
Stock of buses and coaches**

(units)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	19 560	16 817	16 449	16 095	15 811	15 831	15 644	15 378	14 930
Danmark	7 351	8 010	8 105	8 110	8 093	8 031	8 109	9 989	11 261
BR Deutschland	70 458	69 388	69 345	70 214	70 183	70 181	70 370	69 590	69 917
Hellas	18 011	18 237	18 485	18 748	20 074	20 653	21 430	22 080	22 674
España	42 631	41 593	41 874	43 002	43 991	45 168	45 767	46 604	47 180
France	65 000	71 000	72 000	71 000	72 000	72 000	75 000	77 000	76 000
Ireland	2 722	3 295	3 422	3 521	3 701	3 834	4 047	4 388	4 557
Italia	58 149	76 296	77 891	74 114	75 820	76 313	77 731	77 700	77 650
Luxembourg	647	695	693	717	705	734	760	777	814
Nederland	11 200	11 550	11 530	11 480	11 700	(1) 12 000	12 113	12 427	12 341
Portugal	8 489	10 439	10 631	10 827	11 031	11 572	12 099	12 348	12 827
United Kingdom	78 300	74 700	76 300	78 200	80 700	80 700	80 800	79 000	80 900
EU	382 518	402 020	406 725	406 028	413 809	417 017	423 870	427 281	431 051
USA	528 801	593 527	593 728	602 055	612 611	625 040	626 987	631 279	N/A
Japan	N/A	231 228	232 516	234 137	238 021	241 842	245 668	248 258	248 624

(1) Estimate

Source: Eurostat; Transport Yearbook; IRF; World Road Statistics

Comparing traffic levels across countries, Italy is the unquestionable European leader with a number of passenger/km which is more than 15 % higher than in Germany (including the Eastern Länder) and about twice as high as in the United Kingdom and in France. In 1992 Spain became the fourth largest Member State with a bus traffic exceeding that of France for the first time. Differences in traffic levels between countries reflect differences in population size but also differences in the level of development and in the national policies towards the private car. Hence, the most developed Member States tend to have the lowest per capita bus traffic (e.g. Germany, France and the UK) though national policies towards the private car and public transport can have an extremely strong impact as in the case of Denmark where a particularly unfavourable tax treatment of cars results in the highest (and by far) traffic per capita ratio.

### International comparison

Estimates of the stock of buses and coaches point to similar slow growth in the USA, Japan and in the EU. In the USA and in the EU the stock increased by 1.2 % annually over the 1986-92 period, whereas a similar average growth rate was registered in Japan for the 1986-91 period. In the USA, among other factors, the intense price competition among American airlines has caused people to favour air transport instead of coach services, and in Japan high-speed inter-city rail services provide a competitive edge over coach services.

## MARKET FORCES

### Demand

The demand for extensive private mobility, arising from the desire to travel door to door with maximum flexibility, the absence in some countries of adequate alternative public transport and rising real personal disposable incomes have been the main factors behind the extensive growth in private car ownership and use. This has meant that growth in passenger road use has been largely in private cars. Substantial excise duties on fuel prices have barely influenced car ownership and car use as the user perceives the additional incremental cost as minuscule compared to the improvement in mobile efficiency.

In most EU countries, transport by private cars has been increasing faster than overall mobility, in part fuelled by house-

holds owning more than one vehicle. In the traditionally lower car density countries in southern EU, Greece, Portugal and Spain, car ownership and use will continue to grow and outpace demand for public transport.

A significant proportion of the sector is coach services for tourism. Tourist coach services in combination with accommodation arrangements (inclusive tours) is popular among lower and medium income households and among senior citizens. Operators, however, are trying to attract other market segments by offering high quality services on long-haul routes. This aspect of public road transport is important for the tourist industry as it provides a convenient and predictable leisure schedule that is extremely cost efficient.

### Supply and competition

Contrary to urban busses, inter-city busses and coaches usually have seats for all the anticipated passengers and therefore carry a smaller number of passengers for similar vehicle sizes. The long distance services typically use luxury coaches with a high level of interior furnishing and amenities.

The cost of entry of new operators into bus and coach services has historically been low - typically the purchase of equipment and insurance - but due to regulation overhang, the number of new entrants is still limited in some EU countries. Also, entry of new operators is subject to EU directives on access to the profession (condition of financial standing, good repute and professional competence). For non-regular services competition between firms is muted as they provide similar services and also due to the low number of competitors for particular holiday schedules. The major competition comes from other modes of transport, typically the private car, rail and air.

Over longer distances added competition, from improvements in domestic rail networks and the introduction (and extension) of high-speed trains in some Member States threatens the road transporters. However, the experience of the TGV in France over the last ten years indicates that high-speed trains slightly stimulate overall demand for transport services and have mainly tended to take market share from regional air services.

In terms of passenger safety, buses and coaches have significantly less passengers and drivers killed or seriously injured (KSI) per passenger-kilometre compared to cars. On average, it works out at about 1 to 18. Nonetheless there are still

demands to improve safety for coaches, including such measures as compulsory wearing of seat-belts and in some Member States improvements in the road worthiness of the vehicles.

## INDUSTRY STRUCTURE

The regular services sub-sector varies considerably from one Member State to the other. In general the sector is fragmented with a large number of operators with fleets of varying size and although some very large operators exist, the majority of the enterprises are small-sized. Hence the sector is generally considered unconcentrated. In the occasional services sub-sector, the variance between Member States is significant, with some Member States having a dominant carrier, whilst in the others the reverse is true. Medium and large sized operators tend to work more in the international market, in contrast with smaller companies which operate in national and regional markets.

Amongst the larger operators in the EU markets are National Express in the United Kingdom, De Jong Inratours and Beuk in the Netherlands, ALSA and Iberbus in Spain, GTI in France and Deutsche Touring (subsidiary of the German railways) in Germany. Most of these firms also offer regular services. Also, for international European coach operations some 40 operators of international regular services are members of Eurolines. This consortium allows co-operation and efficiency in arranging and pooling service schedules as well as sharing the costs of marketing. Another such organisation is Europabus, which operates in Germany.

The greater part of the investments made by enterprises is for replacement of depreciated vehicles. Particularly in the longer distance market, the intensifying competition and customer expectations on quality standards forces enterprises to operate with high-quality buses and coaches with a broad variety of modern features (e.g. air conditioning, air pressure suspension systems, video facilities, catering etc.).

### Impact of the Single Market

The completion of the Internal Market has positively influenced road passenger transport. The liberalisation of international intra-EU non-regular services and the progressive freedom of cabotage have created new opportunities for operators and somewhat unleashed competitive forces. Larger operators are reacting to the new environment by expanding their foreign activities and by increasing their size. More intense competition has, however, put pressure on profits and wages. In addition to easier access to the market, international transport operators have directly benefited from the removal of border checks which, in the case of non-regular services, entailed relatively burdensome administrative formalities. Overall, the sector has benefited from renewed demand owing to increased cross-border mobility and to the supply of more adequate services. Only few barriers remain to be lifted for the completion of the Internal Market, but existing discrepancies in the enforcement of EU regulations remain a problem.

## ENVIRONMENT

A comparison on a vehicle to vehicle basis between coaches and private cars shows that a bus produces more NO<sub>x</sub>, HC, CO<sub>2</sub>, SO<sub>2</sub> and particulates (but less CO) than the average petrol-engined car. However, in terms of emissions and energy consumption per passenger and per passenger kilometre the bus is considered the most environmentally friendly transport mode. According to the Commission's Green Paper on the Impact of Transport on the Environment, during a non-urban utilisation a bus requires on average 13 passengers to one passenger in a petrol-engined car to equate NO<sub>x</sub> emission, 2 passengers to equate HC emission and 7 passengers to equate CO<sub>2</sub> emission. Concerning, CO<sub>2</sub> emissions, which has become a central concern because of the Greenhouse effect, buses

and coaches (both urban and non-urban) are estimated to contribute only 1.6 % of the total in the EU, compared to 55.4 % for private cars. This small contribution partly mirrors the low share of busses and coaches in total passenger transport but also the superiority of busses and coaches in terms of energy consumption per passenger. When comparing a standard inter-city train with a standard bus at similar occupancy rates, bus and rail services post nearly similar primary energy consumption per passenger kilometre. Both modes consume substantially less primary energy than cars (diesel or petrol) and aeroplanes at similar occupancy rates, however the superiority of buses and rail decreases somewhat when occupancy rates increase.

## REGULATIONS

The EU legislation has established three types of international bus services: occasional, shuttle and regular services. As far as national bus transport is concerned, the categories of service vary from country to country and within certain Member States there is no category of shuttle services.

International regular services are subject to similar rules as those which apply to national services (timetables, set routes and prices). As to non-regular services, the EU Council of Transport Ministers has adopted in 1992 the regulation on the freedom to provide intra-EU international services for road transport by coach and bus. Under this regulation, an authorisation is no longer required for most occasional services and for shuttle services if accommodation is included (inclusive tours). For regular services and shuttle services without accommodation, however, authorisation is still required.

In 1992, the EU Council also adopted a regulation on the conditions under which non-resident carriers may operate national road passenger transport within a Member State. Since January 1 1993, freedom of cabotage allows operators to provide certain non-regular services under the same conditions as resident carriers. Though only closed-door tours presently enjoy freedom of cabotage, other non-regular services will be liberalised as from January 1, 1996.

The degree of regulation of bus and coach services varies greatly between Member States. Certain Member States, such as the United Kingdom, have a very liberal system, where basically only qualitative controls govern the operation of a service (Transport Act). The Netherlands also have a relatively free system (Passenger Transport Law) for non-regular operations but regular bus services remain strictly regulated. In Spain, the 1987 LOTT legislation prescribes very detailed provisions governing all road passenger transport.

Furthermore, a Directive (on the admission to the occupation of road passenger transport operators in national and international transport operations) has come into force on 1 January 1990, strengthening the existing provisions for becoming a passenger transport operator. In particular, it specifies precise minimum financial requirements to ensure the viability of existing and potential operators and it makes the passing of a written examination compulsory for new entrants.

The legal framework concerning intra-community bus transport is established by Regulation 684/92 containing provisions on regular, shuttle, occasional and own-account transport. Freedom to provide services affects regular and non-regular services.

The White Paper produced by the Commission at the end of 1992 on The Future Development of the Common Transport Policy (COM 92/494) has started the ball rolling in terms of a global approach to viewing all modes of transport simultaneously and hence providing a frame work for policy that integrates all modes. One result the White Paper may provide in the long run is to favour public road transport; however,

the approach will be cautious so as to minimise the effects of sudden changes in policy and hence mobility.

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## OUTLOOK

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Growth in inter-city bus traffic will be lower than overall mobility, as private car use is yet to reach its maximum. Policy instruments from national governments, local authorities and potentially the European Commission to discourage private car traffic in order to reduce road congestion and air pollution by cars, are not likely to have significant consequences for the ownership and use of private cars in the short term. This is especially the case, as mentioned earlier, for habitual car owners and users who have a substantial tolerance for mechanisms involving increase taxes and fuel excise. The opening up of Eastern Europe has and will further expand tourist destinations for coaches. Investments in high-speed trains is not expected to threaten the road passenger transport in the short term.

Written by: DRI Europe

# Road freight transport

## NACE 723

Road freight is the dominant sector in the movement of cargoes within the Union, accounting for close to three quarters of inland transport. The sector has suffered from a protracted recession since 1990. It is so far keeping its competitive edge compared to other transport modes, helped in that by the completion of the Single Market which is improving the sector's efficiency and fostering growth of intra-EU traffic. However, in the coming years, growth in road freight will be hindered to some extent by increasing congestion and a lack of investment in road infrastructure. In addition, public authorities are increasingly considering road freight in a global framework where environmental and other social costs are fully taken into account when comparing different transport modes.

### INDUSTRY PROFILE

#### Description of the sector

The goods transport sector includes units exclusively or primarily engaged in the transportation of goods - regular or otherwise - by trucks and vans or similar vehicles e.g. trailers, semi-trailers, road tankers, removal vans, articulated vehicles and truck-trailer combinations.

#### Recent trends

After the buoyant second half of the 1980s, during which growth in total road freight traffic measured in tonne averaged 3.5 % in the EU, the sector entered into more difficult times in beginning of the 1990s. In 1990 and 1991 total freight traffic declined by about 2 % annually. Estimates for 1992 point to an apparent strong recovery with 5 % growth. However, the recovery is entirely accounted for by a 22 % surge in German domestic traffic. Germany excluded the European recovery turns into another year of recession with a more than 2.5 % decline in traffic.

Thanks to the development of intra-EU trade, international road freight traffic grew faster than domestic traffic during the second half of the 1980s, expanding on average by about 8 % per year. The trend continued during the early 1990s when sustained growth in international transport somewhat compensated the recession in domestic transport.

Turning to the performance of individual countries in 1992, most of the Member States reported a drop in total traffic

with particularly dramatic results in the case of Portugal (-12 %) and Greece (-15 %). Apart from Germany, only Denmark, Italy and the Netherlands have experienced a rise in traffic.

International road transport can be analysed either in terms of traffic flows as in Tables 4 and 5 or in terms of shipments made by vehicles registered in the country considered. Based on the latter concept, the Netherlands are the leading European country in terms of international road transport, accounting for close to a quarter of all international shipments by European hauliers. They are followed by Germany (20 %), France (17 %) and Belgium (17 %).

### MARKET FORCES

#### Demand

Road freight generally offers an efficient and facile method of transporting and distributing goods to wholesalers, retailers and consumers. The level of economic activity is a major component in the demand for road freight, and there is a strong correlation between growth in economic development and growth in the demand for road freight, both internationally and domestically. On average, European road freight transport measured in tonne-km expanded faster than real GDP over the past two decades. In tonnes lifted growth was slower than GDP, indicating that an increase in average distance travelled accounted for much of the sector's past growth.

Road freight's largest customer sectors are machinery and other manufactured goods, manufactured minerals and building materials, and food and drink products. In tonnes lifted these three sectors account for about three quarters of the cargo shipped by road. Manufactured minerals and building materials are predominantly transported over short distances and therefore represent more than 45 % of domestic road transport in Europe when measured in tonnes. However, when considering domestic and international transport in tonne-km, machinery and other manufactured goods becomes the largest customer.

Though this effect remains difficult to quantify, the advent of the Single Market has proved beneficial for demand for international road freight transport. In addition to an increase in intra-EU trade, demand has also benefited from a set of factors specific to the road freight sector. The removal of trade barriers has entailed an increase in intra-EU trade for a given amount of EU production both because it has allowed companies to ship goods which were previously too difficult or too costly to export and as a consequence of the restructuring of the European manufacturing industry triggered by the In-

**Table 1: Road freight transport**  
**Total goods transport (1)**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	386 336	335 584	328 108	336 055	375 670	378 271	372 099	396 534	N/A
Danmark	197 181	211 365	222 367	217 705	232 267	228 829	208 472	193 301	205 218
BR Deutschland	2 596 194	2 310 480	2 428 098	2 436 012	2 585 670	2 729 075	2 860 817	3 026 333	3 641 619
Hellas	N/A	159 936	152 836	157 858	142 689	205 799	180 183	189 036	161 256
España	N/A	N/A	929 402	1 100 747	1 129 730	1 231 594	998 782	713 539	702 087
France	1 457 060	1 267 345	1 296 774	1 354 695	1 538 018	1 530 162	1 516 653	1 502 860	1 414 958
Ireland	N/A	91 345	95 126	87 570	82 333	83 257	81 285	80 169	N/A
Italia	N/A	N/A	346 030	N/A	N/A	912 556	937 291	949 606	968 621
Luxembourg	19 114	17 299	19 623	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	404 532	411 495	435 612	440 678	485 491	474 411	487 358	486 711	503 373
Portugal	N/A	N/A	N/A	192 305	212 867	233 170	243 290	275 075	242 518
United Kingdom	1 434 173	1 416 413	1 432 702	1 495 276	1 705 523	1 759 050	1 705 175	1 566 101	1 521 440

(1) Including national traffic, dispatch to and received from foreign countries.  
Source: Eurostat: Carriage of goods

**Table 2: Road freight transport**  
**Goods transport by type of traffic, 1992 (1)**

(%)	National traffic	Exports (2)	Imports (3)
Belgique/België (4)	75.3	14.2	10.5
Danmark	92.6	3.8	3.5
BR Deutschland	95.9	2.1	2.1
Hellas	98.2	0.9	0.9
España	95.9	1.9	2.2
France	93.5	3.4	3.2
Ireland (4)	97.3	1.2	1.5
Italia	95.1	2.5	2.4
Luxembourg (5)	68.4	18.2	13.4
Nederland	79.7	10.7	9.6
Portugal	97.0	1.6	1.5
United Kingdom	98.9	0.5	0.6

(1) Based on tonne-km:s

(2) Dispatch to foreign countries

(3) Received from foreign countries

(4) 1991

(5) 1986

Source: Eurostat: Carriage of goods

**Table 3: Road freight transport**  
**National goods transport**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	310 711	265 383	257 556	259 480	287 611	287 078	276 870	298 589	N/A
Danmark	187 584	199 932	210 484	205 679	220 030	215 949	194 452	178 538	190 117
BR Deutschland	2 489 566	2 213 709	2 324 081	2 327 222	2 464 162	2 594 829	2 715 148	2 868 215	3 491 852
Hellas	N/A	158 372	151 474	156 432	140 906	203 918	176 596	187 379	158 314
España	N/A	N/A	913 335	1 082 831	1 108 849	1 207 972	973 708	685 855	673 318
France	1 384 000	1 197 941	1 220 323	1 273 202	1 442 648	1 419 899	1 404 051	1 394 915	1 322 708
Ireland	N/A	89 731	93 116	85 407	80 130	80 801	78 955	77 998	N/A
Italia	N/A	N/A	327 555	N/A	N/A	866 619	889 065	900 034	921 563
Luxembourg	17 016	11 126	13 422	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	357 611	338 660	358 627	358 822	394 190	378 049	386 940	379 212	401 351
Portugal	N/A	N/A	N/A	190 554	209 305	228 015	237 946	267 450	235 178
United Kingdom	1 418 000	1 407 000	1 421 787	1 480 893	1 691 256	1 743 260	1 687 000	1 547 373	1 505 274

Source: Eurostat: Carriage of goods

**Table 4: Road freight transport**  
**Dispatch of goods to foreign countries**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	N/A	38 402	38 584	42 995	50 395	51 564	55 287	56 370	N/A
Danmark	5 340	5 789	5 852	5 866	6 038	6 564	7 420	7 791	7 878
BR Deutschland	52 245	48 625	53 073	56 134	61 885	68 493	73 644	78 747	74 476
Hellas	1 078	774	735	756	853	890	958	856	1 487
España	N/A	N/A	8 858	10 284	10 981	11 720	12 195	13 165	13 501
France	37 100	35 068	37 229	37 870	45 100	53 036	52 140	51 468	47 367
Ireland	N/A	642	943	993	980	1 147	1 119	975	N/A
Italia	N/A	7 750	8 392	9 162	11 060	22 821	25 093	25 302	24 115
Luxembourg	N/A	3 351	3 563	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	N/A	35 821	37 937	40 297	44 983	48 631	51 496	55 054	53 807
Portugal	N/A	N/A	1 112	643	1 755	2 314	2 557	4 017	3 758
United Kingdom	7 115	3 903	4 513	6 076	6 111	6 934	7 979	8 511	7 079

Source: Eurostat: Carriage of goods



**Table 5: Road freight transport  
Goods received from foreign countries**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	N/A	31 799	31 968	33 580	37 664	39 629	39 942	41 575	N/A
Danmark	4 257	5 644	6 031	6 160	6 199	6 316	6 600	6 972	7 223
BR Deutschland	54 383	48 146	50 944	52 656	59 623	65 753	72 025	79 371	75 291
Hellas	674	790	627	670	930	991	2 629	801	1 455
España	N/A	N/A	7 209	7 632	9 900	11 902	12 879	14 519	15 268
France	35 960	34 336	39 222	43 623	50 270	57 227	60 462	56 477	44 883
Ireland	N/A	972	1 067	1 170	1 223	1 309	1 211	1 196	N/A
Italia	N/A	8 660	10 083	10 627	12 523	23 116	23 133	24 270	22 943
Luxembourg	N/A	2 822	2 638	1 378	2 143	2 200	2 228	2 427	N/A
Nederland	N/A	37 014	39 048	41 559	46 318	47 731	48 922	52 445	48 215
Portugal	N/A	N/A	1 455	1 108	1 807	2 841	2 787	3 608	3 582
United Kingdom	9 058	5 510	6 402	8 307	8 156	8 856	10 196	10 217	9 087
EU	N/A	N/A	196 694	208 470	236 755	267 871	283 014	293 876	N/A

Source: Eurostat: Carriage of goods

ternal Market. The latter effect entails the progressive rationalisation of the European industry around larger production and distribution units as well as increasing trans-border sourcing. The ensuing increase in distances between consumers and suppliers translates into additional demand for the transport sector.

As to the factors specific to road transport, the Single Market is improving the efficiency with which goods can be shipped by road. The deregulation of international transport is fuelling competition between European road transport companies, an effect which is amplified by the progressive deregulation of national road transport in many Member States. Competition fosters innovation and encourages road transport companies to upgrade their services in order to meet developments in demand by shifting from general goods transport to a wide range of specialised and sophisticated transport services. Hauliers tend to be increasingly engaged in distribution and logistics activities as well as in physical transport. Increased competition and the pressure to innovate is also entailing a process of concentration and co-operation. On the other hand an increase in the demand for specific services offers prospects for specialisation.

A major extra-EU market to use the road goods transport service from the EU is Eastern and Central Europe. However, eastern European countries have been unable to cope with the resulting substantial increase in road traffic. Estimates put the average additional time required to travel a specific distance in Eastern and Central Europe compared to the equivalent A road in western Europe at 20 %. Road maintenance, upgrading and the construction of new motorways will be required to ease congestion and to ensure rapid flows of goods and passengers. Implementation of these measures require both considerable investment and time. The TEM (Trans-European Motorway), prepared and carried out under supervision of UN, has the objective of ensuring the construction of an integrated Pan European road system. However, the TEM-project is not expected to be realised before the turn of the century.

The use of information and communication technologies, e.g. Electronic Data Interchange, Tracking and Tracing systems, will act as a fillip for market growth, as the services offered by the players in the road goods transport market can provide better quality (e.g. Just In Time, reliability, flexibility and probability of damage) and/or cover a far wider range of destinations thanks to efficiency improvements.

### Supply and competition

Road goods transport is able to supply a flexible range of services that moves a wide range of products over a very

broad geographic area. One of the cornerstones of road goods transport's competitive position vis-à-vis rail and inland waterways is this geographic flexibility. For short haul movement of goods, road goods transport has a distinct advantage. It is typically on long haul point to point bulk services, where rail can collect from point of initial loading and delivers to point of final discharge, that rail offers its most competitive threat to road goods transport. Overall, services supplied by inland waterways and rail suffer from a lack of competitiveness both in terms of quality (flexibility, reliability etc.) and in terms of price. Over the past two decades modal competition has therefore largely turned to the advantage of road. If transport by pipelines is excluded, the share of road in EU inland transport continuously increased from slightly over 55 % in 1970 to 74 % in 1990. Over the same period the share of the two competing modes (i.e. rail and inland waterways) declined continuously, rail being somewhat more severely hit than inland waterways.

In addition to the road goods transport industry, there is 'own-account', which is a company transporting its own products in its own fleet. In the last few years there has been a noticeable trend for companies using own-account transport to downsize their fleets and move to using third party transportation. The observed increase in the share of 'hire and reward' compared to 'own-account' is in line with the more general trend towards an more outsourcing of non-core activities in the European industry. It is also a consequence of enhanced competition between hauliers and the associated decrease in cost and improvement in quality and complexity of road transport services. The emergence of large transport operators providing complete logistics services is a strong incentive to outsource part or the whole of the logistic function. However, in some cases the frontier between 'own-account' and 'hire and reward' becomes somewhat blurred because of the emergence of professional transporters operating dedicated fleets for large retail chains or manufacturing companies requiring specialised trucks such as oil tankers.

The enforcement of regulations on driving and rest hours have still to be improved in the Union. This, coupled with variations on hours kept at loading and discharge areas can severely affect the logistics and scheduling of road freight movement. Additionally, permissible weights for particular truck and trailer types, which vary from country to country in Europe, have an indirect impact on cross-border movements, although there is now conformity in the Union.

Liberalisation is another important area of transport policy which will continue to affect the supply side in several ways. Firstly, as discussed above, trade between Member States and

thus intra-EU road traffic will continue to increase. Secondly, the deregulation of international transport and the progressive introduction of cabotage will continue to strengthen competition between hauliers from different countries, pushing freight rates downwards. This in turn will benefit the industry as more cargo will be diverted to road. However, it remains somewhat difficult to evaluate the respective effect on freight rates of the Union liberalisation of international intra-EU transport and of ongoing domestic deregulation. The EU liberalisation process only concerns international transport and cabotage, i.e. the right by a foreign haulier to pick up and deliver ship cargo between to points within the domestic country. Nevertheless, the prospect of increased competitive pressures by foreign companies both in the international market and in the domestic market as a consequence of cabotage has led most of those Member States which still imposed strict regulations on their domestic road freight services to start up a liberalisation process in order to boost the competitiveness of their own transport industry.

Comparison of market shares confirms the strong competitive position which the Netherlands hold in intra-EU road freight, in relative as well as in absolute terms. Belgium also is well placed on the intra-EU market. The intra-EU market shares of Germany and France are also high, but compared to their national traffic their contribution to intra-EU traffic is of minor importance. Spain is the only other country where intra-EU traffic is significant to the sector.

### Production process

The production process is relatively straightforward. Cargo is collected en masse at point of origin, or it is consolidated by a transport firm. The consolidation may involve collecting small parcels of freight from many different locations using smaller vehicles before transshipment for the major stage of the journey. Delivery of a large single cargo is to point of destination, where it may be used in its entirety or broken down into smaller parcels for onward delivery. A consolidated cargo is delivered to a point where it can be distributed or it is distributed on by the vehicle used for the major journey leg.

## INDUSTRY STRUCTURE

### Companies

The market is fragmented into many small transport companies. In some EU countries, the number of road transport firms is gradually declining, indicating a tendency towards some co-operation between companies or concentration in the sector. However, the barriers to entry in road freight are minimal due to low initial capital requirement and also minimal product differentiation, hence, liberalisation is expected to foster entry and substantial concentration is unlikely. To some extent, the industry will evolve towards a two segments structure with a large number of small companies providing simple transport services and a limited number of larger operators providing more sophisticated logistics services. Companies

in the first segment will benefit from limited economies of scale and will essentially compete in prices while companies in the second segment will take advantage of economies of scale or of scope to provide complex services where quality will become as important as price.

Member States differ considerably in the number of hauliers, the evolution of this number, and the distinction made between own account transport and transport for hire and reward. However, broadly, there is a degree of inter-relation between country size and number of companies. The main exception are Spain and Italy, which have an unusually high number of enterprises. Traditionally, Member States have had different market access rules for long distance and short distance goods transport respectively, however, as harmonisation progresses this will be less apparent.

### Strategies

Investment in expanding road infrastructure has not matched the development in road use. The growth in the number of cars, trucks and vans has exceeded the capabilities of some road networks. This in turn is causing serious problems for road maintenance, congestion, and technical and operational logistics. The lack of sufficient investments in road infrastructures becomes a serious threat to the goods transport sector. Governments are essentially monopoly suppliers of roads, and this is reflected in their investment decisions. Low investment in roads mirrors increasing strains on public finance but also increasing awareness of environmental issues. Besides, investment in infrastructure in some areas of congestion will do little to relieve the problem. European authorities also acknowledge capacity problems in the in road network. The trans-European road network (TERN) covers 58 000 km of which 43 000 km of existing roads to upgrade and 15 000 km of new links to build by 2004. However, the TERN looks somewhat pale compared to the trans-European rail network which covers 70 000 km and the EU Commission recognises that environmental considerations set constraints to the possible extensions of the road network.

Competition from rail may increase due to additional investment in railway transport, particularly investment in the improvement of the overall quality of railroad transport. The major investment of the Channel tunnel and the link between Sweden and Denmark will also lead to changes in transport flows and logistic locations.

### Impact of the Single Market

The completion of the Internal Market has strongly affected both the supply of and the demand for road transport services. The liberalisation of international intra-EU transport and the progressive introduction of cabotage have seriously spurred competition in the sector. Several Member States have reacted to the prospect of increased competitive pressures, both on the international market and on the domestic market as a result of cabotage, by adopting more liberal policies for their domestic transport market, thereby amplifying the initial effect of the Single Market. Though the sector has benefited from

**Table 6: Road freight transport**  
**International goods transport by traffic relations**

(million tonnes)	(1) 1985	1986	(2) 1987	(2) 1988	(2) 1989	(2) 1990	(2) 1991	(2, 3) 1992
From EU to EU	166.1	189.1	202.5	228.0	256.1	270.8	280.9	237.9
From EU to non-EU	13.4	11.7	12.2	15.0	20.5	21.3	23.5	23.9
From non-EU to EU	8.9	7.6	7.6	9.0	11.8	12.2	12.9	14.4

(1) Excluding España and Portugal

(2) Excluding Luxembourg

(3) Excluding B and IRL

Source: Eurostat: Carriage of goods

the removal of border controls, which constituted a heavy cost burden, liberalisation and increased competition have translated into serious pressures on profits and wages. The Internal Market has also modified the structure of the sector, with an increase in the size of the larger operators needing to expand their geographical coverage to provide truly European services, and the simultaneous entry of a large number of small operators as a result of easier access to the market. On the demand side, the increased integration of European economies has fostered intra-EU trade and therefore demand for international road transport services. Only few barriers remain to be lifted for the completion of the Internal Market, but existing discrepancies in the enforcement of EU regulations remain a problem.

## ENVIRONMENT

Road goods transport is coming under substantial pressure from concerns over the environment. Road traffic is responsible for a large contribution to air pollution. Among the major air pollutants are: Sulphur dioxide (SO<sub>2</sub>), Nitrogen oxides (NO<sub>x</sub>), Carbon monoxide (CO), Particulates (Aerosols), Lead (Pb) and Carbon dioxide (CO<sub>2</sub>). Both gasoline-driven and diesel vehicles emit carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide, though diesel vehicles emit CO and NO<sub>x</sub> at lower rates. Furthermore, gasoline vehicles emit lead, and diesel vehicles emit SO<sub>2</sub> and particulates.

Whilst most emissions are produced by private cars, the emission of particulates originate mainly from diesel engines - important for freight traffic. New EU standards for heavy vehicle emissions, Euro I and Euro II, will reduce emissions by these vehicles by 55-65 %, except for CO<sub>2</sub>. In the short term, there is no expected major technological revolution in engine design that will substantially reduce emissions. Hence, a major option is to ensure that the effect on the environment is costed correctly. The Commission is reviewing options on how to cost this effect, for instance through a proposed tax on energy and carbon. This could be used to stabilise the emissions of the greenhouse gas CO<sub>2</sub> over the coming decade, with emissions in 2000 remaining at the level recorded in 1990. It is important to note that the proposed CO<sub>2</sub> tax does not appear to find unanimous approval by Member States.

## REGULATIONS

The issue of authorisations, the fixing of tariffs and driving times, the imposing of technical standards and taxes on motor

vehicles, are actions that can affect the supply side of the market, for instance, the number of vehicles on the road. As to intra-EU international road transport, all bilateral authorisations and EU quotas have been replaced by EU authorisations since January 1st 1993. Permission to enter the market now depends on qualitative criteria and all quantitative restrictions have been lifted except for a safeguard clause which includes a crisis mechanism in case of serious market disturbances. On January 1st 1990, the old tariff system for international journeys within the EU was replaced with free price fixing.

As to cabotage, restricted market access started in July 1990 with the introduction of a limited number of cabotage licences. End of 1992, 18 000 such licences, each valid two months, were in operation. In June 1993, European transport ministers agreed upon an extension of the number of licences to 30 000 beginning of 1994 and an annual 30 % increase thereafter. The agreement also includes full freedom of cabotage as of July 1998.

Fiscal harmonisation is another important element of the EU policy towards road transport. During the same June 1993 Council, transport ministers agreed upon a minimum vehicle tax to be introduced in January 1995 and reached an understanding concerning infrastructure charging by allowing Member States to introduce road tolls or user charges. The new regulation allows Belgium, Denmark, Germany, Luxembourg and the Netherlands to proceed with their plan to introduce a common user charge system beginning of 1995. All hauliers, irrespective of their nationality, will have to purchase the so-called Euro-vignette in order to use the road network of the participating countries. Proceeds of the charge will be allocated between countries on the basis of predefined calculation rules.

By improved co-ordination, the EU is trying to improve the observance of social measures, i.e. to extend its span of control, to prevent drivers from neglecting the measure dating from November 1985 which regulates their hours of driving.

Other EU measures that may affect the road transport of goods are associated with the EU policy concerning environment and infrastructure. The Communication from the Commission in the form of a white paper entitled *The Future Development of the Common Transport Policy (COM(92)494)*, of December 1992 seeks to set out a global approach to transport issues enabling due consideration of all views before the launch of particular initiatives. It recognises the importance of road transport in the global picture, and seeks to balance transport policy

**Table 7: Road freight transport  
Stock of goods vehicles (1)**

(units)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	268 536	307 778	319 412	338 785	357 540	386 670	N/A	467 358	N/A
Danmark	N/A	474 858	516 584	548 803	573 790	591 720	604 334	623 091	643 653
BR Deutschland	1 591 923	1 626 095	1 648 952	1 668 778	1 699 560	1 741 232	1 806 921	1 886 622	2 033 588
Ellas	N/A	592 926	618 136	645 770	380 132	N/A	N/A	N/A	N/A
España	1 386 329	1 594 423	1 747 744	1 899 075	2 000 468	2 310 237	2 438 541	2 612 520	N/A
France	2 664 194	3 138 231	3 221 543	3 342 657	3 468 314	3 599 074	3 732 750	3 856 871	3 850 607
Ireland	N/A	N/A	N/A	N/A	118 764	130 020	143 166	148 238	144 798
Italia	N/A	N/A	N/A	N/A	3 131 959	3 251 295	N/A	N/A	N/A
Luxembourg (2)	N/A	9 138	9 270	9 627	9 951	10 614	11 275	12 078	12 881
Nederland (2)	N/A	369 500	415 000	437 900	467 800	484 492	506 617	527 146	564 913
Portugal	1 386 329	477 115	498 985	544 163	583 534	653 884	710 238	780 998	836 837
United Kingdom (2)	1 852 000	1 909 000	1 935 000	1 975 000	2 113 000	2 490 000	2 330 000	2 243 000	1 995 000

(1) Including goods motor vehicles, trailers and semi-trailers

(2) Including only goods motor vehicles

Source: Eurostat: Transport Yearbook



in terms of its impact on the environment with sustainable mobility for the Union as a whole. The communication enlarges on the major issues of modal disequilibria, capacity constraints, system and network developments, environmental issues, safety, and social issues.

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## OUTLOOK

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The liberalisation and harmonisation of the EU transport market, the resumption of positive economic growth and the continuing move towards fast and flexible transport will affect both the volume of total transport and modal choice. Environmental regulation, Eastern and Central Europe, investments in road transport and other modes of transport and information and communication technology are other important aspects.

For road transport operators, the European integration will continue to produce some general advantages such as an increased transport volume, more third-country transport, less empty return loads, simplified foreign settlement, and co-operation with foreign transport operators. Intra-EU traffic will grow significantly faster than national traffic, as the effects of the Single Market act as boost to the sector. Meagre investment in infrastructure will, in some cases, act as brake on the efficient expansion of road goods transport. However, investment in infrastructure in some areas of congestion will do little to relieve the problem.

The use of new information and communication technologies will act as fillip for the transport companies as developments in this field have undergone rapid improvements in recent years.

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# Inland waterways transport

## NACE 73

During the past five years, the EU inland waterways transport industry has been affected by overcapacity problems and structural bottlenecks which have hampered the development of an equilibrium between demand and supply in the sector. Scrapping policies at the Community level have made some progress in improving the situation, to the point that these measures have been extended and hardened.

There are prospects of increasing demand (especially in the transport of hazardous goods and unitised cargoes) for inland shipping, which is rightly considered as one of the most environment-friendly and cheap modes of transport.

### INDUSTRY PROFILE

#### Description of the sector

NACE 73 includes units exclusively or primarily engaged in the transportation of passengers and goods on rivers, canals, lakes, lagoons and within river ports. Tugs and push boats operating on inland waterways also belong to this NACE group.

The largest portion of inland waterway transport consists of companies operating ships of various sizes to convey goods throughout Europe on the available inland waterway network. As passenger transportation is limited to a few ferry boats across rivers and boats for river cruises, this part of the sector is very small and will not be considered in this monograph. Most inland shipping operates with unscheduled services, and operations using fixed schedules are very rare.

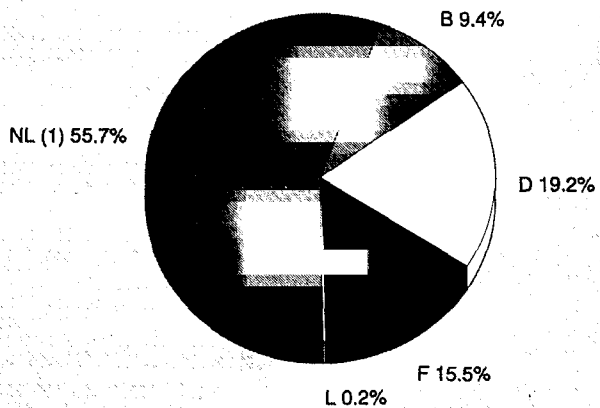
Inland waterways goods transport is usually divided into liquid or dry cargo, according to the type of goods transported.

Next to companies operating ships as their primary activity (professional transport), there are companies active in manufacturing that operate ships on their own account (own account transport).

#### Recent trends

In terms of tonnage transported in 1992, the country with the largest volume is the Netherlands with over 260 million tonnes. Germany ranks second with a total tonnage of about 230 million. Belgium follows in third place with about 89 million tonnes and France is in fourth position with 71 million tonnes. Tonnage transported in Luxembourg exceeded 10 million tonnes in 1992. In the other EU countries, inland shipping is a marginal activity. In the United Kingdom and Italy, only

Figure 1: Inland waterways transport  
Distribution of EU fleet in number of vessels, 1992



(1) 1990

Source: Eurostat: Transport Yearbook

domestic shipping takes place; in Greece, Portugal, Spain and Denmark, inland shipping is virtually non-existent.

When measuring transport activity of inland shipping in terms of tonne-kilometres, the ranking changes. Germany takes by far first position followed by the Netherlands. France ranks third and Belgium fourth. Although the Netherlands has a greater length of navigable waterways in use than Germany, these comprise mostly of canals, whereas Germany has substantial lengths of arterial navigable rivers in use (3 000 kilometres). Also, the majority of inland shipping activity is accounted for by goods transported on the Rhine (622 navigable kilometres in Germany). Nearly 300 million tonnes are transported annually on this main artery of inland transportation for the European continent. Hence, the combination of the traffic density on the Rhine and Germany's greater stretches of arterial waterways provide the higher tonne-kilometre result for Germany. The river is the most important connection between the large ports in the Le Havre-Hamburg range (e.g. Rotterdam and Antwerp) and the European hinterland.

National differences occur when looking at the distribution of goods transport by type of traffic. In some countries, such as France, domestic transport is overwhelming (about half of inland shipping is composed by national traffic). At the other extreme, about the totality of inland waterways transport in Luxembourg is represented by transit traffic. In the Netherlands, exports dominate inland waterway transport with about 45 % of inland shipping, whereas only 19 % is represented

Table 1: Inland waterways transport  
Total goods transport (1)

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	95 758	93 203	94 704	93 812	98 537	97 530	99 438	94 382	88 915
BR Deutschland	240 985	222 408	229 493	220 998	233 322	234 774	231 574	N/A	N/A
France	N/A	64 120	63 118	61 073	64 587	53 111	66 085	70 695	70 900
Luxembourg	N/A	9 698	9 507	8 817	11 463	11 390	10 847	10 707	10 895
Nederland	269 269	254 106	270 597	273 103	283 269	291 724	286 147	273 800	261 145
EU (2)	N/A	643 535	667 419	657 803	691 178	688 529	694 091	N/A	N/A

(1) Total of national traffic, dispatch to and received from foreign countries and transit.

(2) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat: Carriage of goods



**Table 2: Inland waterways transport  
Total goods transport (1)**

(million tonne-kms)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	5 853	5 016	5 156	5 055	5 367	5 237	5 389	5 177	5 018
BR Deutschland	51 435	48 183	52 186	49 703	52 855	54 041	54 804	N/A	N/A
France	N/A	8 395	7 765	7 476	7 335	6 088	7 582	8 347	8 631
Luxembourg	N/A	304	290	270	358	360	336	338	338
Nederland	33 479	32 736	34 544	33 877	35 643	36 251	35 662	34 755	33 530
EU (2)	N/A	94 634	99 941	96 381	101 558	101 977	103 773	N/A	N/A

(1) Total of national traffic, dispatch to and received from foreign countries and transit.

(2) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat: Carriage of goods

by imports. In Germany, the situation is reversed, with about 40 % of inland shipping due to imports and around 20 % is due to exports. In Belgium, imports represent close to half of total inland shipping and exports account for 27 % (measured in tonnes).

Most of inland waterways transport throughout Europe takes place within the EU. Transport to and from non-EU countries mainly relates to transport links with Switzerland (Rhine) and the East European countries along the Danube and the Elbe rivers.

Over the period 1987-92, the tonnage transported in the EU has been decreasing in the Netherlands and Belgium (-4.4 % and -5.2 % respectively), while increases were recorded in France (16.1 %) and Luxembourg (23.6 %). No figures are available for Germany.

## MARKET FORCES

### Demand

Inland shipping specialises in the transport of large quantities of bulk products, such as sand, ores, coal, chemicals, and oil. These are clearly divided into dry and liquid bulks. The larger volumes of goods transported are petroleum products (16 %), iron ore, iron and steel waste, etc. (13 %) and the largest group, crude and manufactured minerals, (33 %). In practically all countries, crude and manufactured minerals are the most important cargoes.

Over the years, demand growth in inland shipping had been fairly limited. In other types of transportation, such as road transport, growth rates of demand have been much higher. The major factor underlying this disparity in demand for inland waterway compared to other modes is that demand has been dominated by types of cargoes such as traditional bulk products used as inputs for traditional industries (e.g. refineries, steel industries, chemical plants), where growth rates of industrial activity have been either moderate or declining.

Another factor which has restricted over time demand for inland waterway transport services is undoubtedly the limited possibility of interconnections between national networks. This is mainly due to the limited capacity of some waterways: for example, 60 % of the French waterway network is accessible only to vessels of less than 400 tonnes.

The cost structures of these industries have supported the requirement for inexpensive transportation for bulk goods, where the transportation costs can sometimes exceed the raw material costs.

There has been a structural tendency to reduce the volumes of goods to be transported. This has been done by transferring the initial processing of raw materials to the origin. As a result, total tonnage of raw materials has declined and the tonnage of processed materials increased. However, this increase of semi-processed and processed cargo has not fully compensated for the decrease in raw materials.

Another problem on the demand side is that there is a tendency for monopsony power: demand is with a limited number of

**Table 3: Inland waterways transport  
Goods transport by type of traffic, 1992**

(%)		National traffic	Exports (3)	Imports (4)	Transit
Belgique/België	(1)	21.0	26.7	49.0	3.3
	(2)	28.8	21.5	42.3	7.4
BR Deutschland (5)	(1)	27.0	23.5	42.6	6.8
	(2)	25.7	19.3	39.0	15.9
France	(1)	44.1	23.7	16.6	15.6
	(2)	49.3	17.9	12.9	19.9
Luxembourg	(1)	0.1	7.4	11.9	80.6
	(2)	0.0	0.9	1.8	97.3
Nederland	(1)	25.4	43.9	18.4	12.3
	(2)	17.6	45.4	19.2	17.8

(1) Based on tonnes

(2) Based on tonne-kilometers

(3) Dispatch to foreign countries

(4) Received from foreign countries

(5) 1990

Source: Eurostat: Carriage of goods

**Table 4: Inland waterways transport  
National goods transport (1)**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	24 766	21 437	20 845	21 988	22 064	20 234	21 134	19 286	18 641
BR Deutschland	81 863	63 715	65 063	61 346	62 903	60 861	62 601	N/A	N/A
France	50 975	30 455	29 747	29 003	29 604	25 613	32 871	32 955	31 286
Luxembourg	0	0	23	20	20	31	40	55	14
Nederland	88 725	74 995	82 609	90 174	89 737	88 439	84 032	74 734	66 362
EU (2)	N/A	190 602	198 287	202 531	204 328	195 178	200 678	N/A	N/A

(1) Excluding transit

(2) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat. Carriage of goods

large industries, which are able to exchange information on the inland shipping market. In the Netherlands, for example, the transport of sand and gravel has been controlled by a cartel of sand and gravel traders and producers. Furthermore, some industries have arranged long-term transport contracts with shipping companies at guaranteed prices. In addition, some industries have their own vessels (own account shipping). They only need to employ additional (independent) vessels to meet peaks in their transport demand.

On the positive side, inland waterway transport can represent a valuable and environment-friendly alternative to road and rail transport, at least in countries where the network allows it. For example, the car factory Ford-Werke in Cologne has recently announced that about 70 % of the cars produced will be transported to distribution terminals by inland waterway ships.

Another tendency is that inland shipping has become important for the transportation of dangerous cargoes, such as highly poisonous or explosive chemical products. These substances require a high level of safety standards from the transporters.

### Supply and competition

Inland shipping is capable of meeting the industry's requirements for bulk transportation which is cheap, energy-efficient, safe and reliable. A key advantage offered by inland waterways in comparison to other modes of transport is the relatively low burden for the environment since the energy use per tonne is very low. From a cost perspective, inland waterways transport is also advantageous: by way of example, in 1989 in Germany the cost of transporting one tonne per kilometre has been calculated at 3.3 pfennig for inland waterways, compared to 12.3 pfennig for railways and 23.3 pfennig for road transport.

The EU inland waterways fleet is dominated by the Netherlands in terms of both number of vessels and carrying capacity. In 1992, Dutch vessels accounted for more than half of ships

in the EU, followed by Germany with about one fifth of the total. The same figures are roughly applicable to the two countries in terms of carrying capacity.

The fleet is characterised by the existence of a large number of private owners mostly operating only one vessel, often with the owner's family living on board. These ships are generally old and of small size, and are not demolished as the owners operate at or below economic cost prices, accepting very little or even negative returns (hence the strong social aspect characterising the activity). Large shipping companies exploiting fleets of 20 to 100 vessels mainly operate on the Rhine and its branches.

The existence of small family-owned vessels which have not yet been scrapped and the introduction of modern large sized vessels has caused a structural imbalance between supply and demand. Overcapacity, therefore, has become a structural phenomenon in inland shipping. During the 1980s, overcapacity was estimated at some 20 % of the EU fleet.

Overcapacity has been blamed for its negative impact on the evolution of prices on the free market. Price regulating and cargo sharing systems were introduced, basically to guarantee ship owners a minimum income.

### Impact of the Single Market

The Rhine market, which represents about 75-80% of total inland waterways transport in the EU, was deregulated more than century before the completion of the Single Market. As a result, the Internal Market programme could only have little incidence on a sector which was already largely competitive. One of the few measures which had a noticeable impact is the suppression of border controls. On the other hand, the recent liberalisation of cabotage has not added much to existing competitive pressures. In the long run, the EU environmental policy is an aspect of the Internal Market which could seriously modify the sector's prospects. From an environmental standpoint, inland waterways constitute the safest transport mode

**Table 5: Inland waterways transport  
Dispatch of goods to foreign countries**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	27 751	28 662	30 638	28 540	28 152	27 809	28 483	27 156	23 789
BR Deutschland	52 831	47 742	49 413	50 567	54 981	58 312	54 425	N/A	N/A
France	21 293	18 566	17 769	17 277	19 477	14 389	18 537	16 156	16 806
Luxembourg	1 031	787	796	797	909	990	952	874	802
Nederland	103 085	105 146	109 311	105 354	110 549	116 397	116 890	118 341	114 589
EU (1)	205 991	200 903	207 927	202 535	214 068	217 897	219 287	N/A	N/A

(1) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat. Carriage of goods



for freight. However, inter-modal competition remains seriously distorted by the fact that environmental aspects are not reflected in modal costs. The competitiveness of inland waterways transport would therefore strongly benefit from measures aiming at a better internalisation of environmental costs.

## REGULATIONS

The action of the EU institutions in the field of inland waterway transport has been characterised by two main aims: the liberalisation of the sector and the reduction of overcapacity.

It is important to stress that a large part of EU legislation in the sector of inland waterways is not applied in countries with a closed canal network, i.e. that is not connected to other EU Member States.

Concerning liberalisation, the first relevant legislative measure taken at EU level has been the Council Regulation (EEC) 3921/91 of 16 December 1991 on inland waterway cabotage. From 1 January 1993 onwards, companies from one EU Member State can carry out national and international inland waterway transport operations in any other Member State. France and Germany were allowed some restrictions on cabotage until 1 January 1995.

In June 1994 the Commission presented to the Transport Council a report on the organisation of the inland waterway market, focusing in particular on the so-called "tour-de-rôle" (in-turn) tariff and charter system.

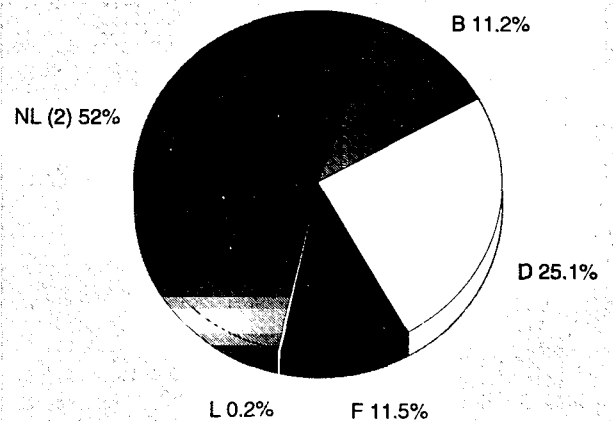
Under this system, carriers inscribe themselves in special "availability lists". According to their rank in the list, carriers can choose to undertake a transport service among those which are put on offer and for which they fulfil the requirements. In case of no choice by the carrier, their place in the list does not get lost. The "tour-de-rôle" guarantees minimum revenue to vessel-owners, and at the same time clearly hampers competition in the sector and reduces the commercial freedom of clients of the service.

The "tour-de-rôle" system is used in Belgium, France and the Netherlands, and affects altogether about 11 % of total cargo in the EU. However, its incidence is far greater at national level: it is estimated that this system affects about 50 % of total cargo in Belgium, 31 % in France and 18 % in the Netherlands.

On the other hand, the Rhine market which represents about three quarters of total inland waterway traffic in the EU is free. The Act of Mannheim of 1868 guarantees free shipping on the Rhine and its arteries for all ships with flags belonging to countries signatory to the Act (Germany, France, the Netherlands, Switzerland, Belgium, and the United Kingdom).

France already aims at abolishing the system after a six years' transition period. On its part, the EU Commission proposes to gradually make the system more flexible by exempting

**Figure 2: Inland waterways transport**  
**Distribution of EU fleet in carrying capacity, 1992 (1)**



(1) Based on tonnes

(2) 1990

Source: Eurostat: Transport Yearbook

certain goods, increasing the possibility to conclude free contracts and by abolishing the obligation to use this system.

To remedy overcapacity problems, Council Regulation (EEC) No. 1101/89 of 27 April 1989 (subsequently amended by Regulations (EEC) 3690/92 and (EEC) 3433/93) was introduced to implement structural improvements in inland waterways transport. It created two set of measures:

- the granting of premiums to reduce the capacity of the active inland waterways fleet; and
- curbs on investment in extra vessels in the course of the co-ordinated scrapping scheme.

The main elements of the EU scrapping scheme for inland waterways are:

- Member States whose tonnage of inland fleet exceeds 100 000 tonnes have each set up a scrapping fund. Vessels from other Member States that operate on the shared network have to adhere to one of these scrapping schemes.
- The total active fleet registered and operating in the Member States is subject to the scrapping scheme. There are a limited number of detailed exceptions.
- New tonnage is only allowed on one of two conditions: (a) equivalent old tonnage is scrapped to match the new tonnage; or (b) a premium is required equivalent to the

**Table 6: Inland waterways transport**  
**Goods received from foreign countries**

(thousand tonnes)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	38 947	39 340	39 823	40 428	45 182	46 629	46 670	44 948	43 539
BR Deutschland	92 339	98 944	100 770	95 635	100 680	100 311	98 764	N/A	N/A
France	12 209	10 332	10 971	10 688	11 259	10 298	12 155	12 043	11 768
Luxembourg	953	974	1 202	1 105	1 244	1 034	1 140	983	1 296
Nederland	49 303	44 261	46 195	45 143	49 246	54 655	52 862	49 408	47 971
EU (1)	193 751	193 851	198 961	192 999	207 611	212 927	211 591	N/A	N/A

(1) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat: Carriage of goods



**Table 7: Inland waterways transport  
EU fleet in number of vessels and carrying capacity**

	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Number of goods-carrying ships (units)</b>									
Belgique/België	3 001	2 513	2 372	2 214	2 168	2 151	1 778	1 639	1 604
BR Deutschland	3 812	3 143	3 103	3 063	2 989	2 990	2 723	2 574	3 282
France	5 224	4 729	4 599	4 565	3 845	3 673	3 292	2 813	2 663
Luxembourg	18	17	18	19	24	24	25	26	28
Nederland	13 431	10 896	10 965	10 842	10 403	10 086	9 555	N/A	N/A
EU (1)	25 486	21 298	21 057	20 703	19 429	18 924	17 373	N/A	N/A
<b>Carrying capacity (thousand tonnes)</b>									
Belgique/België	1 844	1 729	1 715	1 648	1 649	1 680	1 523	1 465	1 475
BR Deutschland	3 672	3 277	3 265	3 250	3 194	3 268	3 056	2 956	3 329
France	2 537	2 308	2 229	2 092	1 915	1 844	1 652	1 535	1 514
Luxembourg	12	11	11	15	22	28	29	25	28
Nederland	6 361	6 572	6 697	6 766	6 871	7 036	6 865	N/A	N/A
EU (1)	14 426	13 897	13 917	13 771	13 651	13 856	13 125	N/A	N/A

(1) Including countries with international or transit traffic of more than million tonnes in 1992.

Source: Eurostat: Transport Yearbook

scrapping premium for the type of vessel brought into operation, which is paid into the scrapping fund.

- Vessel owners paid annual contributions to the scrapping fund based on the tonnage and types of their vessels. Governments have provided interest free loans to the scrapping funds, repayable over a number of years. Transfers between "rich" and "poor" scrapping funds ensure that amortisation periods in all states are identical.

Scrapping activity in 1990-1992 took more than 2 000 dry cargo vessels out of the fleet with a carrying capacity of 1.1 million tonnes; additionally, 260 tanker vessels with a carrying capacity of 260 000 tonnes and 30 000 kilowatts of push boat capacity were removed. Total expenditure to achieve this is estimated to have reached 104 million ECU. The scrapping scheme has achieved a measure of stability between demand and supply, and has been extended beyond the original five years life for another five years. Recently, the conditions for bringing new vessels into operation have been made stricter: shipowners now have to scrap (or to pay for the scrapping of) 1.5 tonnes for each new tonne of new capacity they put into service.

The European Commission has also been active on the front of the harmonisation of criteria for issuing boatmaster certificates. A proposal of directive concerning this issue has been presented to the Council on 8 September 1994.

## THE NETWORK

The network for inland waterway transport in the EU extends itself for about 17 000 km, of which however only about the half can be used by vessels of more than 1 000 tons. Moreover, the connections between different national networks is very limited.

In effect, the so-called EU inland waterway network only includes the rivers and canals of Germany, the Netherlands, France, Belgium and Luxembourg. In the remaining Member States, infrastructure for waterway transport is either absent / insufficient (e.g. the United Kingdom) or disconnected from the European network (e.g. Italy and Spain).

Four major axis can be identified in the European inland waterway network:

First comes the Rhine, being navigable over a distance of 887 km from Basle in Switzerland to the North Sea at Rotterdam. This is the true backbone of the EU waterway system.

Furthermore, a coherent network has been created by waterways navigable for units with a loading capacity from 1 350 to 10 000 tonnes (pushed convoys on the Rhine and certain other sections) which covers most of Germany, the Netherlands, Belgium, Luxembourg and the northern and eastern frontier zones of France.

This network has been recently extended to Eastern Europe thanks to the opening of the Rhine-Main-Danube Canal, the second major inland waterway axis. Since its opening in 1992, this canal has exceeded initial expectations on volumes, and reached 4.2 million tonnes of cargo in its first year of operation.

The third major axis is known as East-West, and is formed by the rivers Elbe, Weser and Ems. Together with other canals such as the Mittelland canal, the axis basically unites some Northern regions of Germany with the new Länder. The Dutch government has recently expressed interest in the construction of the Twente-Mittelland canal, which would greatly improve inland waterway communications between Germany and the Netherlands, by avoiding vessels a diversion via the Rhine and the Weser-Datteln and Dortmund-Ems canals. On the other side, the German government has announced a programme to finance the restructuring of the Berlin-Spandau canal to improve inland waterway transport to and from the city of Berlin.

The fourth major axis is called North-South and serves the regions of Belgium, the Netherlands and France which are not connected to the Rhine. The main rivers of this axis are the Meuse, the Schelde, the Lys and the Sambre.

Although no major bottlenecks exist, investments in new infrastructure continue to be necessary. Increasing ship size requires enlargement of locks and canals, the deepening of waterways and adaptation of inland water ports. Modern navigation facilities are also needed along the waterways.

## OUTLOOK

Demand for inland waterway transport is likely to maintain an upward trend at moderate growth rates. In view of economic integration, transport demand among Member States will increase in terms of both volume and distance to the benefit also of inland waterways. In the field of hazardous goods transport and unitised cargoes, inland waterways are likely to gain.

The developments in Eastern Europe will affect traffic in two ways. Firstly, positive developments will emanate from Ger-



man unification and the opening up of the Eastern European economies. New market opportunities and intensifying trade will occur, but in the short term these effects will be limited. Secondly, negative developments may occur as fleets from East European countries enter West European markets, especially via the Rhine-Main-Danube canal. There is evidence that the low-priced Polish operators have almost driven out German competition on the Polish-German trades. In this case the German Transport Ministry has been negotiating with Poland to seek a 50:50 cargo share with minimum freight rates, and recently introduced a licensing system to enforce the agreement.

Concerning capacity, the EU scrapping system is likely to continue its initial successes. Together with the present trends in demand, equilibrium between demand and supply will be closer to realisation.

Written by: DRI Europe

# Shipping

## NACE 74

The EU shipping industry is moving into a stage of advanced maturity, where the number of players will be dominated by increasing concentration in the top ranks, supported by a number of small niche players in specialised trades. Expectations are for the largest companies to continue to expand by acquisition and alliances, with fewer operators around by the end of the century. In the global liner industry, an EU company has remained in top position, while the EU liner industry gains an addition position in the top twenty ranking. The gradual recovery of some of the major trading power houses and developments within the EU will contribute to further improvements of trade, although the impact on the EU shipping industry is potentially mixed. Developments within the EU concern further deregulation of the EU shipping market and the effects of a shipping policy aimed at achieving an efficient and competitive EU shipping industry. European liner companies are increasingly becoming multi-modal operators and expanding distribution networks via purchases or alliances to meet customer requirements for inter-modal transport and value added services. The tanker and dry bulk fleets are continuing to be dominated by older tonnage and will have to undergo significant renewal in the 1990s if scrapping accelerates. The EU cruise industry is growing and looks to expand significantly over the next few years as real disposable incomes increase.

### INDUSTRY PROFILE

#### Description of the sector

The sector includes units exclusively or primarily engaged in the transportation of passengers and goods in sea-going and coastal vessels and units engaged in the operation of sea-going tugs. Deep-sea transport refers to shipping on long sea routes; and, coastal shipping or short-sea shipping refers to the conveyance of passengers and goods between national or European ports, including those on the Black Sea, the Mediterranean and Moroccan Atlantic.

Within the merchant shipping industry, cargo is usually analysed in sectors, which are dry bulk, tanker (also known as liquid bulk) and liner (typically scheduled services with consolidated cargo from many shippers). These sectors are further subdivided: dry into major dry bulks, such as grain, and minor dry bulks, such as bauxite; tanker into crude and products

(or dirty and clean) and gas carriers; and, liner into container and non-container (or general cargo). Usually tanker and dry bulk is dominated by tramp (non-scheduled) services. There are also specialised vessels that do not necessarily fit into any of these categories, such as refrigerated ships, forest product carriers, car carriers, steel product carriers and combination carriers. The situation is further complicated by non-standard operations. For example, it is possible to have a tramp operator moving containers, or a scheduled operator moving bulk coal, and some vessels can be used for conveying more than one commodity type, such as a gas carrier used for 'clean' oil products.

#### Recent trends

Growth rates derived from Table 2 indicate that, during the period 1986 and 1992, world seaborne trade achieved an average annual growth rate of 4.7 % in tonne-miles; however, the growth rate decelerated over the last three years to average 3.3 %. The various sectors of seaborne trade have shown similar development patterns over 1986 to 1992, although their pace of development varied widely. During this period, most of the sectors averaged rates of around 4 % per year; the two exceptions being iron ore (averaging only 2.1 %) and crude oil (7.3 %). The picture for the sectors' rates of growth for the period 1990-92 was not so rosy, with both iron ore (-2.2 %) and oil products (-0.6 %) recording declines but, despite a slowdown in its development, crude oil managed to maintain strong growth at 6.3 %.

#### Dry bulk and tanker

The dry bulk and tanker sectors form the largest part of seaborne trade in volume terms. In 1992, liquid bulk's (crude and products) share was 47 %; and the three main dry bulk commodities (coal, grain and iron ore) accounted for 27.5 %. Thus, the three major dry bulks and the tanker sectors account for almost three quarters of world trade in tonne-miles. In terms of tonnes, SS&Y Research estimates that total dry bulk trade in grain, coal and ore declined by 1.3 % in 1993. Estimates put about one-fifth of the world's bulk traffic (in tonnes) as originating from or arriving in Europe during 1993 and the overwhelming portion of these flows (94 %) were inbound.

The iron ore trade depends predominately on the steel industry, and to a lesser extent so does the coal trade. In 1993 world steel production trade rose by a modest 0.4 %; its first increase in four years. Surprisingly, the growth in 1993 was not from the traditional countries of Japan or the EU but was realised due to import growth from PR China and South Korea. It is expected that PR China will remain the leading generator of import growth for the iron ore trade until the end of the 1990s. As a result of the increased import demand from the PR China the EU saw a minimal increase of 0.2 % in its crude steel production. However, within the EU there were significant changes among individual producers of crude steel. Germany experienced a 5.3 % decline in production, while Italy, Spain and the United Kingdom all increased production in 1993. This had concomitant effects on iron ore shipments. Estimates for iron ore trade in the EU indicate a 7.4 % decline in 1993. Imports of iron ore from Australia, one of the EU's main external suppliers of iron ore by sea, reported a 15 % decline in trade with the EU for 1993.

The seaborne coal trade experienced a substantial reduction in volume for 1993, declining by 6 % from 1992. The reason for the decline is due to the substantial decrease in demand from the EU. EU production decreased by 16 % and its share of coal imports likewise declined by 18 %. However, for the dry bulk trade as a whole, DRI's Industry Consulting Group indicates that 1994 will provide a modest upturn, primarily from continued demand in the Far Eastern and Japanese markets.

**Table 1: Shipping**  
Main indicators, 1991

	Number of enterprises	Turnover (million ECU)
Belgique/België	188	2002
Danmark	469	3138
BR Deutschland (3)	570	1226
Hellas (1)	(4) 446	N/A
France	147	4259
Italia (2)	273	2713
Nederland	447	2318

(1) 1988

(2) 1989

(3) 1990

(4) Number of local units

Source: Eurostat; Mercure



**Table 2: Shipping**  
Number of persons employed, end-1993 (1)

	Nationals	Non nationals	Total
Belgique/België	1 437	548	1 985
Danmark	10 000	2 100	12 100
BR Deutschland	11 759	4 347	16 106
Hellas (2)	23 516	8 390	31 906
España	6 077	N/A	N/A
France	9 500	900	10 400
Ireland (2)	1 259	322	1 581
Italia	23 818	2 300	26 118
Nederland	6 514	3 166	9 680
United Kingdom	13 967	2 798	16 765

(1) Seafarers on board EU flag vessels

(2) 1992

Source: National Shipowners Associations

Grain trades (wheat and coarse grain) decreased by about 8 % in 1993-94 (grain years are reported July to June) reaching their lowest level since 1986. Of the five primary exporters of grain (US, Canada, Australia, Argentina and EU), only Australia had an increase for the period. Total grain trade exports increased in Australia by 24.0 % while declining in the US (17.4 %), Canada (6.9 %), Argentina (11.1 %) and the EU (15.0 %).

Intermediate dry bulks (bauxite, alumina and phosphate rock) have had mixed fortunes over the last few years. In 1993 overall aluminium production rose by 1.4 % while in the EU production continued its five year downward trend with volumes falling by 2.5 % in 1993. The major factors causing this decline in production are aluminium production has been shifting to low price energy producing countries and low-priced imports from the CIS and Eastern Europe, which the European Commission has countered by imposing limits on these imports. The downward trend of phosphate rock imports into the EU also continued for 1993. On the other hand, alumina production increased by 4.1 % on the year.

Minor bulks, amongst which are steel products, pig iron, ferrous scrap, fertilisers (sulphur and potash), agricultural products (soya, rice and sugar), coke and cement, have experienced mixed results in trade for 1993. EU imports of third-country steel products rose by only 4.2 % in 1993 to approximately 12.5 million tonnes, while exports are estimated to have increased, according to the European Commission, some 40 % to around 26.5 million tonnes. This trade has been dominated by various trade disputes, the most important of which is the anti-dumping duties imposed by the US, which threaten some 1 million tonnes of EU exports. However, as of mid-1993

the threat has been removed with the US International Trade Commission's dismissal of the majority of the disputes. The latest data (through 1992) for pig iron indicates that world imports have fallen by almost 45 % since 1990. Preliminary estimates for pig iron in 1993 do, however, reveal a gradual improvement in trade as Japanese and South Korean imports increase. Total world ferrous scrap imports increased by 10.2 % in 1992 with the EU representing approximately 56 % of the trade. The EU trade of fertilisers (dominated by imports) continued to decline in 1993 as demand remained low. As a result, both sulphur and potash imports into the EU declined. Total world trade in soya beans for 1993/94 declined by 3 % over the period; primarily due to floods in the US, the world's main exporter. However, the US floods presented an opportunity for both Brazil and Argentina to release their extra supplies of soya for export. EU imports in soya bean trade for 1993/94 are expected to be 14.2 million tonnes representing roughly 50 % of the world soya trade of 28.6 million tonnes. However, current growth in the soya import trade is essentially coming from Asia. The global sugar trade experienced a dramatic decline of 13 % in 1993 mainly due to a 39 % reduction in Cuban exports. Western Europe imports of coke declined by 6 % in 1993 emphasising the weakness of its steel industry. Luxembourg, the United Kingdom and France were the only countries to show marginal increases of coke imports for the period. Finally, imports to Europe of petroleum coke increased strongly in 1993 (20 %) following a decline in 1992, with the majority of the demand coming from Italy, Belgium, Spain and the Netherlands.

In the tanker trades, EU imports of crude oil products remained stable in comparison to 1992 levels, averaging 10.0 million

**Table 3: Shipping**  
Development of world seaborne trade

(tonne-miles)	1986	1987	1988	1989	1990	1991	(1) 1992
Crude oil	4 640	4 671	5 065	5 736	6 261	6 757	7 070
Oil products	1 265	1 345	1 445	1 540	1 560	1 530	1 540
Iron ore	1 671	1 728	1 919	1 983	1 978	2 008	1 890
Coal	1 586	1 653	1 719	1 798	1 849	1 999	2 000
Grain	914	1 061	1 117	1 095	1 073	1 069	1 130
Other goods	3 780	3 840	4 040	4 250	4 400	4 510	4 650
Total	13 856	14 298	15 305	16 402	17 121	17 873	18 280

(1) Estimate

Source: Fearnleys Review

**Table 4: Shipping**  
Average yearly rate of change of tonne-miles in seaborne trade

(%)	1986-1991	1989-1991	1987-1992	1990-1992
- Crude oil	7.0	6.5	8.6	6.3
- Oil products	3.5	-1.3	2.7	-0.6
Total oil products	6.3	4.9	7.4	4.9
- Iron ore	3.3	-0.5	1.4	-2.2
- Coal	3.8	3.0	4.3	4.0
- Grain	2.0	-3.9	1.3	2.6
Total main bulk products	3.2	(1) 0.0	2.5	1.2
Other goods	3.6	3.0	3.9	2.8
Total seaborne trade	4.7	3.0	5.0	3.3

(1) Less than 0.05%

Source: Feamleys Review 1992

barrels per day while products declined by 0.1 % mb/d to 3.4 mb/d in 1993. The major crude oil tanker trades were in general positive, with the Arabian Gulf States supplying 13.41 mb/d, Africa declining slightly to 2.54 mb/d, while the North Sea and Russian supplies also increased to 3.33 and 1.65 mb/d respectively. The largest portion of total EU imports of products is intra-EU trade (2.75 mb/d in 1993). However, total products imports recorded a decline of 1.9 % in 1993 as EU refinery capacity utilisation continued to be high (a trend caused by the Gulf War) as imported crudes were refined within the Community. ]

In the gas carrier segment, the major sources of LNG for the EU are Algeria and Libya to the EU. In 1992, Algeria's exports of LNG to the EU are estimated to have been almost 14 million tonnes, the major importers (in quantity) being France, Belgium, Spain and Italy. Libya exported 1.23 million tonnes to its major trading EU LNG trading partner Spain in 1992. The EU is the second largest importer of LPG after Japan, followed closely by South Korea. Total LPG exports for 1993 were 35 million tonnes. Extra-EU imports of LPG are estimated to have dropped by some 15 % in 1992, reflecting increased intra-EU trade.

#### Liner trades

The liner trades are dominated by movements of goods in containers. An analysis of the container trades is an excellent indicator for overall liner trades, with the proviso that there is a trend in the industry to move more liner-propensive commodities into container. Hence, although liner trades are already dominated by containers, container penetration is increasing. In 1993, the total volume moved in containers on the major trades increased by 3.1 % twenty-foot equivalent units.

The growth in demand for liner shipping averaged around 9 percent in 1980 to 1985, slipping slightly to around 6 % in 1985 to 1990, and around 4.7 % on average in the last three years. In recent years, the major growth has been in the intra-Asian market which now accounts for over 12 % of world trade. Deep-sea liner trade into Northern Europe grew by about 4 % in 1992, and declined by 4.4 % in 1993. On out-bound trade, growth in 1992 was fairly strong at 4 % and for 1993 growth was maintained at 3.8 %. The inbound liner trades for Southern Europe steadily increased up to 1992 but in 1993 inbound trade declined by 6 %. The outbound liner trades have maintained growth with an increase of 10 % in 1993.

#### Cruise shipping

Cruise shipping has grown considerably in the last ten years, predominately fuelled by the demand in the United States. However, growth is also expanding in Europe, albeit at a

slower pace, with more cruises available to places previously difficult to enter - for instance the territorial waters of the Warsaw Pact.

## MARKET FORCES

### Demand

In general terms, both manufacturers and retailers need a reliable and continuous flow of products at a reasonable price. Regarding major bulk commodities, which are inputs in the oil refineries (crude oil), the iron and steel industry (iron ore, coal and petroleum coke) and electric power plants (steam coal), the customers are largely in control of the flows to secure their regular supplies. They operate on a global scale.

For general and containerised cargo, customers are moving increasingly toward a global strategy, particularly with just-in-time inventory control, and global purchasing options that mean that purchase can be made from suppliers providing the lowest unit cost for similar goods. Additionally, there is increasing pressure from shippers on the shipping companies as these customers require door-to-door delivery at prices usually associated with port-to-port deliveries. Shippers are under significant pressure to reduce costs and improve time-to-market product delivery, hence it is becoming much more important for shipping companies to provide responsive, flexible, cost efficient and dependable services.

### Supply and competition

The shipping industry is very fragmented, ranging from major diversified shipping companies with liner, dry bulk and tanker operations and hundreds of vessels to one-vessel captain-owners. There are large producers who carry their own cargoes, for instance in the banana and car trades, and there are owners specialised in bulk shipping or solely in the rental or leasing of ships.

### Short sea trades

The European short-sea trades, including the intra-EU seaborne trade, still have the characteristics of regional markets. Mediterranean trade comprises largely national traffic (own-national flagged vessels) and international traffic between the Mediterranean and North African countries. Therefore, in these trades there is imperfect competition. By contrast, in and around the North Sea, there is fierce competition between short-sea carriers due to open trade to all flags. Germany, the Netherlands and Denmark dominate the international short-sea trades.

Short-sea owners dominate specialised trades under European flags because many owners of larger vessels have opted out of the trade under these flags. Specialised trades include chemical vessels, liquid-gas tankers, reefer trade, car carriers, the

**Table 5: Shipping**  
**Development of the world fleet by type of vessel (1)**

	1987	1990	1992	1993	1994
<b>Number of ships (units)</b>					
Oil tankers	5 723	5 753	6 035	6 137	6 309
Other tankers	1 629	1 693	1 896	2 004	2 122
Total tankers	7 352	7 446	7 931	8 141	8 431
Bulk/OBO carriers	4 967	4 915	5 043	4 952	4 873
Container vessels	1 027	1 147	1 273	1 339	1 387
General cargo vessels	18 108	16 899	17 165	17 313	17 357
Passenger vessels/ferries	2 614	2 785	2 918	2 998	3 110
Total fleet	34 068	33 192	34 330	34 743	35 138
<b>Carrying capacity (thousand DWT)</b>					
Oil tankers	240 744	248 483	263 482	267 491	273 668
Other tankers	16 489	16 391	18 729	19 651	20 758
Total tankers	257 233	264 874	282 211	287 142	294 426
Bulk/OBO carriers	223 185	228 601	240 590	237 423	238 432
Container vessels	21 105	25 026	29 595	31 578	33 964
General cargo vessels	108 174	100 621	101 741	102 430	103 721
Passenger vessels/ferries	3 445	3 621	3 875	3 980	4 193
Total fleet	613 142	622 743	658 012	662 553	674 736
<b>Carrying capacity (thousand TEU)</b>					
Bulk/OBO carriers	323	393	413	391	341
Container vessels	1 142	1 435	1 734	1 875	2 042
General cargo vessels	1 032	1 125	1 240	1 342	1 447
Passenger vessels/ferries	9	14	16	17	19
Total fleet	2 506	2 967	3 403	3 626	3 849

(1) Ships of 300 gt/grt and over, 1st of January.  
Source: ISL Bremen

carriage of heavy lifts, and chartered containers. Markets for liquid-gas and reefer trades are much less volatile than those for tankers and bulk carriers, because owners either charter their vessels to the traders or join freight pools.

#### Deep sea trades

Regarding general cargo North-South trades with developing countries (particularly those in Africa and Latin America), conference trade has often been divided in accordance with the 40:40:20 formula of the UNCTAD Code. According to the formula the two national carriers in the trade each have a 40 % share with the remaining 20 % divided among cross traders. The UNCTAD Code applies to conference cargoes only, but some developing countries are attempting to bring their whole liner trade within the scope of the Code. This would enable them to regulate the share of non-conference lines, generally referred to as outsiders. As far as the EU is concerned, the shares obtained by EU lines within a conference on the basis of the UNCTAD code are redistributed on the terms of Regulation no 954/79, the 'so-called' Brussels package.

Many liner companies, both conference members and outsiders, are operating on the principal East-West routes. Although the world's largest container operators are involved on this routes, trade market shares of more than 10 % are rarely achieved. Most of the shares are in the range of 2 % to 9 %. Furthermore, in the relevant North-South trade, the shares vary from 10 % to 20 %. Consequently, no single liner company dominates the trade. It is a very competitive market which is enhanced by the prevailing excess capacity in the liner industry.

To cope with the fierce competition as well as to meet the ever increasing needs of the clients, some carriers are aiming at providing global operations. The creation of the Single EU Market has further encouraged the concept of globalisation

as a spur for greater penetration. Globalisation involves "one-stop shopping" (i.e. door-to-door transport) and "no sweat arrangements". One-stop shopping refers to geographical coverage of the transport service; and, no sweat arrangements refer to the so-called value added services (i.e. integrated transport and ancillary services).

#### Fleet and capacity developments

A comparison of fleets by vessel types to carrying capacity reveals differences in growth. Between 1990 and 1993 the average world development of crude and product dedicated tankers increased by 8.4 % in dead-weight (DWT) and 9.3 % in numbers of vessels. For dry bulk products, the dry bulk and combination carrier fleet averaged a 3.9 % increase in DWT and only a 0.7 % increase in the number of vessels. The relative increase in the capacity of the dry bulk fleet has put substantial downward pressure on freight rates in 1993. Indications for 1994 are for a positive improvement in these rates, but they are still below the levels of 1991. The rates in the liner trade have also been under pressure from excess capacity. The rapid increase in container capacity in relation to the development of "other commodities" has enhanced rather than relieved the pressure on the rates. Excess capacity is expected to continue in the liner industry with no let up in container over-capacity. The liner fleet is relatively young and active, so there are no extensive scrapping programmes. Although the older liner vessels are considered too small and inefficient for the main east/west arterial trades, they are useful in feeder trades and in supporting secondary services, thus there has not been a significant withdrawal from the market.

Between 1990 and the 1993, the number of vessels over 300 grt in the world's merchant fleet increased by 1551 vessels, or a 4.7 % increase in growth. However, the relative growth of carrying capacity (DWT) and container capacity (TEU) was higher. In particular, the growth of container capacity

**Table 6: Shipping**  
**Development of the EU fleet in world perspective (1)**

	1987	1990	1991	1992	1993	1994
<b>Number of ships (units)</b>						
World	34 068	33 192	33 964	34 330	34 743	35 158
OECD (2)	13 589	12 282	12 485	12 436	12 079	11 689
EU (2)	6 606	5 414	5 421	5 391	5 121	4 956
USA	819	544	531	514	502	443
Japan	4 062	3 844	3 825	3 833	3 792	3 634
Other (3)	6 942	7 045	7 015	7 345	7 731	7 970
Rest of the world (4)	13 537	13 865	14 464	14 549	14 933	15 499
<b>Carrying capacity (thousand DWT)</b>						
World	613 142	622 743	642 651	658 012	662 553	674 736
OECD (2)	217 722	198 205	213 485	212 547	205 564	204 618
EU (2)	111 755	91 657	94 499	94 805	93 826	96 856
USA	24 537	22 365	23 571	23 668	22 435	22 435
Japan	55 488	39 915	38 796	36 968	36 336	36 336
Other (3)	202 321	220 183	220 743	237 981	248 639	254 933
Rest of the world (4)	193 099	204 355	208 420	207 484	208 350	215 185
<b>Carrying capacity (thousand TEU)</b>						
World	2 506	2 967	3 129	3 409	3 626	3 849
OECD (2)	1 205	1 180	1 286	1 360	1 376	1 401
EU (2)	753	726	788	848	860	887
USA	208	222	227	233	234	234
Japan	125	82	85	93	88	87
Other (3)	494	700	720	849	950	1 087
Rest of the world (4)	807	1 087	1 120	1 194	1 300	1 301

(1) Ships of 300 gt/grt and over, 1st of January.

(2) Including former DDR

(3) Includes open registry

(4) Other except OECD countries and open registry

Source: ISL Bremen

was quite significant, averaging 6.3 % per year. During the past two years, the development of both the world fleet and capacity have accelerated and although their development varied considerably, the container fleet increased fastest.

In 1993, the world container fleet stood at 8.1 million TEU, of which 4.4 million was owned by the carriers and 3.6 million by container lessors. Container production in 1993 was down 17.4 % to 950 million from 1.15 million TEUs in 1992. Companies adopted an expansive approach as they ordered significant numbers of containers in early 1992 in anticipation of accelerating demand for trade in containerised commodities. In 1993 the owned carriers added more capacity (13.2 %) in comparison to leased capacity (11.5 %). This was a significant reversal from 1992 where leased capacity increased by 20.5 % and owned capacity increased by only 13.7 %. The slowdown in container demand has forced price reductions in some container types, with dry containers averaging a 7 % drop in prices.

EU fleet development has not kept pace with the world fleet. Unlike the world fleet, the number of vessels with EU Member State flag decreased by almost 300 vessels over the period from 1990 to 1993 a 5.7 % decline; although the capacity in DWTs has increased marginally by 2.4 %. However the USA and Japan have also faced declines in their merchant fleet over this period. For example, in the USA, the number of ships declined by 8.4 %, while container capacity increased only marginally by 0.3 %. Contrary to developments in the EU, the USA and Japan, the "other" countries (open registry) flag categories showed significant growth in both their fleets (8.9 %) and their fleet capacity (11.4 %). Part of the explanation for these figures is the move of some EU carriers to flag out their vessels in order to reduce costs.

With the exception of Denmark, France, Luxembourg and the Netherlands the merchant fleet of all Member States declined over the period 1990 to 1993. The substantial increases in the Danish and Luxembourg fleets are due largely to formation of a second Danish register - the Danish International Register (DIS) - and the introduction of the Luxembourg register that have allowed cost-effective movements from other flags into these registers. In particular, Belgium's fleet declined substantially (67 %) as most of its private fleet was transferred to Luxembourg. Other countries facing considerable reduction in their fleets were Spain (31.7 %) and the United Kingdom (28.4 %). Only two countries, Spain and the United Kingdom, had a decline in their container capacity (TEU) for the period 1990 to 1993. In the remaining Member States, container capacity (TEU) increased substantially in Denmark (34 %), the Netherlands (29.1 %) and Portugal (35.3 %). However, aggregate container capacity in the EU registered fleet increased from 1990 to 1993 by roughly 2100 thousand DWTs.

In 1993, Greece had the largest share in the EU fleet, 27.5 % of the vessels and 49.4 % of the DWT, due to the large number of bulkers and tankers owned and operated by Greek concerns. Greece is followed at some distance by Italy with 15.4 % of the vessels but only 10.8 % of DWT, due to a large number of smaller vessels on their registry. The differences in the fleet structure of the Member States are clearly presented in Table 7. More than half of the fleet in Luxembourg and Greece is comprised of tankers and bulk carriers; in contrast to Denmark, Germany, Spain, Ireland, the Netherlands and Portugal where general cargo and container vessels account for more than half of their respective fleets. For the EU as a whole and Japan, general cargo vessels hold the greater share. In the USA, tankers are the main vessel type.

**Table 7: Shipping**  
**Development of the EU fleet by Member State (1)**

	1990	1991	1992	1993	1994
<b>Number of ships (units)</b>					
Belgique/België	82	80	31	27	23
Danmark	435	466	494	499	511
BR Deutschland	843	850	832	720	650
Hellas	1 417	1 398	1 423	1 407	1 451
España	424	399	368	322	257
France	207	202	199	210	219
Ireland	63	66	67	62	62
Italia	814	850	828	791	736
Luxembourg	2	1	48	52	48
Nederland	484	495	518	515	497
Portugal	70	78	75	69	79
United Kingdom	574	536	508	447	423
<b>EU</b>	<b>5 415</b>	<b>5 421</b>	<b>5 391</b>	<b>5 121</b>	<b>4 956</b>
<b>Carrying capacity (thousand DWT)</b>					
Belgique/België	3 017	2 931	50	47	37
Danmark	6 890	7 390	7 868	6 739	6 917
BR Deutschland	6 400	6 771	6 937	6 206	5 812
Hellas	37 621	41 039	43 531	46 354	52 094
España	5 838	5 639	5 059	3 977	2 278
France	6 214	5 531	5 378	5 553	6 073
Ireland	161	176	195	189	186
Italia	11 373	11 852	10 672	10 132	9 025
Luxembourg	6	3	2 624	2 608	2 421
Nederland	3 956	4 154	4 368	4 506	4 222
Portugal	1 015	1 232	1 342	897	1 539
United Kingdom	9 166	7 781	6 781	6 618	6 252
<b>EU</b>	<b>91 657</b>	<b>94 499</b>	<b>94 805</b>	<b>93 826</b>	<b>96 856</b>
<b>Carrying capacity (thousand TEU)</b>					
Belgique/België	22.5	22.5	N/A	N/A	N/A
Danmark	102.7	128.4	144.8	155.7	165.2
BR Deutschland	226.1	259.7	288.0	267.5	277.2
Hellas	67.8	61.6	69.9	78.7	88.4
España	15.8	16.0	16.8	15.2	14.7
France	59.1	53.4	56.1	59.3	58.2
Ireland	2.9	2.9	3.7	3.8	3.4
Italia	51.5	57.0	59.8	57.7	55.0
Luxembourg	N/A	N/A	19.8	17.3	16.4
Nederland	86.4	95.5	106.9	121.8	122.0
Portugal	3.3	4.5	6.2	5.1	5.4
United Kingdom	87.5	86.8	75.6	78.1	81.0

(1) Ships of 300 gt/grt and over, 1st of January.  
Source: ISL Bremen

National governments and the European Commission want to maintain an EU fleet not only for strategic and commercial reasons but also because of its contribution to Member States' economies in terms of income, employment and balance of payments. Employment of EU nationals has decreased from about 250 000 crew members in 1980 to about 108 000 in 1993. The decrease has been mainly due to the movement of owners and operators away from EU flags to open registers where there are less stringent manning conditions and costs tend to be lower. In 1993, EU nationals made up 85 % of the total employed in the EU shipping industry. This share varies considerably by Member State, e.g. it is relatively low in the Netherlands, where it is 67.3 %; in comparison with France and Italy where the percentages are 93 and 96 % respectively.

## INDUSTRY STRUCTURE

### Companies

#### Tanker and bulk

In the EU, the tanker trades are dominated by time charters of tankers plying specific routes and ships owned and managed by the major oil conglomerates. The bulk trades are formed of three distinct groups, time charters, the single cargo same route and tramp vessels, where the vessel location and voyage depends on cargo availability.

#### Liner

The liner industry is moving from the product life cycle stage of maturity to advanced maturity, where customer sophistication is high, product differentiation is low and concentration substantially increases. Hence, in this final stage of the life cycle, the two types of carriers that will survive are the first



**Table 8: Shipping  
Structure of the EU fleet by Member State, 1993 (1)**

	Tankers (%)	Bulk/OBO carriers (%)	General cargo vessels (%)	Container vessels (%)	Passenger ships (%)	Total number of ships (units)
Belgique/België	37.0	0.0	18.5	0.0	44.4	27
Danmark	20.0	2.4	52.3	9.6	15.6	499
BR Deutschland	6.5	2.9	63.9	16.1	10.6	720
Hellas	24.0	31.1	26.4	1.7	16.8	1407
España	21.1	5.3	58.1	5.3	10.2	322
France	29.5	5.2	32.9	9.5	22.9	210
Irland	9.7	3.2	66.1	12.9	8.1	62
Italia	37.5	7.0	28.3	2.3	24.9	791
Luxembourg	34.6	32.7	19.2	11.5	1.9	52
Nederland	14.2	2.3	73.8	4.5	5.2	515
Portugal	24.6	4.3	59.4	4.3	7.2	69
United Kingdom	29.1	6.7	36.7	6.3	21.3	447
EU	22.7	12.0	43.2	6.1	15.9	5121
USA	40.8	7.2	26.9	16.5	8.6	502
Japan	34.0	2.9	50.7	1.1	11.2	3792

(1) Ships of 300 gt/grt and over, 1st of January.  
Source: ISL Bremen

tier carriers with established multi-modal presence and the niche operators that trade in speciality trades. Most companies in-between these two extremes are likely either to disappear or merge over the coming decade.

Towards the end of the third quarter of 1994 the aggregate capacity in service of the top 20 container carriers totalled 1.8 million TEU, representing 46.2 % of the world's total available slots. The share of the top 20 liner companies has been increasing steadily: it was 43.7 % in 1993, against 32 % in 1982.

Traditionally the Asian carriers have dominated the rankings and continue to do so. However, an EU line, Maersk Line, has remained in first place. The Asian carriers dominate the top 20 with 10 carriers, of which 3 are now in the top 5. These 10 carriers together accounted for 911 762 slots, slightly over half of the top 20 operating capacity. Sea-Land and APL

represent the US in the top 20 with an aggregated operating capacity of 223 643 TEU or 12.4 % of capacity (in 1993 it was 13.6 %). Apart from ZIM Israel Navigation and the Mediterranean Shipping Company, the remaining operators are from the EU. The EU lines now occupy six places among the top 20 and their aggregate operating capacity was 563 826 TEU or 31.3 % of capacity, which is substantial gain in share from the 1993 result of 27 %. The two major EU ranking changes from 1993 were DSR-Senator Lines move from 20th position to 8th by adding 15 ships increasing their capacity by 48 455 TEU and the addition this year of Compagnie Maritime d'Affretement from France into 20th position.

#### Cruise shipping

Cruise shipping is dominated by the US, which accounts for some 85 % of the world cruise industry. The US industry has expanded by almost 10 % per year for the last few years,

**Table 9: Shipping  
World merchant fleet by type and area shares, 1994 (1)**

Type of vessel	Total fleet	Thousand dead weight ton (dwt)			Others (2)	Total fleet	Dwt-share of country groups (%)			Others (2)
		EU	Other OECD	Open registry			EU	Other OECD	Open registry	
Oil tankers	273 667.8	43 565.7	51 051.5	119 251.0	59 799.6	100.0	15.9	18.7	43.6	21.9
Chemical carriers	7 499.7	1 078.4	2 033.1	2 734.8	1 653.4	100.0	14.4	27.1	36.5	22.0
Liquid gas tankers	13 257.8	1 669.6	4 916.9	4 226.8	2 444.5	100.0	12.6	37.1	31.9	18.4
Bulk carriers	205 147.8	26 574.2	26 417.1	70 787.3	81 369.2	100.0	13.0	12.9	34.5	39.7
Oil/bulk/ore carriers	33 285.0	4 908.7	5 280.0	15 765.0	7 331.3	100.0	14.7	15.9	47.4	22.0
General cargo	72 830.0	5 838.7	5 918.8	20 099.1	40 973.4	100.0	8.0	8.1	27.6	56.3
Multi-deck	44 577.3	3 819.6	2 258.8	12 052.2	26 446.7	100.0	8.6	5.1	27.0	59.3
Single-deck	28 252.7	2 019.1	3 660.0	8 046.9	14 526.7	100.0	7.1	13.0	28.5	51.4
Cellular container	33 964.3	8 789.8	4 487.8	9 123.5	11 563.2	100.0	25.9	13.2	26.9	34.0
Ferries	3 141.1	1 021.9	1 031.2	324.9	763.1	100.0	32.5	32.8	10.3	24.3
Passenger vessels	1 052.2	224.7	162.1	487.4	178.0	100.0	21.4	15.4	46.3	16.9

(1) Ships of 300 gt/grt and over, 1st of January.  
(2) Including state trading  
Source: ISL Bremen

**Table 10: Shipping  
Fleet by major types and area, 1994 (1)**

	Total fleet oil tankers (thousand dwt)	(%)	Total fleet bulk carriers (thousand dwt)	(%)	Total fleet container ships (thousand TEU)	(%)
EU	43 565.7	19.0	26 574.2	25.0	535.0	58.4
Other OECD	51 051.5	33.1	26 417.1	42.9	293.8	50.2
Open Registry (major)	119 251.0	39.1	70 787.9	26.2	544.0	56.8
Others	59 799.6	24.3	81 369.2	37.0	668.8	49.1

(1) Ships of 300 gt/grt and over, 1st of January  
Source: ISL Bremen

with passengers up from 1.43 million in 1980 to 3.86 million in 1991. However, as the industry comes under increasing pressure to advance safety standards, it will see some structural change in the major players. At least half of the fleet is over 20 years old, and the latest regulations from the IMO will accelerate the division between the major groups with modern tonnage and the 'others'. Also, the demand for cruises has undergone a shift away from longer cruises to those of 3 to 5 days, which should act as fillip to the EU cruise industry which has tended to specialise in short-sea cruises. Increasing concentration in the industry will mean a bipolar orientation towards the major players and the much smaller specialist operators.

### Strategies

In the last two to three years, there has been a major shift in the operation structure of the liner carriers. Historically, there have been a small number of global carriers, with many companies operating in just one or two of the three major trades and niche operators filling the smaller trades. However, increased globalisation has led to acquisitions and alliances.

The response of the major EU liner carriers to the global and European challenge has been very different. Nedlloyd and P&O have built up large transport networks and restructured them in line with the growing importance of intra-European trade. Container logistics on a world-wide scale and inland activities (storage, distribution and transport) on a European scale are underlying Nedlloyd's policy, which aims at being present throughout the whole transport chain with the view to providing a full logistic package. In 1988, therefore, Nedlloyd Road Cargo, Nedlloyd Air Cargo and Nedlloyd Lines Agencies were established. In addition, acquisitions were obtained in countries like Germany and the United Kingdom. On more of a world-wide scale, Nedlloyd, American President Lines (APL), Mitsui OSK Lines (MOL) and Orient Overseas Container Line (OOCL) are establishing a new co-operative agreement for transpacific trade.

P&O has followed a similar multi-modal policy. It has invested in key areas of surface transport industries and follows a strategy of acquisition. Furthermore, it developed P&O European Transport Services (POETS), grouping together European haulage and distribution activities. P&O, together with Maersk and Sea-Land, has also moved into the growing Mediterranean hub market. In addition, P&O Australia and Sea-Land have recently formed a joint venture with the Port Authority of Vostochniy (Russia), the primary Trans-Siberian railbridge port. It has also been investing substantially in Chinese ports.

Unlike P&O and Nedlloyd, CMBT, Bolore and Hapag-Lloyd continued to focus on their core transport activity and enhanced operations for their deep-sea service clients. CMBT (largely owned by CMB Group) has taken steps to become a leading door-to-door operator for the European market. Its deep-sea strategy is concentrated on North-South traffic. Hapag-Lloyd concentrates on intercontinental door-to-door transport, al-

though they currently provide some distribution in Europe for Far Eastern clients and have continued to sub-contract many inland modal movements for cost-efficiency reasons.

As for non-European carriers, Sea-Land's activities have acquired a truly European dimension. For haulage on European roads, Sea-Land used a joint venture with Frans Maas as part of a policy of forming alliances to enter the EU market. 'K' Line, the Japanese carrier, recently announced the formation of a global alliance with Hyundai Merchant Marine.

The number of conferences, capacity sharing agreements and alliances continues to grow as companies try to come to terms with over-capacity.

### Impact of the Single Market

In general, measures pertaining to the Single Market programme have had a positive though limited impact on the shipping industry. The largest share of the sector's activity is accounted for by extra-EU trade, and therefore falls outside the scope of the Internal Market. In this context, the benefits of the Internal Market may have been largely indirect, through faster growth in European GDP and therefore additional trade. The most important direct effect of the Internal Market is the progressive liberalisation of intra-EU shipping and the introduction of cabotage. As to the EU environmental policy, further progress is required for establishing a level playing field in terms of inter-modal competition. Presently, shipping cannot fully capitalise on its environmental advantages because the prices of other modes, primarily road, do not reflect associated social and environmental costs.

### ENVIRONMENT

Increasing pressure is being brought to bear on EU (and non-EU) shipping companies in the areas of environment and safety. In its communication "A Common Policy on Safe Seas", the Commission expressed the main points of its future policy. In addition the Council, in its resolution of 8 June 1993, fully supported the Commission and the measures outlined in action programme@HEADING 6 = Starting from the observation that although adequate international rules exist to cover many aspects, often ships are not constructed, maintained or operated up to those standards, the action programme from the Commission is based upon a coherent package of measures including:

- measures to establish a convergent implementation of existing international rules in the Community;
- measures to ensure a tighter and more effective control of ships, regardless of their flag, by the State of the port;
- measures to promote coherent and harmonised development of navigational aids and traffic surveillance infrastructure, bringing maritime safety into the electronic age;

**Table 11: Shipping**  
**Ships registered in EU, USA and Japan, 1993 (1)**

	Number of ships	Gross tonnage (thousands)	Share of EU total (%)	Fleet structure as share of country total (%)			
				Bulk liquid	Bulk dry	Other cargo	Other
Belgique/België	199	218.0	0.4	3.4	0.0	30.2	66.4
Danmark	1 066	5 292.7	8.7	30.4	9.4	56.1	4.0
BR Deutschland	1 234	4 978.6	8.2	7.0	6.2	85.8	1.0
Hellas	1 929	29 134.4	47.9	47.9	42.8	8.9	0.3
España	1 888	1 752.4	2.9	31.1	12.7	23.5	32.8
France	775	2 701.3	4.4	59.4	4.0	28.0	8.6
Ireland	189	184.7	0.3	13.5	1.4	61.5	23.5
Italia	1 548	7 030.2	11.6	35.2	26.0	31.8	7.1
Luxembourg	48	1 326.5	2.2	35.8	50.5	13.1	0.6
Nederland	1 006	3 085.6	5.1	19.3	3.2	61.0	16.6
Portugal	333	1 001.6	1.6	75.7	2.7	10.3	11.3
United Kingdom	1 532	4 116.9	6.8	31.0	2.5	48.7	17.8
EU	11 747	60 822.9	100.0	38.9	26.8	28.7	5.4
USA	5 617	14 071.7	-	N/A	N/A	N/A	N/A
Japan	9 950	24 247.5	-	N/A	N/A	N/A	N/A

(1) Propelled sea-going merchant ships of not less than 100 gross tonnage at the end of year.  
 Source: Lloyd's Register of Shipping's World Fleet Statistics

- measures to support international organisations enabling them to strengthen their primary role in international standard-setting.

The Council has formally adopted the first (out of two) directive on mandatory reporting by ships carrying dangerous/polluting goods, the directives on common criteria for ship inspection and certification bodies, and on qualification and training of seafarers, the regulation on segregated ballast tankers, and has reached a common position on a directive concerning controls of ships by the States of the port (PSC), in view of its formal adoption expected in Spring 1995.

Many other proposals are to follow soon, regarding safe management code for Ro-Ro passenger ferries, non-convention vessels, fishing vessels, marine equipment, licence regime for passenger vessels and a system of recovering costs of aid to navigation from users.

Estimates put pollution from maritime transport at 12 % of the total pollution entering the sea and the average loss of life at sea is around 1000 per year. The major problem has been and will continue to be one of enforcement.

CFCs continue to be an issue in the refrigerated industry, as production of the more damaging ones are phased out globally. Within the industry the forerunner substitute to CFC12(R12) appears to be HFC(134a). This is impacting the industry for refrigerated containers and the purpose built refrigerated vessels, as equipment needs to be changed over the next few years to allow for the use of the CFC substitutes.

## REGULATIONS

Governments have offered throughout the years incentives to owners to keep their vessels under national flags. Nevertheless, an increasing number of vessels owned by EU nationals have been transferred to open registers. Initially, these registers were used to avoid tax liability but, in the last few years, cost reduction (particularly of manning costs) has been the main motive. The main open registers are those of Liberia, Panama and Cyprus. Some cost-saving measures have been made by governments, such as investment allowances and government-supported research to advance automation and innovation, to help EU owners with high labour costs under national flags.

Some countries have tried to mitigate the owners' plight further by creating offshore registers or similar schemes which may allow wider employment of foreigners at lower wages and of nationals at reduced levels of taxation. Denmark introduced a separate international register for Danish vessels, and Germany authorised a similar scheme in 1989.

These initiatives have now been followed with a proposal from the European Commission to introduce positive measures through EUROS as a Community ship register. EUROS would operate in parallel to the existing national registers (i.e. certain vessels already entered on national registers could as an option of the ship owner also be registered in EUROS), in which case such ship owners may be entitled to financial and fiscal benefits with a view to improving their competitive position.

The past decline of tonnage under EU flags due to the relative high cost position vis-à-vis more liberal registers, external relations to remedy protectionist practices and other distortions underlies the development of an EU shipping policy. A start on such a policy was made in 1986, when the Council adopted four major shipping regulations: 4055/86, 4056/86, 4057/86 and 4058/86. These regulations focus on liberalisation, protectionist and competition practices, which refer both to non-EU countries and EU Member States. The principles underlying these regulations are fair and free competition.

The main purpose of regulation 4056/86/EEC was to lay down rules for the application of the competition rules in international maritime transport and aims to ensure that competition in international maritime transport services from or to one or more Community ports is not unduly distorted through restrictive practices, while avoiding excessive regulation of the market. It applies to international maritime transport services other than tramp vessels. The regulation granting a group exemption to liner conferences vis-à-vis the EU competition rules was aimed at stability, guaranteeing regular and reliable services to transport users.

Regulation 4057/86/EEC is designed to deter unfair pricing practices in maritime transport; through continuous underpricing practices of some non-EU countries. These practices are detrimental to the competitiveness of EU ship owners in international liner shipping. The regulation allows for a redressive duty to be imposed on the foreign ship owners concerned.

**Table 12: Shipping**  
**Top 20 container service operators as of September 1, 1994**

(TEU)	less than 1000	1000- 1499	1500- 1999	2000- 2499	2500- 2999	3000- 3499	3500+ over	Total
Maersk Line	16 008	19 614	10 420	23 842	22 836	37 085	56 000	185 805
- ships (number)	26	17	6	11	8	12	14	94
Evergreen Line/Uniglory	14 096	17 510	10 860	0	54 560	37 708	25 374	160 108
- ships (number)	17	15	6	0	20	11	6	75
Sea-Land Service	14 234	26 291	11 557	16 070	38 484	0	47 022	153 658
- ships (number)	23	22	7	7	14	0	11	84
Cosco Container Lines	21 360	30 606	27 486	8 662	13 715	13 976	30 263	146 068
- ships (number)	41	24	15	4	5	4	8	101
NYK Line	12 812	16 624	21 365	11 244	24 717	15 270	21 898	123 930
- ships (number)	23	13	12	5	9	5	6	73
P&O Containers	5 344	6 838	11 749	13 217	8 447	21 682	32 700	99 977
- ships (number)	9	5	7	6	3	7	8	45
Mitsui OSK Lines	15 374	12 142	14 057	2 142	29 950	0	14 573	88 238
- ships (number)	27	11	8	1	11	0	4	62
DSR-Senator Lines	9 291	7 468	8 689	8 000	37 310	15 085	0	85 843
- ships (number)	15	6	5	4	14	5	0	49
Hanjin Shipping Co	1 182	6 958	4 982	0	48 200	0	24 144	85 466
- ships (number)	2	6	3	0	18	0	6	35
Nedlloyd Lines	6 925	13 045	23 308	4 311	5 757	9 353	21 952	84 651
- ships (number)	11	11	14	2	2	3	6	49
K Line	10 157	6 586	1 902	11 274	22 808	27 648	0	80 375
- ships (number)	19	6	1	5	8	8	0	47
Zim Israel Navigation	15 401	14 003	7 108	7 270	5 620	21 273	0	70 675
- ships (number)	26	12	4	3	2	7	0	54
American President Lines	11 045	4 140	0	8 000	25 300	0	21 500	69 985
- ships (number)	20	3	0	4	9	0	5	41
Mediterranean Shipping Co.	14 875	17 354	26 220	9 200	0	0	0	67 649
- ships (number)	25	15	16	4	0	0	0	60
Hapag-Lloyd	410	2 926	0	4 181	22 038	3 430	30 954	63 939
- ships (number)	2	2	0	2	8	1	7	22
Neptune Orient Lines/PUL	7 799	1 228	5 384	15 336	8 834	9 981	10 854	59 416
- ships (number)	17	1	3	7	3	3	3	37
Yangming Marine Transport	1 424	0	1 932	20 504	0	22 862	10 812	57 534
- ships (number)	3	0	1	10	0	7	3	24
Orient Overseas Container Line	3 641	3 538	3 589	0	15 655	29 173	0	55 596
- ships (number)	7	3	2	0	6	9	0	27
Hyundai Merchant Marine	1 356	0	7 350	2 021	17 904	0	26 400	55 031
- ships (number)	3	0	4	1	6	0	6	20
Compagnie Maritime d'Affrètement	3 290	1 452	3 846	11 326	0	16 621	7 076	43 611
- ships (number)	8	1	2	5	0	5	2	23

Source: Containerisation International Yearbook

Regulation 4058/86/EEC is aimed at safeguarding free access to cargoes in ocean trade. The regulation provides for a procedure to be applied when certain trade practices by a non-EU country threaten to restrict free market access by Member States' shipping companies.

Regulation 4055/86/EEC applies the principle of freedom to provide services to maritime transport both between Member States and between Member States and non-EU countries. This regulation provides for the phasing out or adaptation to Community legislation of agreements between a Member State and a non-EU country containing cargo sharing clauses and of unilateral national restrictions on the carriage of goods wholly, or partly, preserved to the national flag. This practice could seriously affect the trading interests of all countries by substantially increasing transport costs. Adjustment to Community law of agreements concerning trades not governed by the United Nations code of conduct was to be completed by 1 January 1993.

Further mention should be made of the deregulation of the EU shipping market, implying the freedom of cabotage (i.e.

the freedom of a shipping company established in one Member State to operate on the domestic market of all the other Member States). In December 1992, the EU Transport Ministers adopted the regulation applying freedom to provide services to maritime transport within Member States. The text provides for a series of derogations for different trades in certain areas of the Community.

The following maritime transport services carried out in the Mediterranean and along the coast of Spain, Portugal and France are temporarily exempted from the implementation of the regulation:

- cruise services, until 1 January 1995;
- the transport of strategic goods (oil, oil products and drinking water), until 1 January 1997;
- services by ships smaller than 650 GT, until 1 January 1998;
- regular passenger and ferry services, until 1999.

Island cabotage in the Mediterranean and cabotage with regard to the Canary, Azores and Madeira archipelagos, Ceuta and Melilla, the French islands along the Atlantic coast and the French overseas departments is also exempted until 1 January 1999. This derogation extends for Greece until 1 January 2004 for regular passenger and ferry services and services provided by vessels less than 650 GT. In those areas outside the geographical scope of the above mentioned derogations, liberalisation was completed as from 1 January 1993.

An issue that has gained significant prominence in the last twelve months has been the application of the EU competition rules to maritime transport. Investigations by the Directorate for Competition (DG IV) found that some EU lines had been acting uncompetitively, particularly in the North-South trades, by breaching Articles 85 and 86 of the Treaty of Rome and regulation 4056/86. On October 1994, the Commission found that capacity management agreements, as practised in the North Atlantic trade, violate Article 85 of the Treaty.

With the growing trend of vertical transport integration, the European Commission's, June 1994, issuance of its "Maritime Transport Report" addressing intermodal operations within the EU may significantly impact on conference carriers. In its decision of 21 December 1994, the Commission found that price fixing on the inland leg through conferences is illegal under EU competition rules. As of June, the Commission is recommending that conference carriers begin to initiate joint inland operations, with regard to multimodal pricing, which will not adverse impact upon shippers and which would promote more open competition.

Finally, the new EU banana policy which came into effect on 1 July 1993 has imposed a new set of quotas on banana imports into the EU. Bananas are estimated to have about a 40 % share of refrigerated trade; hence there are dedicated operators, terminals and distribution services for bananas, and the impact of the tariffs may be significant on EU consumers, as producer and shippers pass on the tariffs to consumers in the form of higher prices. It is too early to assess the impact of the new tariff regime on the banana shippers, except to note that the new regulations, as much as the previously preferred status of some exporters, cause distortions in the market.

## OUTLOOK

Global developments will continue to fuel growth in world sea-borne trade. The trend of continued growth in the Far East/Asian markets in both demand and global sea-borne trade are expected to continue and will impact on the future development of global alliances and conference growth.

Although developments within the EU will improve trading conditions, the outlook for the EU shipping industry is mixed. "Europe 1992" and the resulting gradual deregulation of the EU shipping market coupled with improving economic growth in the EU will provide an increase in the Community's share of world trade. The four regulations adopted by the Council of Ministers at the end of 1986 and recent discussions on the future of the Common Transport Policy, aimed at increasing the competitiveness of the EU shipping industry towards non-EU countries which apply unfair trading practices, may contribute to less protectionism. The aim of the Commission to achieve an efficient and competitive EU shipping industry should also enable EU ship owners to regain a major role in world shipping using ships registered in the EU. The proposed EUROS register should contribute to that end. However, the downside is that the EU shipping companies are facing and will face increasing competition from lower unit cost carriers such as those from the Far East. This may result in a reduction in the EU shipping industry and more global alliances, as the export of cargo is viewed as more important to the growth of the Community on the world stage rather than the growth of the shipping industry per se. Increased competition should

reduce the price of traded goods through lower transport costs and hence EU exports and imports will have lower wholesale prices.

A large part of the tanker and bulk fleets will have to be renewed in the 1990s as the existing fleet becomes increasingly aged, which may entail problems in private financing, given the risks and the huge amounts involved. The availability of both finance and reputable ship owners in Europe will help the EU to play a larger role in bulk transport. The vessels involved in merchant shipping will be of proven design, with the exception of double-hulled tankers and hatchless container ships, but there will be a tendency towards larger container vessels.

The development of the world economy and implementation of the measures aimed at increasing the competitiveness of the EU fleet are expected to have the greatest impact in the medium-term. Total carrying capacity is expected to increase at a much slower pace than container capacity: Container penetration in the liner trades continues to grow and most of the prospective growth is expected in the liner sector.

Employment of EU nationals in the EU shipping industry is expected to continue to decline as shipping companies continue to flag out, although the EUROS register, if and when approved by the Council of Ministers, may contribute to halting or even reversing this trend.

Written by: DRI Europe

The industry is represented at the EU level by: European Community Shipowners Association (ECSA). Address: Rue Ducale 45, B-1000 Brussels; tel: (32 2) 511 3940; fax: (32 2) 511 8092.



# Air transport

## NACE 75

Air transport is starting to move out of the financial doldrums caused by the recent economic weakness of some of the major trading blocs and the Gulf War. Deregulation has spurred competition within existing airlines in the EU and will prompt both an increasing number of privatisations of the traditional EU state carriers and allow airlines to consolidate operations through mergers and alliances. These will act as a spur for the globally oriented airlines to improve their competitive position vis-à-vis the airlines from the other major geographical blocs. Hence, although in the short term the pain of the adjustment process will continue, a leaner, fitter and aggressive industry will emerge.

### INDUSTRY PROFILE

#### Description of the sector

The air transport industry comprises enterprises which are exclusively or primarily engaged in the transport of passengers and goods by air on scheduled or chartered services as well as helicopter and air taxi services, local pleasure flight operators, etc. Air transport also includes the town offices of airline companies.

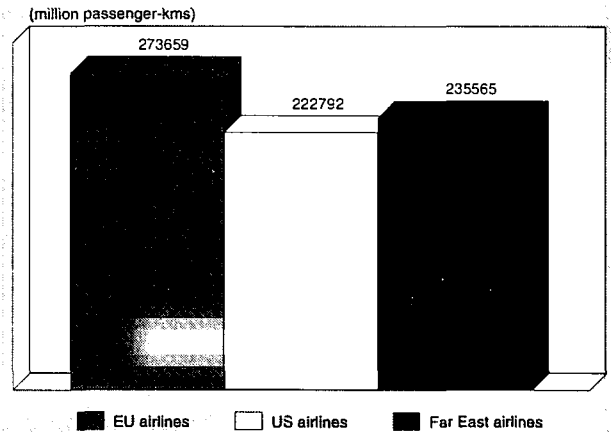
Air traffic (excluding military) is usually divided into commercial and general aviation. Commercial aviation consists of passenger travel, both charter and scheduled, and air freight, which includes air freight on freighter aircraft, combination passenger/freight aircraft and freight in the hold of passenger aircraft, and air courier and mail services. General aviation includes private use of planes and air taxi services.

This monograph will focus on the commercial aviation sub-sector, with particular emphasis on the major airlines of the EU Member States. Unless otherwise specified, statistical information mentioned in the text refers to scheduled traffic for the large EU carriers. These statistics therefore do not cover two important segments of the industry, namely regional airlines and charters.

#### Recent trends

Average growth rates in demand for air transport during the latter period of the last decade were healthy, with an average annual growth rate of 7.7 % for passenger-kilometres and 8.9 % for tonne-kilometres (freight) for the period 1985 to 1990. During the same period employment grew by some 3 % per year. This rate of growth was due to the positive economic growth experienced by the countries served by EU airlines, both within the EU and externally. However, the industry experienced a severe and unexpected downturn in 1991. This downturn was due to recessionary pressures emanating from the US and the United Kingdom and the weakening of economic growth in other major European countries. In addition, the downturn was exacerbated by the effects of the Gulf War with the result that between 1990 and 1991 passenger-kilometres declined by 4.7 %, and tonne-kilometres by 2.9 %. EU air transport staged a recovery in 1992, driven largely by the improving economic environment in the United States and in the Far East as well as price cutting and fierce competition between airlines. Growth on 1991 was 13.8 % for passenger-kilometres and 3.2 % for tonne-kilometres. However, much of this growth corresponded to a catch up effect. Compared to the level of traffic reached in 1990, growth in 1992 reduces to a more usual 8.5 % for passengers and a weak 0.2 % for freight. Notwithstanding a worsening of the economic climate in all major EU countries except in the UK, freight transport recovered strongly in 1993 with a 7.8 %

Figure 1: Air transport  
International comparison of IATA members, 1993



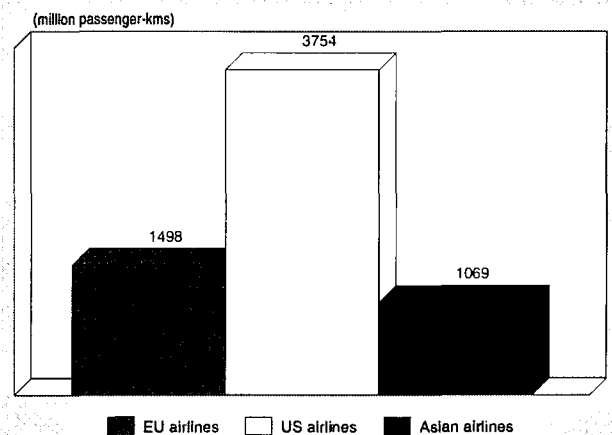
Source: WATS: International scheduled services

increase in tonne-kilometres. In the meantime, passenger traffic continued to register healthy growth (7.3 %).

Recent indicators issued by the Association of European Airlines point to particularly sustained traffic in 1994 which is likely to turn out as one of the best growth years in 15 years. Over the nine months to September, passenger and freight traffic increased by 8.3 % and 13.1 % respectively compared to the same period the year before. These figures should only be used as broad indicators, as there are definitional differences to those shown in Table 2.

Surging aircraft orders in the late 1980s have combined with slowing traffic growth in the early 1990s to generate serious overcapacity and intense competition. Resulting low fares, together with low load factors, have taken a heavy toll on European airlines. Between 1990 and 1992, AEA carriers accumulated losses of 3.5 billion ECU and provisional figures for 1993 point to another significant loss in the 1.8 to 1.9 billion ECU region. However, preliminary results for the second quarter of 1994, indicate that the situation is at last im-

Figure 2: Air transport  
International comparison of number of jet aircraft, 1993 (1)



(1) Only IATA members  
Source: IATA

**Table 1: Air transport  
Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	190	4 262	(6) 8 223
Danmark	111	1 124	11 877
BR Deutschland	(3) 305	(3) 4 536	(6) 75 434
Hellas (1)	(5) 79	N/A	6 076
France	158	9 621	59 246
Italia (2)	71	3 461	20 659
Luxembourg	56	N/A	2 213
Nederland	113	3 792	29 230
Portugal (3, 4)	9	826	11 727

(1) 1988

(2) 1989

(3) 1990

(4) Covers only enterprises with at least 5 employees

(5) Number of local units

(6) Number of employees

Source: Eurostat; Mercure

**Table 2: Air transport  
Production indicators**

	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
Volume of passenger transport (million passenger-kms)	159 361	181 350	182 859	205 730	227 298	243 180	262 211	249 868	284 419	305 311
Volume of goods transport (million tonne-kms)	7 377	10 347	11 251	12 380	14 037	15 095	15 834	15 381	15 870	17 109
Number of persons employed (units)	248 938	249 817	253 704	262 400	267 319	280 236	290 065	285 242	265 649	258 926

Source: AEA

**Table 3: Air transport  
AEA scheduled passenger traffic by carrier of Member States, 1993**

Carrier	Passenger-kms (millions)		Europe (%)
	Total (1)	International (2)	
Aer Lingus	3 759.2	3 707.3	44.8
Air France	43 534.6	36 385.4	15.7
Alitalia	24 520.4	22 693.8	25.1
British Airways	80 085.7	75 044.0	16.9
Iberia	23 265.4	17 892.5	31.1
KLM	36 806.6	36 803.8	11.1
Lufthansa	52 657.9	47 738.5	20.8
Luxair	290.5	290.5	100.0
Olympic Airways	7 898.7	6 963.6	38.9
Sabena	6 485.3	6 485.3	34.5
SAS	18 138.5	13 869.1	47.7
TAP Air Portugal	7 868.1	6 971.2	42.9
EU	305 310.9	274 845.0	21.9

(1) Sum of domestic and international traffic.

(2) Total International: all short/medium haul and long haul international traffic.

Source: AEA

**Table 4: Air transport****Country to country scheduled intra-European passenger traffic on AEA airlines, 1993**

(million) From	To	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK	EU
Belgique/België		-	105.8	379.0	64.2	244.6	317.3	44.8	335.0	14.1	123.6	93.0	603.7	2 325.0
Danmark		104.0	-	442.6	40.2	116.8	189.8	30.7	131.1	2.7	145.9	27.2	400.6	1 631.5
BR Deutschland		380.1	439.8	-	435.3	737.8	1 161.4	124.3	1157.8	0.0	59.74	203.58	2 449.9	7 685.5
Hellas		67.6	42.7	458.5	-	64.7	135.0	0.0	322.6	0.0	98.3	11.8	238.6	1 439.7
España		248.1	120.7	739.5	64.1	-	665.4	31.5	667.1	12.9	258.3	239.2	940.8	3 987.6
France		319.5	197.7	1 216.5	133.1	669.3	-	98.9	1 211.2	0.0	470.7	326.85	2 388.7	7 032.3
Ireland		44.5	30.6	125.0	0.0	33.4	98.9	-	31.9	0.0	59.9	6.4	1 172.5	1 603.1
Italia		332.5	138.2	1 163.5	315.2	670.8	1 238.8	32.6	-	0.0	369.2	131.1	1 109.4	5 501.4
Luxembourg		15.2	4.6	0.0	0.0	13.0	0.0	0.0	0.0	-	0.0	9.7	26.3	68.9
Nederland		122.4	147.4	591.2	97.9	255.7	453.2	61.4	366.9	0.0	-	86.0	724.4	2 906.5
Portugal		94.8	28.7	211.3	11.6	251.1	0.0	6.4	131.7	8.8	85.9	-	437.5	1 267.7
United Kingdom		589.9	404.5	2 490.6	233.2	930.1	2 295.5	1 150.0	1 169.0	29.8	719.0	436.0	-	10 447.5
EU		2 318.5	1 660.7	7 817.8	1 394.8	3 987.2	6 555.3	1 580.6	5 524.1	68.2	2 926.3	1 570.7	10 492.5	45 896.7

Source: AEA

proving, at least for those carriers which have made the most sweeping cost cutting efforts in the recent past.

Growth in the EU's regional airlines' traffic has been over 2 time greater than the industry average over the last six years. Even in 1991, during the trough of the recession, traffic expanded by 10 % (number of passengers). Growth in 1992 and 1993 reached 16 % and 14.2 % respectively and preliminary data show a 14 % growth for the first half of 1994 compared to the same period the year before. The regional fleets have also been undergoing a change, with a steady increase in average aircraft size. The share of aircraft of more than 40 seats has increased continuously in recent years. In addition, more than 50 % of the regional fleet is under six years old giving it one of the younger aggregate fleets.

#### International comparison

Figure 1 shows the relative sizes of the aggregates of the EC, US and Far East airlines. It includes domestic traffic, and hence the US airlines account for more passenger-kilometres than the EU and the Far East combined, and also more than double the EC.

Table 6 provides a ranking of world carriers based on aggregated domestic and international passenger traffic. The top ten world airlines include two EU airlines and two Far Eastern carriers but no less than six US airlines. The top four carriers are all American and the largest European airline, British Airways, only comes in fifth position. Table 6 also provides a clear picture of the level of dependence the EU airlines have on international travel demand. The proportion of international travel in total travel for the EU airlines belonging to the top 20 is 89 %, compared to 31 % for the US airlines. The corresponding figure for the Far East airlines is closer to that of the EU at 77 %.

#### MARKET FORCES

##### Demand

At the aggregate level, changes in the demand for air travel are highly dependent on the growth prospects for the world economy. There is a very strong relationship between air transport demand and trade, which in turn is driven by the level of economic activity. However, the major components of air travel (i.e. business, leisure and cargo) respond to different

**Table 5: Air transport****AEA scheduled freight traffic by carrier of Member States, 1993 (1)**

Carrier	Total (2)	Tonne-kms (millions)	
		International (3)	Europe (%)
Aer Lingus	97.4	97.3	11.9
Air France	3 619.4	3 526.5	1.3
Alitalia	1 326.9	1 318.3	3.6
British Airways	2 733.7	2 673.5	2.9
Iberia	544.0	484.5	9.1
KLM	3 070.4	3 070.4	2.7
Lufthansa	4 635.9	4 616.8	3.1
Luxair	0.5	0.5	100.0
Olympic Airways	127.0	118.9	34.1
Sabena	400.7	400.7	4.6
SAS	420.4	402.6	11.6
TAP Air Portugal	170.5	157.6	20.3
EU	17 146.8	16 867.5	3.5

(1) Excluding mail

(2) Sum of domestic and international traffic

(3) Total international: all short/medium haul and long haul international traffic

Source: AEA



**Table 6: Air transport**  
**IATA member's ranking - Top 20 scheduled passengers carriers, 1993**

Rank	Carrier	Passenger-kms (millions)		Share (%)	Rank
		Total	International		
1	United Airlines	162 527	62 647	38.5	2
2	American Airlines	156 302	46 419	29.7	4
3	Delta Air Lines	133 346	36 532	27.4	9
4	Northwest Airlines	93 549	40 977	43.8	7
5	British Airways	80 086	75 044	93.7	1
6	Continental Airlines	68 114	17 465	25.6	16
7	USAir	56 681	3 961	7.0	50
8	Japan Airlines	54 615	41 372	75.8	5
9	Lufthansa	52 658	47 623	90.4	3
10	Qantas	44 510	34 478	77.5	11
11	Air France	43 535	36 385	83.6	10
12	Singapore Airlines	41 265	41 265	100.0	6
13	All Nippon Airways	36 831	9 569	26.0	31
14	KLM	36 807	36 804	100.0	8
15	TWA-Trans World Airways	36 707	11 480	31.3	28
16	Cathay Pacific	29 069	26 668	91.7	12
17	Alitalia-Linee Aeree Italiane	28 377	22 521	79.4	13
18	Korean Air Lines	25 588	22 097	86.4	14
19	Iberia	23 265	17 408	74.8	17
20	Thai Airways	22 874	20 609	90.1	15

Source: WATS: Scheduled services

pressures. Air travel for business purposes is primarily driven by activities that require face-to-face contact. Leisure travel is dependant on the levels and growth of real personal disposable income and available leisure time, whilst air freight depends largely on international trade. Hence periods of economic growth or recession can impact air travel significantly: for instance, in a period of strong economic growth business expands generating more business travel, real incomes increase generating growth in leisure travel and trade improvements generate more air freight. In addition, patterns of leisure travel have changed due to increasing available leisure time and income allowing for a greater proportion of major holidays to involve long distance travel, as well as short breaks that require flights.

In the recent years, enhanced competition between airlines has also underscored the impact of cuts in fares on travel demand. Whereas leisure demand has long been known to be sensitive to prices, the recession of the early 1990s has made most companies more cost conscious as to their travel budgets. Whereas the forthcoming recovery should ease some of the pressure on business travel budgets, it seems unlikely that business travellers will completely renew with their pre-1990 behaviours. Many companies have indeed realised that some of the business trips could be easily replaced by phone calls and that significant cost cutting could be made by downgrading from the business to the economy class, particularly on short-haul flights.

### Supply and competition

Most of the EU 'flag carriers' provide global services, whilst the small to medium sized EU airlines concentrate on predominantly intra-European services (British Midland and Luxair), specific inter-continental services (Virgin Atlantic Airways) or niche point to point routes. However the small to medium sized carriers do have alliances and equity partnerships that allow them access to much larger and global route structures. Within the EU the scheduled airlines are increasingly competing on a level playing field due to de-regulation. However, as many of these airlines are providing some form or another of global offering to passengers, they face severe competition from the major airlines of other geographic regions

that are also global in nature. The main competition comes from the US 'megs' and the Far Eastern airlines. In addition, EU schedule services continue to face competition from the EU charter carriers.

However, one longer term direct effect that European de-regulation may have is on the charter industry. Prior to de-regulation the charter industry was able to offer point to point services for leisure travel at a substantially lower unit price and cost than the scheduled carriers. On the price issue, it was the double approval regime that helped the scheduled airlines to maintain potentially artificially high fares, whilst the charter airlines were pricing on cost equated levels. The charters were able to do this as they were in essence wholesaler's offering direct flights, whilst scheduled services were typically retailers. Charters could also match supply to the seasonal peaks and troughs of demand that was typically leisure dominated. The so-called third EU package on air transport liberalisation entails more or less complete free pricing for intra-EU scheduled traffic so that some of the intra-EU charter traffic may decline as the scheduled carriers take some of the traditional leisure traffic away from the charterers. In addition, the distinction between charter and scheduled services becomes increasingly blurred as carriers may choose to operate scheduled as well as non-scheduled services between EU airports. Charter services also increasingly look like retail services as they are now allowed to appear on Computer Reservation Systems (CRS) and tickets can be purchased by the public in the same manner as scheduled services. In general, charter operators affirm their commitment to remaining the major suppliers of wholesale passenger air services meeting point to point seasonal demand and whereas there may be a decline in intra-EU charter traffic, charter traffic from within the EU to destinations outside the EU, where the current bilateral agreements continue, will strengthen.

A number of studies undertaken in the late 1980s comparing the efficiencies of the European airlines with those of the USA (and, in some cases, with the Eastern carriers) highlighted some interesting conclusions. Three inter-related factors have stood out as crucial to the relative efficiencies of airlines, namely the operating regulatory environment, the structure of airline operations and labour costs. Issues such as fuel

**Table 7: Air transport**  
**IATA member's ranking - Top 20 scheduled freight carriers, 1993**

Rank	Carrier	Tonne-kms (thousands)		Share (%)	Rank
		Total	International		
1	Federal Express	2 796	557	19.9	2
2	Lufthansa	794	737	92.8	1
3	Japan Airlines	719	432	60.1	5
4	Korean Airlines	649	492	75.8	4
5	American Airlines	604	289	47.8	11
6	Air France	571	549	96.1	3
7	United Airlines	536	218	40.7	14
8	Northwest Airlines	495	316	63.8	10
9	KLM	478	478	100.0	5
10	Singapore Airlines	467	467	100.0	6
11	Delta Air Lines	459	120	26.1	23
12	British Airways	442	429	97.1	8
13	Cathay Pacific	395	388	98.2	9
14	All Nippon Airways	390	58	14.9	37
15	Air Canada	344	186	54.1	16
16	Varig	294	110	37.4	24
17	Thai Airways	287	253	88.2	12
18	Qantas	262	185	70.6	17
19	Swissair	254	240	94.5	13
20	Alitalia-Linee Aeree Italiane	252	217	86.1	15

Source: WATS: Scheduled services

costs or scale economies do not appear to be highly relevant. Many of the large airlines are active in the spot oil market, and hence fuel costs are more or less an even field. Size tends to bring some benefits such as large scale marketing, with particular emphasis on frequent flyer programmes, or a better co-ordination of schedules and airport capacity utilisation. However, scale economies do not confer some magic status on cost management, as the demise of some of the largest airlines has shown, i.e. Pan Am and TWA.

Some of the Far Eastern carriers fare well in efficiency comparisons as they operate in capacity constrained markets with long stage lengths and a low-cost workforce.

The studies also looked at competitive issues for labour, as this is presently the most controllable cost and typically the European airline staff, in particular cabin and cockpit crew, are more highly paid than their US and Eastern counterparts. This higher wage burden on the European airlines is not offset

by higher productivity. In fact, the US and Eastern airlines appear to have a higher average degree of productivity than their European counterparts. This is one indication that the European carriers still have a long way to go before they match the productivity levels of their major competitors.

In particular, a communication by the EU Commission (COM(94) 218 final) states that, in 1992, physical productivity of European carriers was more than 20 % lower than the levels achieved by US carriers. Furthermore competitive disadvantages incurred by European airlines are not restricted to labour costs but also include user costs such as infrastructure charges, air traffic control charges and congestion costs. Compared to US competitors, European carriers also have to face higher costs in terms of equipment both because of exchange rate risks (aerospace equipment is traditionally billed in USD) and a less favourable tax-lease treatment.

**Table 8: Air transport**  
**Employment and fleet of AEA's scheduled carriers by Member State, 1993**

	Employees	Fleet	Aircraft on order	Employees/airplane
Aer Lingus	5 373	29	3	185
Air France	42 092	147	23	286
Alitalia (1)	18 034	97	63	186
British Airways (2)	49 584	250	61	198
Iberia	23 000	120	33	192
KLM	24 615	95	13	259
Lufthansa	44 194	218	12	203
Luxair	1 082	11	0	98
Olympic Airways	10 754	57	0	189
Sabena	9 698	45	0	216
SAS	21 000	160	11	131
TAP Air Portugal	9 500	37	4	257
EU	258 926	1 266	223	205

(1) Aircraft on order include orders for ATL.

(2) Fleet includes wholly-owned subsidiaries.

Source: AEA

## INDUSTRY STRUCTURE

### Companies

#### Scheduled passenger services

In the EU there is typically a three tier structure in scheduled air passenger transport defined by numbers of routes and age of operation. The first tier includes those carriers that have been and still are the so-called "flag carriers". The second tier consists of the carriers that operate reasonably large networks, either within the EU or internationally or both (for instance British Midland). The third tier comprises the regional carriers, such as ATI in Italy or Air Inter in France, and the tiny niche point-to-point airlines, i.e. Orient Air, which operates from Waterford, Ireland to Gloucester, England via Dublin. However, in scheduled international and domestic services, the EU air transport industry is dominated by the small number of flag carriers. The ownership structure for the flag carriers in 1994 is presented in Table 9. The dominant four flag carriers share 70 % of the services operated by the EU flag carriers in terms of passenger-kilometres (including domestic scheduled services).

This would indicate that the scheduled EU carriers are dominated by the 'flag' carriers, however, although the figures indicate that the industry could be considered concentrated, the number of EU airlines actually in operation is substantial. IATA lists 35 airlines operating scheduled passenger services. The European Regional Airlines Association (ERA) lists another 20 regional airlines that are not included in the IATA list. The regional airlines account for 1 in 7 of intra-Community passengers on scheduled services. Also, the regionals operate a fleet of over 600 aircraft in the Community. There are also a number of much smaller regional airlines operating that are not members of either organisation. Hence, excluding freight only operators and the non-member airlines there are 109 scheduled passenger airlines operating in the Community.

#### Charter passenger services

The EU hosts 35 specialised charter operators. In addition, some of the schedule carriers operate charter services directly or through subsidiaries. The importance of these charter operators is pinpointed by ACE, the European Community's Independent Airline Association, which estimates that 60 % of international revenue passenger-kilometres performed in Europe by the combined membership of ACE and AEA are performed by ACE members. Also, its members employ almost 20 000 staff (1992 figure).

#### Air freight services

Air freight is often referred to as the poor cousin in the air transport industry. This misnomer is due to the lack of accurate and substantive data on the sector, coupled with the market being a mainly buyer market. Though the trend is changing progressively, scheduled passenger airlines are still extremely reliant on the freight forwarders to fill up the cargo holds on scheduled routes. Often, the amount of cargo space is finalised at the last moment when the final number of passengers on the flight is known, usually an hour or so before departure. There are, however, very good early estimates of available cargo space based either on maximum passenger capacity and/or bookings for the flight. The scheduled freight carrier, whether independent or a subsidiary of a scheduled airline, typically has a scheduled route for cargo on dedicated freighter aircraft.

Amongst the EU carrier members of the AEA, the air freight sector is dominated by two airlines, Air France and Lufthansa, which together account for almost half of the recorded market. British Airways and KLM follow in third and fourth place. Comparing the revenues for scheduled passenger traffic with freight traffic, freight accounts for just over 14 % of revenue.

#### Strategies

There are three dominant strategies observable in the EU at present, of varying degrees of importance and influence. These are privatisation of national flag carriers and the associated

**Table 9: Air transport  
Ownership structure of EU airlines, 1994**

Airline	Country	Ownership-share (%)	Owner
Sabena	Belgique/België	61.8	State ownership
		37.5	Finacta
		0.7	Private shareholders
SAS	DK (+ SWE and N, ratio 2:3:2)	50.0	Government interests
		50.0	Private investors
Lufthansa	BR Deutschland	51.4	Federal Republic
		43.1	Private shareholders
		5.5	Public sector institutions
Olympic Airways	Hellas	100.0	State ownership
Iberia	España	99.8	State-owned holding company INI
Air France	France	99.3	State ownership
Aer Lingus	Ireland	100.0	State ownership
Alitalia	Italia	86.4	State-owned holding company IRI
Luxair	Luxembourg	37.3	Private companies
		36.5	State ownership (incl. share of state-owned bank, 13.4 %)
KLM	Nederland	13.2	Luxair Group and others
		13.0	Lufthansa
		38.2	State ownership
TAP Air Portugal	Portugal	61.8	Private shareholders
		100.0	State ownership
British Airways	United Kingdom	100.0	Publicly quoted company (no major shareholders)

Source: AEA

**Table 10: Air transport**  
**Development of AEA's total scheduled passenger traffic (1)**

(million passenger-kms)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
Aer Lingus	2 049	2 474	2 496	2 738	3 284	3 970	4 190	3 786	4 011	3 759
Air France	25 392	28 583	27 571	31 440	34 333	36 734	36 653	33 711	37 034	43 535
Alitalia	12 877	14 576	13 994	15 343	15 634	17 619	19 126	18 187	23 586	24 520
British Airways	40 140	41 103	40 430	46 299	56 939	60 758	66 795	62 835	72 491	80 086
Iberia	14 818	17 576	18 333	19 402	20 495	21 035	22 112	20 473	23 857	23 265
KLM	14 058	18 039	19 070	21 801	23 270	24 927	26 390	27 307	31 695	36 807
Lufthansa	21 056	24 522	26 645	31 771	34 033	36 133	41 903	42 685	48 661	52 658
Luxair	0	111	120	128	151	138	253	258	286	290
Olympic Airways	5 062	7 468	6 382	7 121	7 530	8 015	7 764	6 193	7 262	7 899
Sabena	4 853	5 663	5 561	5 973	6 528	6 760	7 572	6 223	6 203	6 485
SAS	10 956	12 063	12 539	13 207	14 027	15 291	16 516	15 416	15 699	18 139
TAP Air Portugal	3 428	4 240	4 475	4 978	5 640	6 231	6 836	7 025	7 671	7 868
UTA	4 673	4 932	5 243	5 527	5 433	5 568	6 101	5 769	5 962	0
EU	159 632	181 350	182 859	205 730	227 298	243 180	262 211	249 868	284 419	305 311

(1) Domestic + international traffic  
Source: AEA

issue of state subsidies, the formation of alliances and, less importantly, the formation of start-ups and expansion of the small regionals.

On balance in the European industry, it will be the process of privatisation, which is encouraged by de-regulation, that will have the largest aggregate impact on the industry. Government subsidies to flag carriers to cover operating losses will be severely restricted in the new environment. Airlines will have to operate profitably in order to survive, and this in turn will require a change in the corporate environment with, in particular, increased flexibility and the ability to react more swiftly to a changing competitive environment. An example of the differing abilities of the first tier carriers to react to changing circumstances is illustrated by some of the carriers reactions to contain costs during the recent downturn. British Airways reacted very rapidly to the downturn by reducing employment levels in 1991 by some 12 %, whereas, amongst the larger state owned carriers the reaction was either much weaker or contrary to expectations, with Air France reducing employment by 1.2 % and Lufthansa increasing employment by 4.2 %. It was only in 1992, that these two carriers reacted more strongly.

Privatisation will have a substantial impact on employment: for instance, in the run-up to privatisation British Airways reduced staffing by one third through a programme of voluntary reduction and early retirement schemes. This amounted to almost 20 000 employees. Similarly, the partial privatisation of Lufthansa in September 1994 which will scale down the state share in the airline's equity to 35 %, was preceded by a restructuring programme which, within one-and-a-half year, brought about a 17 % in cut in the payroll and a 31 % surge in productivity.

The most rapid transformation of the industry structure is taking place through alliances, both within the EU and globally. These alliances take a number of forms, from equity investment to code-sharing agreements. Typically equity alliances involve an EU airline purchasing minority stakes in other airlines, for instance, British Airways currently owns 24.6 % of USAir, 25 % of Qantas, 49 % of Deutsche BA, 49.9 % of TAT, 40 % of the Plimsoll Line, and 31 % of Air Russia, as well as absorbing Dan Air in October 1992.

Shared equity stakes could follow the pattern of the abandoned 'Alcazar' alliance between Scandinavian Airlines System (SAS), KLM Royal Dutch Airlines, Swissair and Austrian Airlines. These four medium sized airlines announced plans

in April 1993 to set-up a jointly owned company with SAS, KLM and Swissair owning 30 % of the equity each and Austrian taking the remaining 10 %. The joint venture would have had a single management structure and balance sheet. The new company would have matched the individual European majors in size and passengers, and would not be too far behind the US 'mega-carriers'. The agreement failed mainly because airlines did not agree on the choice of a US partner. Longer term expectations are that the four airlines will now form mergers or allied operations with other EU or non-EU airlines as their individual markets are considered by them to be too small to compete globally. This example provides a clear insight into the difficulty of forming strategic partnerships based on equity investment.

The alliance between Lufthansa and United provides a typical example non-equity alliances. The agreement includes ticket code-sharing, collaboration on frequent flyer programmes and marketing, and some sharing of airport facilities. Essentially, it will allow Lufthansa access to the 200 cities served by United. Many European airlines are now involved in similar agreements. Iberia has set up a commercial collaboration with United. Delta has reached a set of bilateral agreements with Sabena, Virgin and Austrian Airlines. Air France has joined forces with Air Canada and Alitalia is cooperating with Continental.

Non equity alliances as well as many M&As operations, such as BA's partial equity purchase of USAir, KLM's stake in Northwest and Delta and Swissair's cross-shareholding, are largely motivated by the need of a partnership between US and European carriers. For US carriers collaboration allows the entry into the newly liberalised Single European market while, for European carriers, collaboration entails access to the world's largest domestic airline market.

Increasing concentration in the airline industry, particularly through alliances, continues to dominate strategic thinking in Europe, especially following the third package. Many of these alliance involve code-sharing and block-space agreements. Code-sharing provides a seamless flight that may involve two or more airlines (usually two) and potentially a change of aircraft. The advantage of the code-share is that it shows up on CRS as a single flight and hence appears before flight combinations with two or more flight numbers. Blockspacing is where airlines add their code to another carrier's flight and vice versa, where the two carriers have blocked space on the flight of the other carrier.

The liberalisation of the EU skies, discussed below, has allowed the smaller niche regional carriers to expand services where previously route rights and slots were hard to come. In addition the regulations on start-ups should foster additional point to point small airlines, as they take away some of the competitive edge previously held by other airlines through prior legislation. The question is whether European skies will experience a pattern similar to that observed in the US where one of the most striking upshot of deregulation has been the emergence of new low-cost airlines offering now-frills services on short and medium-haul routes. In the US, these new competitors have driven traditional carriers into costly price wars and triggered another round of restructuring in the industry. In some cases, traditional carriers have even reacted with the creation of their own low-cost subsidiaries. To some extent, the phenomenon is also spreading in Europe but several factors will limit its extension. Several flag carriers have anticipated these developments, setting up their own low-cost subsidiary. Besides, entry into European skies remains limited by a set of structural hurdles such as congestion at the biggest airports, subsidies to state-owned airlines and competition by high speed rail on small to medium-haul routes.

### Frequent flyer programme

Frequent Flyer Programmes (FFPs) are used as a competitive tool by airlines to win frequent travellers by providing rewards for flights taken on a particular airline or groups of airlines. These rewards usually take the form of points which count towards free flights, ticket upgrades, leisure travel and holidays, amongst others. Many airlines view FFPs as defensive, in order to maintain competitiveness and existing customer base rather than gain additional custom. The programmes have two advantages for the airlines in that they provide a useful marketing tool for matching customer requirements more exactly and developing new marketing strategies, and since they are usually restricted they enable airlines to balance loads on flights. The major drawback are the costs associated with administering the programmes and providing the rewards. The airlines in the EU have introduced FFPs cautiously and with a large variation in the levels of rewards.

Several changes have been observed recently. More airlines are now rewarding the lowest fare leisure traveller compared to the original requirement of business or fully flexible economy tickets. Hence, airlines are keen to fill up the back of

**Table 11: Air transport  
ACE members traffic, 1993**

	Country	Passenger-kms (millions)	Passengers (thousands)
Aero-Lloyd Flug	D	(1) 4 667.6	1 022.6
Air 2000	UK	11 300.0	4 062.3
Air Belgium	B	757.0	200.0
Air Berlin	D	1 000.0	500.0
Air Europa/España	E	(1) 4 500.0	2 327.8
Air Europe SpA	I	3 087.8	228.5
Air Holland Charter	NL	(2) 1 000.0	500.0
Air Liberté	F	(1) 2 815.0	1 030.0
Air UK Leisure	UK	1 819.8	951.2
Airtours Int'l	UK	8 288.6	3 550.0
Balair-CTA	CH	(1) 3 310.0	1 035.2
Britannia Airways	UK	18 092.4	7 616.0
British Midland AW	UK	3 365.1	4 734.8
Caledonian Airways	UK	6 135.0	1 825.0
Centennial	E	337.3	267.6
Condor Flugdienst	D	14 457.8	5 100.0
Corsair	F	5 570.0	1 100.0
Deutsche BA	D	491.2	949.5
Euralair	F	883.0	678.6
Eurobelgian AL	B	1 164.0	645.0
Excalibur	UK	2 400.0	675.0
Futura	E	2 066.1	1 255.1
Germania	D	2 311.4	1 211.9
Hapag-Lloyd Flug	D	8 796.0	3 596.0
LTE Int'l Airways	E	1 512.6	800.8
LTU Int'l Airways	D	7 770.2	2 796.4
LTU-Süd Int'l Airways	D	4 697.8	1 943.3
Maersk Air	DK	1 343.0	1 320.0
Martinair Holland	NL	7 423.8	1 586.1
Monarch Airlines	UK	9 500.0	4 100.0
Oasis AL	E	(1) 2 000.0	1 000.0
PremiAir	DK	7 890.2	2 844.6
Sobelair	B	2 000.0	916.0
Spanair	E	4 478.0	2 105.5
TEA Italy	I	1 000.0	500.0
Transavia Airlines	NL	(2) 3 000.0	1 300.0
Virgin Atlantic AW	UK	9 001.0	1 226.0
Total		170 231.7	67 500.8

(1) 1992

(2) Estimate

Source: ACE



the aircraft on a marginal cost basis. There also appears to be indications of an FFP competition, as airlines have been increasing rewards, in some cases doubling them. Finally, business travellers seem to be shifting their priorities when joining a FFP, attaching more importance to being at the head of the waiting list for overbooked flights than to earning free flights.

Though the number of members of the major EU airlines' programmes is still tiny compared to the US, membership in FFPs are on an upward trend and more than 85 % of business travellers now belong to a frequent flyer scheme.

### Impact of the Single Market

For the airline industry, the most important aspect of the Internal Market has been the liberalisation of air transport services. By freeing entry, capacity and fares within the European market, liberalisation is bound to have an important impact on the structure of the sector. However, this effect will only materialise progressively and, at the moment, only a relatively small number of M&A operations or start-ups may be directly attributed to the Internal Market. The impact of liberalisation has so far been quite different depending on the type of airlines considered. Charter airlines, which have long operated in a competitive environment, have until now been much less affected than other airlines. By contrast, liberalisation has largely supported the activity of regional airlines, partly owing to easier market access and partly owing to the transfer of routes from larger carriers who need, for cost cutting reasons, to re-orient their structures towards longer distances or higher capacity routes.

Because much of the benefits of European integration ultimately hinge on increased competition and the existence of a level playing field, competition policy is a crucial element of the 1992 programme. In particular, the sector is characterised, in several countries, by a large amount of state-ownership so that a sound policy in terms of state subsidies becomes particularly important. In terms of competition, another crucial factor is inter-modal competition between air transport and high-speed-rail. The EU environmental policy has so far failed to recognise that air is not less environmental friendly than high-speed rail and that the subsidisation of the high-speed rail is therefore unfair for commercial aviation.

There remains important barriers to the completion of a fully integrated market. One of them is the necessary liberalisation of ground handling services, the cost of which can sometimes seriously distort competition. Another, considered by the in-

dustry as a chief priority, is the cost burden resulting from the non-harmonisation of air traffic control systems in Europe and, more generally, the existence of serious shortages in terms of airport capacity.

## ENVIRONMENT

The two most important environmental impacts of the air transport industry are noise and air pollution. Noise is particularly important. Estimates included in the Commission's Green Paper on The Impact of Transport on the Environment suggest that the percentage of the population exposed to aircraft noise above 55 db(A) varies from 35 % in the Netherlands to 1.7 % in Denmark, and above 65 db(A) from 1 % in Germany to 0.3 % in Denmark. Hence, the location of airports close to residential areas is a key factor in noise pollution. Estimates released by the AEA show that the modern jets generate about the same level of noise as a TGV, but for a comparatively minute distance (some 4 kilometres). However, the discussion about noise continues at full pace, and most services that land or take off at airports near residential areas have strict requirements about night flights and the levels of thrust that can be used. This has a detrimental impact on the airlines costs as it can take much longer for an aircraft to reach optimum cruising altitude and hence the fuel burn and the time taken for a particular stage length is higher.

Estimates for air pollution put carbon dioxide emissions second to road transport but the gap is considerable, with road accounting for almost 80 % and air taking almost 11 %. Other emissions such as nitrogen oxides are still under investigation, however, some figures from the UK indicate that air emissions of NOx account for only 1 %. Further research is being conducted on the measurement of NOx in the troposphere, where it is feared that the effect of the greenhouse gases is greater than at ground level.

An important caveat to understanding the relative pollution of air transport vis-à-vis other modes is that the advances made by modern technology are substantially reducing both air and noise pollution.

## REGULATIONS

The Commission of the European Communities has taken a gradual approach to deregulation in order to avoid the pain experienced by the US industry following the deregulation of the US market. In 1978, the US government deregulated

**Table 12: Air transport**  
**Development of AEA's total scheduled freight traffic (1)**

(million tonne-kms)	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993
Aer Lingus	89	81	75	81	102	118	128	115	109	97
Air France	1 545	2 391	2 632	2 928	3 154	3 261	3 423	3 230	3 284	3 582
Alitalia	519	747	834	901	1 019	1 107	1 159	1 218	1 262	1 327
British Airways	992	1 140	1 244	1 410	2 027	2 183	2 291	2 236	2 461	2 734
Iberia	384	510	527	524	589	725	753	614	578	544
KLM	944	1 396	1 497	1 720	1 873	1 990	2 125	2 220	2 394	3 070
Lufthansa	1 506	2 413	2 821	3 242	3 479	3 840	4 026	4 093	4 284	4 636
Luxair	0	0	0	0	1	1	0	0	1	0
Olympic Airways	61	103	92	104	102	103	113	114	107	127
Sabena	394	565	574	536	651	661	663	486	386	401
SAS	403	399	402	380	397	419	442	406	390	420
TAP Air Portugal	105	133	123	125	141	160	171	163	167	171
UTA	435	467	428	431	503	528	542	485	448	0
EU	7 377	10 347	11 251	12 380	14 037	15 095	15 834	15 381	15 870	17 109

(1) Domestic + international traffic, excluding mail.  
Source: AEA



**Table 13: Air transport  
Comparison of EU, USA and Far Eastern IATA members,  
1993**

	Load-factor (%)	Number of persons employed
EU airlines	64.6	262 711
US airlines	54.2	499 187
Far East airlines	62.6	260 926

Source: WATS: Systemwide scheduled services

the domestic market by abandoning the geographical limits to route networks, fare regulation and refusing to enforce the hitherto powerful economic regulations. The result of deregulation in this market was a proliferation of new entrant carriers in the early 1980s. The lower unit costs arose from the surplus of experienced labour that had been made redundant by the established airlines. However, a large number of these new entrants were later either taken over by the larger airlines or went bankrupt and ceased operations, as well as some of the very large operators. The effect of this was to concentrate the US domestic and international air travel in a handful of 'mega' carriers with a number of substantially smaller 'niche' carriers. As a result of the deregulation in the US and in some other markets, deregulation is often accused of aiding or at the very least not stopping concentration. However, in the recent past, US skies have remained fiercely competitive, partly under the spur of low-cost entrant carriers, and fears of anti-competitive behaviours due to increased concentration now appear largely overdue.

Following the US, European support for liberalisation of air transport policy gathered momentum, with the United Kingdom being one of the leaders. In 1984, the UK signed a new air services agreement with the Netherlands, which was further modified in 1985 and in essence completely freed air services between the two countries. The agreement allowed free entry of new carriers, open route access by designated airlines to any point in either country, no control on capacity and a double disapproval fare regime. This agreement represented the first major break in the usual bilateral traditionally found in Europe. More agreements followed in Europe, some of which were very liberal in that they removed any controls on the points that could be served in each country by the other country's airlines. In theory this offered equal opportunities for either countries' airlines.

Typically, the bilateral agreements that were negotiated in Europe during the mid 1980s allowed first, third, and fourth freedom rights, but more importantly relaxed the limits on

capacity as well as fare regulation and propagated the double disapproval fare regime.

The Commission of the European Communities added weight to the existing agreements in a series of three packages, which enforced new agreements on members that had not negotiated liberal bilateral agreements, and, more importantly, allowed more extensive fifth freedom rights, as well as paving the way for cabotage later in this decade.

Although the first two packages were quite limited in scope, they nonetheless underscored the Commission's commitment to deregulating the air transport sector within the European Community.

The main achievement of the first two packages was to harmonise national legislation at the then most achievable level for competition as well as providing the foundations for the third package. The process has been quite gradual due to the negotiation required between the individual Member States and the need to keep in line with the progress towards the Single Market. The first and second packages were thus not viewed as deregulation since there remained a number of legislative constraints including continued capacity limitations and some fare regulation.

It is the third package that came into force on 1 January 1993 that really liberalised the air transport market in the European Community and that will influence most of the future organisation of the sector. This package essentially allowed any airline, existing or start-up, to operate anywhere in the Community with whatever capacity and fare level the airline chooses. There exist a small number of exceptions, such as very thin routes which can be protected, but these do not detract from the aggregate effect of liberalising air transport in the European Community. However, in order to obtain an 'air operator's certificate (AOC)' for start-ups, the airline has to provide the relevant authorities with a business plan that includes minimum capital requirements and the ability to operate for a minimum term. Cabotage is currently restricted to 50 % of capacity and is only allowed if the airline starts or finishes the flight in its home country but it will be completely unrestricted from April 1997.

So far, the reaction by the airlines to the third package has been relatively cautious. There has been no explosion of fare reductions or added capacity, however alliances, whether equity based or not, are increasing, both amongst the EU airlines and between EU airlines and non-EU airlines. This increasing concentration is based on both the EU airlines' desire to seek positive positioning within the EU and the need to act global. This somewhat mirrors the situation that was observed in the US in the 1980s, but with less equity involved.

Recent agreement has been reached by the EU transport ministers on a code of conduct for computer reservations systems

**Table 14: Air transport  
Air freedom rights**

First Freedom	To overfly one country en-route to another
Second Freedom	To make a technical stop in another country
Third Freedom	To carry passengers from the home country to another country
Fourth Freedom	To carry passengers to the home country from another country
Fifth Freedom	To carry passengers between two countries by an airline of a third country on a route with origin/destination in its home country
Sixth Freedom	To carry passengers between two countries by an airline of a third on two routes connecting in its home country
Seventh Freedom	To carry passengers between two countries by an airline of a third on a route outside and completely separate from its home country
Eight Freedom/Cabotage	To carry passengers within a country by an airline of another country on a route with origin/destination in its home country

Source: AEA



**Table 15: Air transport**  
**Expected annual growth rates of air traffic by country market**

(%)	1994	1995	1996	1997	1998
Belgique/België	5.6	5.3	5.3	5.3	5.2
BR Deutschland	4.4	5.2	5.7	6.0	5.9
Hellas	7.6	4.8	4.7	4.6	4.8
España	4.1	3.1	4.1	4.6	5.1
France	3.2	2.9	6.3	6.4	6.6
Ireland	-1.1	3.0	3.5	3.5	3.5
Italia	6.8	5.5	6.2	6.1	5.7
Nederland	5.1	5.3	5.5	5.7	5.5
Portugal	6.0	7.4	7.8	8.0	8.2
United Kingdom	2.7	2.7	5.0	5.1	5.2
Scandinavia	4.7	4.6	4.5	4.6	4.3

Source: AEA

(CRS) which in essence ensures that airlines that own a CRS are prevented from poaching passengers from other airlines that participate in the same system.

In January 1993, the European Council also reached an agreement on common rules for the allocation of slots at Community airports. The new code of conduct sets out transparent and non-discriminatory rules for the allocation of slots in order to avoid competition distortion due to an unequal access to slots.

Following the industry's structural difficulties, the European Commission set up a "Comité des Sages" to review the situation of the European airlines and to propose policy actions. The committee's final report was published in January 1994 and was followed by a communication of the European Commission in June 1994 which set up guidelines for a concerted action programme for civil aviation in Europe. In short, the communication recognises that the present difficulties of the industry stem from a combination of world overcapacity and European specific problems such as low productivity and high costs. The Commission regards efficiency improvements and cost-saving measures in the civil aviation system in Europe as political priority for the years to come and stresses that making the internal market fully effective and achieving significant enhancement in infrastructure are key elements for the improvement of the sector's competitiveness (COM(94) 218 final). In particular, air transport infrastructure, both in terms of air traffic management and in terms of airport capacity, falls within the scope of the provisions on Trans European Networks of the Maastricht Treaty and, as such, will benefit from European coordination and from European funds.

## OUTLOOK

With 1994 now promising to be one of the best years in terms of traffic growth in more than a decade, the outlook of the airline industry appears rather upbeat. The gradual recovery of European economies during the second half of 1994 will continue to fuel short and medium term growth in European air traffic. Table 15 illustrates the AEA forecast by country, with nearly all countries providing reasonable average growth rates for the period 1994-98. However, European airlines are still characterised by large differences in competitiveness and some carriers are better positioned to take advantage of future growth opportunities.

The deregulation of the skies will force continued consolidation within the industry in order for airlines to remain competitive with both their competitors within the EU and outside the EU. Hence the number of major EU operators is expected to decline in the future, whilst the number of smaller niche point to point airlines will increase.

One blight on future growth of air traffic in the EU is the limitations of infrastructure for air transport, in particular as to Air Traffic Control (ATC). Eurocontrol, Europe's largest air traffic control grouping, has re-iterated warnings that significant investment is required to harmonise and update Europe's air traffic control in order to avoid the crunch that is looming. At present, 23 countries of the European Civil Aviation Conference have 31 different air traffic control systems. These systems rely on 18 different types of computers and 30 incompatible programming languages. Though the situation somewhat improved in 1993, the vast majority of delayed flights in Europe are still attributable to airport and air traffic control system. Although improvements to ATC are being provided, there is still a long way to go in terms of investment capital and time before a harmonised system of ATC will be available that is comparable to the one currently in existence in the United States.

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# Postal and express services

## NACE 79

The trend towards deregulation of the postal market in Europe has received a boost by the recent developments in Germany, which are likely to be echoed in other EU countries. The driving force behind deregulation is undoubtedly the globalisation of the communications market, which calls for European postal operators to be able to offer more market-oriented services.

Further policy initiatives put forward by the European Commission are likely to cause further structural changes in the services provided by both postal administrations and private operators.

### INDUSTRY PROFILE

#### Description of the sector

NACE 79 includes all units exclusively or primarily engaged in transmitting sounds, images, documents and packages for the benefit of the general public. Apart from postal and express services, this NACE heading includes telephone, telegraph, telephotography and telex services.

This monograph deals exclusively with postal and express services. In particular it concerns the activities of postal administrations of Member States and private operators. However, postal administrations are also involved in financial services like postal giro offices (NACE 812) and post office savings bank branches (NACE 813.1).

Postal and express services provide the mechanism whereby letters and packages are moved between two distinct groups of users. The service provides transmission for business to business, business to private and private to private.

The distinction between letter services and parcel services for both postal and express is determined by weight and contents (typically letters carry 'communication'; parcels carry 'goods', although letter services can carry small goods). Pricing of the services is determined by weight, geographic destination (where zonal price differences are typically

differentiated into domestic, EU, and substructures for the rest of the world) and required speed of delivery.

Letter services provided by postal administrations can be categorised in three main areas:

- Standard letter services for letters, post-cards, printed papers and small packets with or without priority delivery;
- Subsidiary letter services, which include registered letters, recorded letters, certificate of posting/advice of delivery, special delivery, express, direct bags ("M-bags"), post office boxes and post restante;
- Additional specialised letter services, such as postal electronic mail, "hand delivery", "city mail", periodics (magazines and newspapers) and direct mail.

Most postal administrations provide letter services under a monopoly (reserved services); except for Sweden and Finland. In general a concession is granted to the postal administrations, in which they have special and exclusive rights for offering these services. The provision of the service is then obligatory. Parcel and express services are offered in a more competitive environment (non-reserved services), where postal administrations usually dominate in some parcel sub-services (such as private-private), whilst private operators can dominate express services and business to business transmission.

In financial services, postal administrations offer the following:

- postal payments (money orders, postal orders and cheques, "valeurs déclarées");
- girobank operations (tele-payment, interior accounts/deposits/pay-out, foreign currency, mortgages and charge/credit cards);
- savings bank operations (home savings and common funds investment);
- other payments (pensions, welfare services, licences, taxation and public payments).

However, the services are not always offered directly by the postal administrations but sometimes as agents on behalf of separate banking companies.

#### Recent trends

The postal services sector is an important sector for the European Community, accounting for about 0.9 % of total GDP of the European Union and employing about 1.7 million staff.

**Table 1: Postal and express services**  
Postal administrations - Receipts as a share of gross domestic product

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	1.00	0.98	0.94	0.90	0.86	0.84	0.78	0.78	0.82
Danmark (1)	0.80	1.06	1.08	1.09	0.88	0.87	0.91	0.89	0.95
BR Deutschland	0.84	0.98	0.92	0.92	0.74	0.82	1.16	0.68	0.62
Ellas	0.28	0.21	0.24	0.26	0.32	0.30	0.30	0.27	0.29
España	0.21	0.23	0.21	0.20	0.17	0.22	0.22	N/A	N/A
France	1.46	1.54	N/A	1.44	1.35	1.35	1.05	N/A	N/A
Ireland	0.61	0.94	0.93	0.92	0.84	0.78	0.80	0.83	0.82
Italia	0.40	0.61	0.64	0.65	0.69	0.67	0.73	0.64	0.66
Luxembourg (2)	0.54	0.67	0.79	0.79	0.73	0.64	0.59	0.68	0.64
Nederland	1.57	1.56	0.89	0.93	0.88	0.91	0.90	N/A	N/A
Portugal	0.37	0.45	0.38	0.38	0.39	0.41	0.50	0.55	0.54
United Kingdom	1.00	0.92	0.91	0.90	0.83	0.87	0.86	0.90	0.78
EU	0.93	0.99	N/A	0.92	0.84	0.85	0.88	N/A	N/A

(1) Excluding payments received from and paid to foreign postal administrations

(2) In 1991-92, including only letter post

Source: UPU, national postal administrations

The sector is critical for most business and private interaction and trade, as it provides an important mechanism for communication, which although facing competition from other forms of communication such as telephone and fax, remains a major force.

Measured in terms of the number of items handled, the largest postal administration in the EU is France's La Poste (22.8 billion in 1992). The German Bundespost ranks second (17.0 billion) and the United Kingdom's Royal Mail third (16.3 billion). These top three provide more than half of item movements in Europe.

Over the last ten years the number of post offices open to the public and the numbers of employees have broadly been stable or slightly declining in most EU countries. The analysis of available data (presented in Table 3) is made impossible by the varying definition of post office and of post employees.

Competition from private operators has taken some of the aggregate market share (in value terms) as in the late 1980s private express services had strong growth with rates in the range of 30-40 % a year. However, estimates in volume terms for the intra-European express market are at around 30 million items per year, which is significantly smaller than the comparable total for the postal administrations (including extra-EU movements) of over 80 billion items.

The private operators have caused a shift in the market for postal services. National postal administrations have been faced with increasing competition in non-reserved services from the private international operators aggressively moving into the market, especially in the field of parcels and priority express services. This has hastened most postal administrations into improving their own priority and package services.

#### International comparison

Comparing postal administrations in the EU with those in the USA and Japan reveals that on average each EU citizen received 260 mail pieces in 1990. In the USA, the number of mail pieces received annually by citizens is much higher at around 650. This difference is due mainly to a much higher level of direct mailing activity. In Japan the average amounts to about 160 pieces.

Within the EU there are large differences in the average number of per capita mail items received. In countries such as the Netherlands this number is the highest with over 400 items per year. On the other hand, in Greece and Portugal the average is below 100 items annually. Figures for Japan reveal that in

Tokyo mail received per capita amounts to 388, whereas in some rural prefectures this is less than 60 pieces.

Comparisons of relative efficiency of the postal administrations often use the number of items handled per employee. These comparisons, although partially useful for broad brush comparisons, are fraught with problems as the number employed by an administration may include workers who are irrelevant to postal services, for instance in the girobank division, and the structure of mail services differs significantly within the EU itself and among the EU and the USA or Japan.

## MARKET FORCES

### Demand

Customers of postal services are either businesses or domestic households. According to industry sources, about 60 % of all mail originates from businesses and is destined to domestic households; around 30 % is "business to business", and the remaining 10 % of postal service traffic circulates among domestic households.

For parcel services the distribution is slightly different. Businesses and organisations send about 85 % of all parcel items, the bulk of which (70 %) is received by individuals. About two-thirds of parcels sent by individuals are destined for other individuals.

For postal administrations, the market is rather evenly spread over various end-users. The more important outlets are the publishing industry, which sends periodicals to its readers by mail and accounts for about one fifth of the shipments made, and direct marketing/advertising mail; for instance, non-addressed mail delivered to households in 1992 by Belgium's De Post/La Poste was 51 million items, which is more than 7 % of all items. Another important segment is mail ordering.

During the past few decades, mail order developed as a competitor of store retailing services. This allowed postal services to benefit from the growth in package movements created by mail order, as they have been able to meet with requirements such as customer communication, catalogue distribution, statement sending and goods distribution. More recently, private operators have taken part of this market too from public administrations.

Advertising by mail (direct mail) has also increased its importance for postal services over the years. An increasing share of marketing and sales budgets is spent on direct mailing activities. In this market segment too, postal administrations

**Table 2: Postal and express services  
Postal administrations - Gross investments**

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	29.7	25.0	25.5	32.3	34.0	44.6	82.3	99.8	87.4
Danmark	(1) 36.1	(1) 46.5	29.9	49.6	17.6	22.1	17.2	27.4	33.0
BR Deutschland	209.6	359.8	435.4	459.7	613.2	615.7	664.0	646.9	990.6
Ellas	1.4	7.6	5.9	1.3	4.0	4.7	2.6	4.3	7.4
España	14.0	32.8	64.6	N/A	11.4	18.1	20.5	N/A	N/A
France	251.3	382.9	N/A	453.8	429.8	413.9	461.7	N/A	N/A
Ireland	2.2	9.8	7.9	11.2	10.8	16.3	9.5	14.1	16.8
Italia	179.7	681.0	866.9	841.8	948.0	758.6	836.6	882.5	N/A
Nederland	67.2	123.9	121.0	100.5	89.7	76.7	90.0	N/A	N/A
Portugal	8.1	15.6	16.5	13.3	15.5	21.8	24.4	41.1	49.4
United Kingdom	115.8	N/A	172.1	216.6	216.7	382.4	330.6	574.9	637.6
EU (2)	915.1	N/A	N/A	N/A	2390.7	2374.9	2539.4	N/A	N/A

(1) Including telecommunications services

(2) Excluding Luxembourg

Source: UPU, national postal administrations

**Table 3: Postal and express services**  
**Postal administrations - Main indicators**

	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Number of post offices open to public (units)</b>									
Belgique/België	N/A	N/A	N/A	1 840	1 838	1 833	1 821	1 822	1 816
Danmark	5 369	5 358	5 396	5 459	4 887	4 765	4 873	4 786	4 709
BR Deutschland	18 865	17 967	17 826	17 748	17 642	17 568	29 515	26 135	22 250
Ellas	1 298	N/A	N/A	N/A	N/A	N/A	N/A	1 254	1 245
España	N/A	12 535	12 938	12 985	12 985	18 582	41 833	44 544	42 081
France (1)	17 380	17 223	17 297	17 089	17 028	16 999	16 967	16 945	16 855
Ireland	2 162	2 143	2 138	2 118	2 082	2 069	2 046	2 023	2 002
Italia	N/A	14 348	14 373	14 461	14 426	14 439	14 464	N/A	14 411
Luxembourg	105	107	106	106	106	106	106	106	106
Nederland	2 694	2 913	2 878	2 624	N/A	N/A	N/A	2 405	N/A
Portugal	11 578	7 999	7 932	8 117	7 399	7 198	7 306	7 814	7 532
United Kingdom	22 480	N/A	21 211	21 071	21 030	20 871	20 638	20 160	19 958
<b>Number of post items handled (millions) (2)</b>									
Belgique/België	3 493	3 014	2 993	3 111	3 083	2 981	3 378	3 463	3 436
Danmark	1 513	1 570	1 698	1 728	1 744	1 758	1 790	1 815	1 904
BR Deutschland	14 255	14 646	15 291	14 849	15 844	15 940	16 318	17 052	N/A
Ellas	454	418	426	433	451	475	438	428	456
España	4 861	4 219	4 538	4 434	(4) 5 026	5 574	5 609	4 714	4 700
France	13 486	16 352	16 775	17 915	18 833	20 016	20 746	21 868	22 844
Ireland (3)	320	434	447	456	465	472	482	646	529
Italia	6 399	7 192	7 482	8 086	8 279	8 988	8 912	8 247	7 712
Luxembourg	114	148	159	167	172	173	173	138	141
Nederland	4 729	5 319	5 529	5 695	5 890	6 105	N/A	(4) 6 300	N/A
Portugal	520	505	527	561	606	658	716	815	882
United Kingdom	N/A	14 159	13 035	14 068	14 242	15 803	16 412	16 601	(5) 16 364
EU	N/A	67 976	68 900	71 503	74 635	78 943	N/A	82 087	N/A
<b>Number of persons employed (units)</b>									
Belgique/België	52 041	49 373	46 292	46 565	46 022	46 057	45 383	46 133	46 046
Danmark	30 857	30 040	35 100	32 000	33 600	34 400	28 235	27 351	25 636
BR Deutschland (6)	280 295	272 577	272 781	273 312	272 571	272 571	277 691	279 990	333 407
Ellas	9 017	10 626	10 791	11 384	11 602	11 690	12 020	11 216	11 009
España	49 624	49 954	58 675	56 900	56 094	70 389	70 236	66 810	65 589
France	285 007	304 667	303 700	300 586	295 300	295 887	299 785	297 428	296 660
Ireland	12 600	10 998	10 994	10 701	10 269	9 871	9 812	9 564	9 722
Italia	182 205	N/A	N/A	N/A	237 088	230 615	236 922	233 518	226 643
Luxembourg	1 427	1 463	1 466	1 474	1 694	1 702	1 704	1 769	1 764
Nederland	68 593	72 864	68 485	63 278	64 414	58 894	60 450	61 970	N/A
Portugal	18 671	17 067	16 805	16 511	16 277	16 092	15 846	15 057	14 303
United Kingdom (7)	179 795	186 100	200 170	210 600	218 000	235 200	235 168	197 000	190 000
EU	1 170 132	N/A	N/A	N/A	1 262 931	1 283 368	1 293 252	1 247 806	N/A

(1) Including mobile post offices

(2) Domestic and international service including dispatch and receipt

(3) Figures for Ireland 1980-90 include only domestic service

(4) Estimated by DFI

(5) Excluding international receipt

(6) 1980-91 part-time employees converted into full time equivalents; 1992 as "head-count"

(7) Excluding part-time employees from 1990 onwards

Source: UPU, national postal administrations

are losing market share to private operators, particularly in urban areas.

Distribution of publications by mail remains important for postal administrations. They can offer cheap mailing services at preferential tariffs. However, private operators are competing with this low value mail services, as other requirements can be important (e.g. a guarantee to deliver the next day).

### Supply and competition

The past two decades have witnessed a considerable alteration of the competitive environment for postal administrations.

The widespread development of cable communications (i.e. fax, electronic mail) has reduced the postal share in the com-

munication market. Also the success of private operators on the parcel market has further reduced the postal administrations' dominance of the sector. In the near future, the expected rapid expansion of home shopping is perceived as yet another competitive challenge to postal services.

Nowadays, private operators are mainly active in the high value added express services from business to business. In the future, they could enter the thriving business-private segment, in order to profit from the booming trend of direct mail. Private operators might also be interested in unsophisticated, low-value added advertising which is distributed to households in large volumes.

**Table 4: Postal and express services**  
**Postal administrations - Receipts and expenditure**

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Receipts</b>									
Belgique/België	849.0	1 038.8	1 069.1	1 084.8	1 106.8	1 170.7	1 181.3	1 238.1	1 389.9
Danmark (1)	381.3	811.9	909.9	967.5	808.8	824.9	932.7	936.0	1 040.5
BR Deutschland	4 924.9	7 988.8	8 316.8	8 871.3	7 483.3	8 785.0	13 662.9	8 732.8	8 543.2
Ellas	81.4	92.0	95.6	102.8	144.6	148.9	154.7	151.4	172.6
España	326.5	502.5	499.9	520.5	509.2	755.2	833.4	N/A	N/A
France	6 962.6	10 623.6	N/A	11 060.9	11 007.6	11 836.8	9 866.5	N/A	N/A
Ireland	84.3	233.8	250.7	251.2	245.3	253.7	279.4	303.3	320.2
Italia	1 320.2	3 429.0	3 947.8	4 282.1	4 910.6	5 315.0	6 295.0	5 977.8	6 200.2
Luxembourg (2)	17.6	30.7	40.3	41.7	42.3	41.9	41.5	51.4	52.6
Nederland	1 912.7	2 648.7	1 614.4	1 758.3	1 728.1	1 883.4	2 000.9	N/A	N/A
Portugal	66.9	122.6	131.2	138.5	159.0	192.1	235.5	306.8	351.7
United Kingdom	3 868.6	5 558.8	5 172.1	5 379.5	5 891.9	6 623.2	6 610.6	7 343.7	6 253.2
EU	20 796.0	33 081.2	N/A	34 459.1	34 037.5	37 830.8	42 094.4	N/A	N/A
<b>Expenditure</b>									
Belgique/België	849.0	1 016.5	1 035.1	1 020.0	1 044.6	1 165.2	1 200.6	1 283.8	1 384.6
Danmark (1)	443.2	576.5	N/A	626.9	800.5	806.0	868.7	898.3	950.9
BR Deutschland	6 661.5	8 880.3	9 341.6	10 132.1	9 584.2	9 454.4	13 662.8	10 578.3	14 724.9
Ellas	81.4	159.8	145.8	141.1	163.1	193.4	199.3	217.1	249.4
España	413.8	605.9	669.2	760.6	683.8	928.4	N/A	N/A	N/A
France	7 291.4	10 709.1	N/A	10 758.9	11 011.9	11 645.4	9 679.7	N/A	N/A
Ireland	108.1	236.3	249.9	247.7	243.1	260.4	290.2	307.2	320.6
Italia	2 377.3	4 687.5	5 690.9	6 258.7	6 455.3	7 007.9	7 935.2	8 321.4	8 395.0
Luxembourg (2)	44.3	76.1	72.2	80.9	87.7	88.2	96.8	54.8	60.9
Nederland	1 858.4	2 489.9	1 610.5	1 702.6	1 684.6	1 790.4	1 856.2	N/A	N/A
Portugal	106.5	170.6	184.2	162.3	157.4	179.7	204.5	240.9	282.1
United Kingdom	3 817.6	5 301.6	4 966.0	5 136.8	5 718.6	6 535.4	6 188.9	7 014.1	5 944.3
EU	24 052.5	34 910.1	N/A	37 028.6	37 634.8	40 054.8	N/A	N/A	N/A
<b>Surplus/deficit (3)</b>									
Belgique/België	0.0	22.3	34.0	64.8	62.2	5.5	-19.3	-45.7	5.3
Danmark (1)	-61.9	235.4	N/A	340.6	8.3	18.9	64.0	37.7	89.6
BR Deutschland	-1 736.6	-891.5	-1 024.8	-1 260.8	-2 100.9	-669.4	.1	-1 845.5	-6 181.7
Ellas	.0	-67.8	-50.2	-38.3	-18.5	-44.5	-44.6	-65.7	-76.8
España	-87.3	-103.4	-169.3	-240.1	-174.6	-173.2	N/A	N/A	N/A
France	-328.8	-85.5	N/A	302.0	-4.3	191.4	186.8	N/A	N/A
Ireland	-23.8	-2.5	1	3.5	2.2	-6.7	-10.8	-3.9	-4
Italia	-1 057.1	-1 258.5	-1 743.1	-1 976.6	-1 544.7	-1 692.9	-1 640.2	-2 343.6	-2 194.8
Luxembourg (2)	-26.7	-45.4	-31.9	-39.2	-45.4	-46.3	-55.3	-3.4	-8.3
Nederland	54.3	158.8	3.9	55.7	43.5	93.0	144.7	N/A	N/A
Portugal	-39.6	-48.0	-53.0	-23.8	1.6	12.4	31.0	65.9	69.6
United Kingdom	51.0	257.2	206.1	242.7	173.3	87.8	421.7	329.6	308.9
EU	-3 256.5	-1 828.9	N/A	-2 569.5	-3 597.3	-2 224.0	N/A	N/A	N/A

(1) Excluding payments received from and paid to foreign postal administrations

(2) In 1991-92, including only letter post

(3) Receipts less expenditures

Source: UPLU, national postal administrations

If one analyses the market for mail, it is true that in the business-to-business segment (30 % of total traffic), the advent of electronic mail will reduce market opportunities for the post; on the other hand, the private-to-private segment (10 %) will remain largely dominated by physical mail.

More importantly, the business-to-private segment, which is the largest of all, offers good growth opportunities for postal administrations which are sufficiently equipped on the technology side, and which have an adequate commercial and marketing freedom.

The best opportunity for public postal operators is represented by the so-called "hybrid mail", i.e. letters which are electronically printed and addressed and delivered by hand. In this market segment, post offices can offer their services to businesses interested in direct mail campaigns, by providing

electronic printing and hand-delivery of letters. Other opportunities lie in the provision of on-line electronic mail and data exchange services, in competition with cable communication companies.

#### Production process

The production process of postal services can be divided in five stages: collection of mail, sorting for destinations, transportation, final sorting and delivery of mail. Mail delivery is the largest cost item, accounting on average for about two-thirds of operational costs. Next comes transport and sorting for destination with a combined share of about one quarter of total costs. The remaining is accounted for by mail collection and final sorting for delivery. These figures are aggregate approximations and vary widely between administrations.



**Table 5: Postal and express services**  
**Postal administrations - Annual change of number of items handled**

(%)	1985	1986	1987	1988	1989	1990	1991	1992
<b>Domestic service</b>								
Belgique/België	4.1	-3.0	2.6	-0.5	-2.2	14.9	3.2	-0.4
Danmark	8.5	9.0	2.0	1.0	0.6	2.0	0.5	5.1
BR Deutschland	-0.2	4.7	-3.2	7.2	1.3	2.5	5.3	N/A
Hellas	-3.8	8.0	-1.7	2.8	7.4	-9.6	-1.2	3.9
España	1.8	8.3	-5.2	28.4	-0.1	0.1	-16.3	3.8
France	3.4	3.7	7.3	5.8	6.2	4.0	5.1	4.9
Ireland	4.6	3.0	2.0	1.9	1.5	2.2	2.5	-22.3
Italia	0.2	4.7	9.5	5.3	8.2	-1.2	-8.0	-8.7
Luxembourg	5.0	12.4	8.5	2.3	0.4	2.4	3.1	0.6
Nederland	3.3	4.4	5.6	6.0	3.1	N/A	N/A	N/A
Portugal	9.4	4.7	6.6	9.6	9.4	9.2	13.3	8.9
United Kingdom	9.1	-7.6	8.1	1.6	11.5	4.0	0.5	2.4
<b>International service</b>								
Belgique/België	-11.4	15.1	11.5	-2.9	-9.4	4.0	-2.2	-3.3
Danmark	6.9	-0.8	0.0	0.0	3.1	-0.1	12.5	2.4
BR Deutschland	-2.9	1.1	1.2	0.2	-8.5	0.3	-7.1	6.3
Hellas	-10.6	-17.8	15.6	9.8	-1.8	-1.3	-6.2	15.4
España	-9.2	0.5	26.3	N/A	N/A	5.7	-12.6	-34.2
France	0.4	-17.3	-3.5	-12.2	8.7	-6.1	14.3	-9.6
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-4.1
Italia	2.1	-1.0	-3.3	-24.0	12.7	3.7	-1.3	17.5
Luxembourg	9.3	2.3	2.2	3.5	-0.1	-2.3	-49.0	8.3
Nederland	25.9	0.9	-13.5	-17.2	8.8	N/A	N/A	N/A
Portugal	8.8	2.1	5.7	-1.2	2.1	6.6	17.0	3.3
United Kingdom	-4.9	-11.4	6.0	-3.7	4.5	2.0	10.5	N/A
<b>Total service</b>								
Belgique/België	1.8	-0.7	3.9	-0.9	-3.3	13.3	2.5	-0.8
Danmark	8.4	8.1	1.8	0.9	0.8	1.8	1.4	4.9
BR Deutschland	-0.4	4.4	-2.9	6.7	0.6	2.4	4.5	N/A
Hellas	-5.6	1.8	1.7	4.3	5.2	-7.8	-2.4	6.5
España	0.6	7.6	-2.3	N/A	N/A	0.6	-15.9	-0.3
France	3.2	2.6	6.8	5.1	6.3	3.6	5.4	4.5
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-18.0
Italia	0.4	4.0	8.1	2.4	8.6	-0.8	-7.5	-6.5
Luxembourg	7.1	7.3	5.5	2.9	0.2	0.2	-20.5	2.8
Nederland	6.0	3.9	3.0	3.4	3.7	N/A	N/A	N/A
Portugal	9.3	4.3	6.5	8.0	8.4	8.9	13.8	8.2
United Kingdom	7.8	-7.9	7.9	1.2	11.0	3.9	1.2	N/A

Source: UPU, national postal administrations

A good network is of crucial importance for postal services. The complexity of the interactions between all the different points in a network demands a good logistics chain. For international mail the problem is even more complex, as domestic networks have to be matched. Essentially there are two network systems: the hub-and-spoke system, in which a region is serviced from a central "hub" via "spokes" with local centres; and the spider's web system, in which local centres interact directly with each other.

Productivity is very different between the postal administrations of the EU countries. On average, postal administrations have an estimated turnover per employee of about 22 000 ECU. On the other hand, private operators have a turnover per employee that is more than double the postal administrations. These differences mainly arise from the different value added provided and consequently are not totally comparable. Also, network quality, labour costs and productivity are among the factors that cause wide ranges in tariffs for what, apparently, are the same services. Private operators charges are substantially higher, since customers pay for a higher service quality.

An often used indicator for service quality in postal administrations is the percentage of domestic mail delivered the day after collection. In small countries like Denmark, Netherlands and Luxembourg this rate is in excess of 95 %. In Germany, a large country relative to the previous ones, the Deutsche Post AG manages 81 %. On the other hand, in Italy, another large country, it is 17 %. This poor service quality of the Italian postal authority can allow private operators to gain a larger market share. It is important to note that these estimates of delivery rates are not strictly comparable, and should only be used for broad comparisons.

## INDUSTRY STRUCTURE

### Companies

Table 6 profiles the legal status of the postal administrations of the Community in 1994. All public postal operators are controlled and owned by the various governments, with the notable exception of the Netherlands; where the government sold 33 % of its shares to the public in 1994. At the same

**Table 6: Postal and express services  
Postal administrations - Legal status, 1994**

	Legal status	Financial authority
Belgique/België	Public corporation	Financial autonomy
Danmark	State administration	Separate budget
BR Deutschland	Public corporation	Financial autonomy
Hellas	Public corporation	Financial autonomy
España	Public corporation	Financial autonomy
France	Public-law autonomous establishment	Financial autonomy
Ireland	Public limited company	Independent
Italia	Public corporation	Financial autonomy
Luxembourg	Public corporation	Financial autonomy
Nederland	Public limited company	Independent
Portugal	Public corporation	Financial autonomy
United Kingdom	Public corporation	Financial autonomy

Source: European Commission, DG XIII

time, all postal administrations in the EU enjoy various degrees of financial autonomy.

Private operators can be classified into four categories: companies operating globally or intercontinental, pan-European companies that are essentially EU domestic, national operators and local operators. The globals include companies such as the big four 'integrators': DHL, Federal Express, GD Express Worldwide (GDEW), a joint venture between TNT and the postal administrations of France, Germany, the Netherlands, Sweden and Canada) and United Parcel Service (UPS). They offer services which go beyond postal services and integrate various forms of transport and distribution. Examples of the second category are Kühne & Nagel (D), Jet Services (F), TAT Express (F) and Securicor (UK). In the national and local levels a host of small companies offer express services that range from long distance indigenous city to city pairs, to city or conurbation area delivery by specialist motorcycle couriers.

The initial strong growth in the market for express services has attracted companies active in other fields of transportation and forwarding. For example airline companies like KLM, Lufthansa, British Airways and Air France support the services offered to the market by providing inexpensive, but otherwise redundant, cargo space in their aircraft to the freight forwarders and consolidators. Freight forwarders and railroads have started express services. Postal administrations have set up their own international express service (EMS) in order to take advantage of the higher value added market, and in some cases are involved with the private sector, for instance GDEW.

At the beginning of the 1990s, the large private operators have been faced with weakening growth and have experienced some setbacks due to the downward pressure on the high value added end of the market caused by recessionary constraints. Rationalisations and closure of some activities has occurred as well as a fall in aggregate employment in the private sector. However, in 1994, these courier companies have all been experiencing very high growth.

### Strategies

The trend towards deregulation of the postal market has gained momentum in the past few years. Examples provided by the Netherlands (30 % privatised), Finland and Sweden have shown that postal administrations are able to turn postal services into profitable operations.

In Germany, the government has recently decided to end the post office monopoly for deliveries of mass printed materials and catalogues of over 250 grams from 1 January 1995. The second step of the deregulation process in this area will reduce the weight limit for private transport companies to 100 grams from 1 January 1996.

The recent victory of the conservative coalition in the German general elections is likely to push further the deregulation process.

The most immediate impact of liberalisation measures will be the need for postal administrations to offer more market-oriented products in order to survive in a competitive market. In anticipation of such development, postal administrations have already become increasingly commercial.

For example, following the above-mentioned deregulation measures, the German post office has announced that, starting from 1 April 1995, it will cut prices for mass mailings to better face private competition.

In some countries, the profitability of financial services provided by postal administrations is high, sometimes well above 10 % of the turnover in that sector. This enables a partial and sometimes full compensation of losses on postal services, but at the same time begs the question of what is the level of cross-subsidisation in the administrations.

Together with a strong drive towards meeting customers' needs, postal administrations have also improved efficiency on the supply side. This has been achieved mainly by investments in automatic sorting of mail. Also the efficiency of operations in the network has been improved by a more cost-based attitude.

In an international perspective, postal authorities cooperate in various organisations, such as the Universal Postal Union (UPU) of the United Nations, the European Conference of Postal and Telecommunications Administrations (CEPT) and the Association of European Public Postal Operators (PostEurop).

PostEurop, which regroups postal operators from 38 countries in Europe, has been set up in 1993 as a forum for coordinating result-oriented developments within the European postal market: among its specific tasks, PostEurop aims at raising quality-of-service standards by monitoring market developments and facilitating the exchange of experience and expertise.

In the private sector market for parcel and express shipment services, the level of demand has placed a limit on the number of operators. Hence there has been a number of mergers and strategic alliances, which is likely to continue in the short to medium term. These have and will continue to involve integrators, carriers and forwarders, and also postal administrations.

A key example of the changing structure of the industry is TNT Australia, which sold most of its European network to GDEW. In GDEW the five key member administrations combine their EMS services with the international express network of old TNT network. This alliance is attractive for postal

administrations as they have reduced their exposure to the old bilateral agreements structure. The success of this strategy is confirmed by the news that also the post offices of Austria, Switzerland and Hungary are negotiating their entry into GDEW.

### Impact of the Single Market

The Single Market programme had a positive, though limited impact on public postal operators. The most relevant measures of the programme have undoubtedly been those contained in the EU competition policy. The progressive opening up of mail services and the increasing competition from telecommunications services have turned postal operators into more customer-oriented entities. Additionally, the progressive liberalisation of transport services could have a direct positive impact on postal services by reducing transport costs (the major input after labour). Many of the Green Paper's recommendations are seen as vital to improve public postal services throughout the EU. Some proposals (such as a possible liberalisation of direct mail and inward international items) are still under discussion. Public postal operators welcome the Single Market programme and the EU's initiative to review its implications for the postal sector. In particular, clarification of universal services and reservable area requirements should provide a solid base for improving services to customers.

The Single Market programme has been one of the major catalysts for the rapid expansion of the private express services sector. The most relevant measures for the sector are enshrined in the competition policy. The progressive dismantling of monopoly and the monitoring of state aids are of utmost importance for the continuation of growth in the sector. The achievement of the free movement of goods within the EU has also eased the activity of global couriers, who have adapted their strategy and logistics in order to operate within a single market. According to the EEO, there are some important obstacles to the completion of the Single Market which are yet to be removed: the industry asks, in line with the spirit of the Treaty of Rome, for the complete liberalisation of cross-border mail services, the abolition of cross-subsidies on grounds of unfair competition and the total liberalisation of transport services, notably in rail and air transport. Finally, according to industry sources, more harmonisation is needed concerning customs clearance procedures, which are still based on different criteria for the same items throughout the EU.

### REGULATIONS

In each country governments have legislation for postal administrations to provide universal postal services. Provision requirements differ from Member State to Member State.

In non-reserved services the market has tended to regulate itself. For reserved services however, a body has been responsible for regulating the monopoly market. Historically the regulator was also the operator, i.e. the postal authority. The recent trend has been for Member States to try to separate the regulatory authority from the operational function by establishing a body under the responsible ministry.

The removal of custom barriers within the EU has helped levelling the competitive playing field between postal administrations and private operators for intra-EU services, by significantly reducing the cost of customs clearance which were required to private operators. Previously, these costs were minimal for the postal administrations as they were directly borne by the service users.

In the continuing formation of the Internal Market, the European Commission is developing a common policy for postal services throughout the European Union. This requires substantial policy harmonisation in the various Member States.

The Commission presented a Green Paper in June 1992 on the development of the single market for postal services. This was followed in June 1993 with a communication from the Council to the European Parliament on Guidelines for the Development of Community Postal Services (COM(93) 247 final). This latest communication has taken into consideration the large (and generally positive) response generated by the Green Paper, and consequently seeks to provide a detailed approach to action by specifying the measures required. The communication discusses in some detail the following topics: the common definition of the universal service; the maintenance of reserved services; service quality standards; measures that may be required to promote harmonisation in the Community; separating the functions of regulation and operation; and some aspects of extra-EU postal interaction. In order to harmonise and liberalise the EU postal services, a provisional implementation process is proposed, which acknowledges that legislative action will be required at the Community level; but that strongly strives to avoid measures that will lead to a deterioration of the level of service provided in Member States.

More recently, the Council of Ministers asked the Commission to present legislative proposals to change the regulatory system of postal services. The Commission, in its paper entitled Proposal for Regulatory Framework for Postal Services in the EU, makes a strong case for liberalisation by affirming that justifications put forward by some postal administrations for restricting the operation of direct mail and cross-border mail are not proven.

### OUTLOOK

The outlook for postal services differs according to the type of service offered. For traditional letter services, growth is expected to continue but only at a marginal rate due to competition from advances in modern communication such as facsimile, electronic mail and EDI.

In parcels and express services, growth is expected to be substantially higher. The integration of the European market implies increased interaction (in terms of traffic and trade) between the Member States. This increased interaction will continue to put pressure on postal administrations to provide high quality services.

Another strong growth market will be with direct marketing & sales related mail. This will be a market with strong competition between postal administrations and private operators, as confirmed by the forthcoming developments on the German postal market.

Of crucial importance for today's postal services is the application of modern technologies. Private operators can generally boast a high-tech structure, while some postal administrations are in the need of a large investment effort into new technologies to raise their competitive profile.

Another important issue is the regulatory environment. A community policy for postal services will seek to reduce the present lack of harmonisation in legislation concerning reserved and non-reserved services, to introduce a more cost-oriented tariff system and to apply free market principles where possible.

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# Sea ports and other sea transport facilities

## NACE 763

*Supporting services to sea transport are highly heterogeneous in nature, and range from loading and discharging ships to several other ancillary services such as operation and maintenance of docks.*

*Within the EU, port authorities can be either publicly owned or privately owned (or a combination). This distinction entails a different conception of the nature and functions of a port, which has given rise to a dispute about state funding of ports in some Member States.*

*Competition among ports is very strong. In recent years, most ports in Europe have been investing heavily in modern infrastructure, superstructure and facilities in order to keep ahead of competing ports.*

*The European Commission has recently made a series of proposals to integrate EU ports in the trans-European transport network. The proposed guidelines recognise the role of ports as essential interface between sea and land (about 90 % of the EU external trade operations are carried out by sea).*

### INDUSTRY PROFILE

#### Description of the sector

NACE 763 includes all supporting services to sea transport and coastal shipping, that is sea ports and other sea transport facilities. Examples of service types are tugs at sea, pilotage, lighthouse operations, buoys and other navigation facilities, stowing, stevedoring, loading and discharging of sea-going vessels, and operation and maintenance of sea harbours, piers and docks.

The supply of seaport facilities and services must be distinguished in the provision of infrastructure and superstructural facilities and handling services. Facilities are generally managed by a port authority, whereas handling services are mostly in the hands of private companies. The situation however, greatly differs from country to country.

Also, it is important to mention the distribution and industrial activities carried out in or near the port areas, although they

are not included in the statistics. These activities create employment and added value and are one of the reasons why competition between ports can be so intense.

#### Recent trends

In 1992 the 177 seaports in the EU which reported to the MERC World Ports Database, handled total traffic of about 2 236 million tonnes of cargo. The three top individual country volumes were handled in the United Kingdom, with some 444 million tonnes in 42 ports, the Netherlands with 369 million tonnes in 10 ports, and Italy with 319 million tonnes in 18 ports. These three countries account together for just above 50 % of total traffic volume in seaports in the EU.

Figures for the top 12 EU ports indicate that 1993 saw stagnating or negative growth in total traffic, thereby accentuating a downward trend which became apparent in 1992. Within the top 12 EU league, the three largest ports, Rotterdam, Antwerp and Marseilles all reported declining traffic volume: the fall was particularly important in Rotterdam (-4.4 %). However, there are early signs of a recovery during 1994 at least among some ports (e.g. Antwerp).

#### Passenger transport

In most ports in the European Union, passenger traffic is negligible or even non-existent. For some ports, however, it is the main activity. For example, the ports on both sides of the Channel depend heavily on ferry traffic between the United Kingdom and France. Even amidst several logistic difficulties, the opening of the Channel Tunnel in 1994 is perceived as a major competitive threat to the ferry operations on the Channel and as a consequence to the ports along the Channel.

Passenger traffic is also important between mainland United Kingdom and Ireland and Northern Ireland. A number of ports in the Mediterranean have significant passenger facilities for ferry links. Particularly important examples are in the south of Italy, where ferry connections exist with Greece and the countries in Northern Africa. Also, Greek ports generally have passenger facilities providing for domestic inter-island ferry links in the Aegean Sea.

Finally, mention should be made of the ports in Northern Germany and Denmark. From these ports, important ferry links exist with Sweden, Finland and Norway. The port of Copenhagen is currently completing the construction of a new passenger terminal enabling the handling of 10 vessels simultaneously. However, the proposed bridge between the south

**Table 1: Sea ports and other sea transport facilities**  
**Total traffic in EU ports**

	Number of ports (units)			Traffic volume (million tonnes)		
	1990	1991	1992	1990	1991	1992
Belgique/België	5	5	5	162.6	164.2	165.6
Danmark	6	8	8	30.9	38.4	47.0
BR Deutschland	14	19	18	181.8	203.5	232.7
Hellas	2	2	4	24.5	23.8	26.9
España	21	21	36	217.3	223.7	261.4
France	18	35	23	290.3	302.5	294.9
Ireland	3	7	4	19.0	25.4	21.3
Italia	12	23	18	249.6	327.2	318.6
Luxembourg	0	0	0	0.0	0.0	0.0
Nederland	7	12	10	358.0	374.7	368.7
Portugal	7	8	9	56.3	51.1	55.3
United Kingdom	23	39	42	407.9	427.9	443.8
EU	118	179	177	1 998.2	2 162.3	2 236.2
USA	39	53	48	901.5	1 156.6	1 151.2
Japan	48	64	N/A	1 936.4	1 545.5	N/A

Source: Maritime Economic Research Centre, Rotterdam



**Table 2: Sea ports and other sea transport facilities**  
**Top 10 seaports in the world - Breakdown by major type of goods traffic, 1992**

(million tonnes)	Seaport	Total traffic	Breakdown of traffic by type of goods		
			Dry bulk	Liquid bulk	General cargo
Nederland	Rotterdam	293.1	87.6	141.9	63.6
Singapore	Singapore	238.4	7.3	105.4	125.7
Japan	Chiba	191.7	49.6	114.0	28.1
Japan	Kobe	169.6	N/A	N/A	N/A
China PR	Shanghai (1)	139.6	92.5	15.9	31.2
Japan	Nagoya	130.9	39.0	35.7	56.2
Japan	Yokohama	121.4	14.2	43.3	63.9
Belgique/België	Antwerp	103.7	31.4	26.9	45.4
Japan	Kitakyushu	95.8	18.1	9.6	68.1
Japan	Osaka	95.1	4.1	0.5	90.5
Brazil	Vitoria/Tubarao (1)	94.6	85.6	1.9	7.1
South Korea	Ulsan	93.4	15.2	71.4	6.8

(1) 1990

Source: Maritime Economic Research Centre, Rotterdam

of Sweden and just south of Copenhagen across the Öresund will have a major impact on traffic currently on ferries between southern Scandinavia and mainland Europe (potentially similar in effect to the Channel Tunnel).

### Container transport

Container traffic emerged from the need to unitise general cargo items into manageable units of equivalent size. For this purpose the twenty-foot container was developed which could be easily filled with general cargo for transportation and easily unloaded when reaching its destination. During its development, containers of different size emerged, but the standard unit of measurement has remained the twenty-foot container. Traffic flows are thus expressed in Twenty-foot Equivalent Units (TEUs).

Port authorities and container handling companies make heavy investments to create an attractive infrastructure where containers and container ships can be handled as fast and as reliably as possible. Modern container terminals operate with highly automated container location and tracing systems. An example is the Maasvlakte-terminal of ECT in Rotterdam, where modern straddle carriers can trace containers automat-

ically. Large gantry cranes also need to comply with the increasing ship size: the largest ships (of so called 'post panamax size') carry up to 4 500 TEUs.

In 1992, the latest year for which data are available, total container handling in the 20 largest ports throughout the world amounted to some 53.3 million TEU (see Table 6), which represents an increase of about 23 % against 1990.

The largest container ports at world level are currently Hong Kong and Singapore, handling almost 8 million and 7.6 million TEU respectively in 1992. These ports have become major hubs in the Southeast Asian region for container traffic flows: Hong Kong's growth reached 30 % in 1992, whilst Singapore managed a healthy growth of 19 %.

In the EU, Rotterdam is the largest container port, as well as being ranked third world-wide. In 1992, following growth in container movement of close to 10 %, it regained this place that it lost in 1991 to the Taiwanese port of Kaohsiung. Other major EU container ports (respectively Hamburg, Antwerp, Felixstowe and Bremen) all improved their performance in 1992. The general economic recession which hit Europe in

**Table 3: Sea ports and other transport facilities**  
**Traffic volume in top 12 seaports in the world (1)**

(million tonnes)		1990	1991	1992	1993
Nederland (2)	Rotterdam (5)	287.7	290.8	291.6	278.8
Singapore (3)	Singapore (5)	187.8	206.4	238.4	273.7
Japan (3)	Kobe (4)	171.5	174.1	169.6	N/A
Japan (3)	Chiba	170.2	168.3	171.7	159.5
PR China (2)	Shanghai (4)	139.6	N/A	N/A	N/A
Japan (3)	Nagoya	128.9	136.8	130.9	134.4
Japan (3)	Yokohama	123.9	121.9	122.5	123.7
Belgique/België (2)	Antwerp (5)	102.0	101.3	103.7	101.9
Hong Kong (2)	Hong Kong (5)	66.0	76.4	83.4	96.1
Japan (3)	Osaka (4)	97.4	98.7	95.1	N/A
Japan (3)	Kitakyushu	95.2	98.7	95.8	93.1
France (2)	Marseilles	90.3	89.4	90.4	87.3

(1) Ranked on 1993. Figures for Kobe 1992, Chiba 1987-92 and Hong Kong 1989-92 are revised.

(2) Mass tonnes

(3) Freight tonnes

(4) Ranked on latest available data

(5) Foreign traffic only

Source: ISL



**Table 4: Sea ports and other sea transport facilities**  
**Top 10 seaports in the EU - Breakdown by major type of goods traffic, 1992**

Country	Seaport	Total traffic (million tonnes)	Breakdown of traffic by type of goods (million tonnes)				Containers (thousand TEUs) (2)
			Oil	Oil products	Iron ore	Coal	
Nederland	Rotterdam	293.1	102.3	20.4	38.1	21.5	4122
Belgique/België	Antwerp	103.7	6.6	17.7	10.2	9.5	1835
France	Marseille/Fas	90.4	49.5	11.5	6.0	5.4	351
BR Deutschland	Hamburg	65.1	4.2	10.0	6.6	2.2	2268
France	Le Havre	50.1	28.2	6.2	0.0	6.8	746
BR Deutschland	Duisburg (1)	45.2	0.0	2.4	3.1	7.5	N/A
United Kingdom	London/Tilbury	44.5	10.2	10.2	0.4	2.4	379
United Kingdom	Teesen Hartlepool	43.4	20.4	4.8	6.0	3.2	109
United Kingdom	Sullum Vae	41.4	41.4	0.0	0.0	0.0	0
Italia	Genoa	41.4	19.8	6.6	1.6	1.5	293
France	Dunkirk	40.2	6.0	4.5	9.1	5.6	70

(1) Including also inland shipping

(2) TEU = twenty-foot equivalent unit

Source: Maritime Economic Research Centre, Rotterdam

1993 has likely brought about a reduction of container traffic in all major EU ports.

### International comparison

In the 1960s and 1970s, European ports were among the larger ports in the world; in the 1980s ports in South East Asia and Japan emerged among the largest in the world's top 12 seaports. Japan's presence in the league is spectacular, with half of the top 12, with ports like Kobe, Chiba, Nagoya and Yokohama. The port of Singapore has second position with large volumes of general cargo (mainly in containers) and liquid bulk (mainly oil). There are presently no US ports among the world top 12.

The EU has three ports in the world's top ranking, which are Rotterdam, Antwerp and Marseilles. For more than 30 years, Rotterdam has been the largest port in the world. In 1993, total traffic handled in Rotterdam amounted to about 279 million tonnes, which is however just some 5 million tonnes ahead of second placed Singapore. Traffic handled through Rotterdam is dominated by liquid bulk (oil, oil products, chemicals, etc.) at 142 million tonnes, and dry bulk at 88 million tonnes, mainly consisting of iron ore and coal for the German steel industry.

Antwerp, the second largest European port, moved up to the eighth position in the world's top 12 in 1992, displacing Hong Kong. Antwerp handles a growing share of general cargo (45 million tonnes) and is also strong in the dry bulk segment (31 million tonnes). Antwerp is an important competitor for Rotterdam.

The third largest European port is Marseilles with some 90 million tonnes in 1992. Traffic through this port consists mainly of oil (about 50 million tonnes of cargo in 1992).

In 1992 the top three ports in the USA, according to MERC, were respectively Houston, Corpus Christi and Tampa. Their current capacity varies from about 87 million tonnes for Houston, to 72 million tonnes for Corpus Christi and 49 million tonnes for Tampa handled per year; this puts them into the medium-size bracket in comparison with European and Japanese ports. The most important types of goods handled are liquid bulk, which is essentially oil and oil products, and containers.

**Table 5: Sea ports and other sea transport facilities**  
**Traffic volume in top 12 seaports in the EU (1)**

(million tonnes)		1989	1990	1991	1992	1993
Nederland	Rotterdam (3)	289.9	287.7	290.8	291.6	278.8
Belgique/België	Antwerp (3)	95.4	102.0	101.3	103.7	101.9
France	Marseilles	93.4	90.3	89.4	90.4	87.3
BR Deutschland	Hamburg	57.6	61.1	65.2	64.9	65.8
France	Le Havre	52.2	54.0	57.2	53.1	54.9
United Kingdom	London	54.0	58.1	52.8	48.9	50.9
United Kingdom	Tees & Hartlepool	38.8	39.7	42.4	43.4	42.4
Italia	Genoa (2)	42.2	43.6	41.8	42.3	N/A
France	Dunkirk	39.1	36.6	40.7	40.2	40.8
United Kingdom	Sullom Voe	40.7	36.0	35.9	41.4	39.4
Italia	Trieste	N/A	34.2	35.5	36.7	36.6
United Kingdom	Milford Haven (2)	N/A	32.3	35.8	35.6	35.7
EU (4)		N/A	875.7	889.0	892.3	N/A

(1) Ranked on 1993. Figures for Tees & Hartlepool 1992, Dunkirk 1992 and Hamburg 1989-92 are revised.

(2) Ranked on latest available data

(3) Foreign traffic only

(4) Including top 12 seaports in the EU

Source: ISL

**Table 6: Sea ports and other sea transport facilities**  
**Traffic volume of top 20 container ports in the world (1)**

(thousand TEU)					
Rank	Port	Country	1990	1991	1992
1	Hong Kong	Hong Kong	5 101	6 162	7 972
2	Singapore	Singapore	5 224	6 354	7 560
3	Rotterdam	Nederland	3 667	3 783	4 123
4	Kaohsiung	Thailand	3 495	3 913	3 961
5	Busan	Korea	2 349	2 571	2 751
6	Kobe	Japan	2 596	2 635	2 608
7	Los Angeles	United States	2 116	2 038	2 289
8	Hamburg	BR Deutschland	1 969	2 189	2 268
9	New York	United States	1 872	1 866	2 104
10	Keelung	Thailand	1 828	2 008	1 941
11	Yokohama	Japan	1 648	1 796	1 887
12	Antwerp	Belgique/België	1 549	1 761	1 836
13	Long Beach	United States	1 598	1 768	1 830
14	Tokyo	Japan	1 555	1 784	1 729
15	San Juan	Puerto Rico	1 381	1 584	1 577
16	Felixstowe	United Kingdom	1 436	1 434	1 543
17	Dubai	United Arab Emirates	916	1 255	1 482
18	Bremen	BR Deutschland	1 198	1 278	1 315
19	Bangkok	Thailand	1 018	1 171	1 303
20	Oakland	United States	1 124	1 195	1 288

(1) Ranked on 1992

Source: Containerisation International Yearbook

## MARKET FORCES

### Demand

Demand for seaport facilities and services comes primarily from transportation activities. Transport companies are in need of such facilities in order to move cargoes from origin to destination and from one transport mode to another. The demand for these companies (in effect the demand for transport services) comes from shippers wanting their goods to be transported and thus depends largely on the economic activity in the hinterland of the port.

### Supply and competition

The variety in the supply of seaport facilities and services is wide. It concerns not only the handling of cargo from one mode of transport to another, but also storage of goods, distribution facilities, customs clearance, towing and berthing of ships, food and fuel supply services, customs handling, ship-repair and other services.

Over the last ten years, there has been a tendency to broaden the variety of services available within the transportation services - which was traditionally limited to cargo handling and movement. Hence, transport companies have changed into service providers offering a complete logistic chain from door-to-door. In addition, increasing automation and electronic data interchange techniques have made transportation and handling processes substantially more efficient than what was available in the early 1980s. This has enabled transport companies to more closely match customer requirements, for instance, just-in-time delivery systems for industries.

## INDUSTRY STRUCTURE

### Port traffic

Most of the EU's largest ports can be characterised as importing ports as incoming traffic is much higher than outgoing. There are only a few ports where exports exceed imports, such as Calais and Rouen (F) and Tyne (UK). Similar situations exist in the USA and Japan. In the USA, only Duluth is effectively

an export harbour; in Japan, Tokyo can be characterised as such.

The breakdown by type of traffic in Table 4 shows which is the dominant traffic through the major EU's ports. In each Member State, one or a few ports specialise in liquid bulk traffic. These are essentially the locations for import of oil and oil products. Examples are Le Havre and Marseilles in France, Wilhelmshafen in Germany, Trieste in Italy, Sines in Portugal and Southampton in the United Kingdom. Similarly, specialisation exists for dry bulk traffic. Ports like Bremerhaven and Lubeck in Germany and Limerick in Ireland handle practically only dry bulk goods. Finally some ports can be characterised as general cargo ports, such as Zeebrugge, Calais, Dublin, Valencia and Felixstowe.

### Strategies

There is substantial competition among ports on the northern seaboard of Europe (the Hamburg to Le Havre range) to attract container traffic and become the one of the major hubs in Western Europe. Expansion by investment in facilities is seen by the ports as a major weapon in maintaining or improving their relative competitive positions.

The Port Authority of Rotterdam is particularly ambitious to maintain its pole status with large investment plans. These investments should enable the port to reach 400 million tonnes of traffic handled by 2010. The total investment budget amounts to some 11 billion Dutch guilders, of which 7 billion will come from the central government. In addition, private companies will have to invest another 20 to 25 billion Dutch guilders in superstructures and facilities.

Additional multi-modal access to the port will be crucial in the development of the port of Rotterdam, requiring investment in more infra-structure. Very important for Rotterdam will be the planned construction of the Betuwe-lijn, a freight-only railroad connecting the port with Germany, which is currently under discussion. Another issue is the opening of the Rhine-Main-Danube canal, enabling Rotterdam to extend its hinterland connections to the countries bordering the Danube and the Black Sea. Furthermore, the transformation of certain parts of the port area into specialised port locations have been rated

**Table 7: Sea ports and other sea transport facilities  
Cargo handled in largest ports**

(million tonnes)	1987	1988	1989	1990	1991	1992
<b>Belgique/België</b>						
Antwerp	91.1	96.9	95.4	102.0	101.4	103.7
Brugge-Zeebrugge	17.6	20.1	25.8	30.3	30.8	33.3
<b>Danmark</b>						
Aarhus	6.6	7.3	7.0	6.9	6.9	6.6
Copenhagen	9.4	9.4	9.0	9.5	9.4	10.1
<b>BR Deutschland</b>						
Bremen-Bremerhaven	30.0	31.1	32.5	30.2	30.7	30.0
Hamburg	56.7	58.7	57.6	61.4	65.5	65.1
Lubeck	15.8	17.0	17.7	18.0	16.5	17.9
Rostock	N/A	N/A	20.8	13.2	10.4	9.9
Wilhelmshafen	14.6	15.0	14.6	13.9	17.9	31.6
<b>Hellas</b>						
Piraeus	8.3	8.9	9.4	9.4	9.8	9.8
Thessaloniki	12.8	11.2	14.6	15.1	14.0	15.1
<b>España</b>						
Barcelona	16.9	18.0	18.1	18.0	18.3	20.4
Bilbao	24.0	26.3	27.0	25.2	27.4	29.8
Tarragona	23.9	22.8	26.0	24.2	23.7	26.0
Valencia	16.2	10.8	N/A	12.0	11.8	13.1
<b>France</b>						
Bordeaux	9.4	8.9	9.1	9.6	8.9	9.2
Boulogne-sur-Mer	4.3	4.4	4.8	5.4	4.3	3.8
Calais	11.4	12.4	15.3	16.0	17.2	18.0
Dunkirk	32.4	35.7	39.1	36.6	40.7	40.2
Le Havre	51.1	49.9	52.2	54.7	57.2	50.1
Marseille	91.3	95.8	93.4	91.6	89.4	90.4
Nantes St. Nazaire	24.6	22.0	23.9	24.9	25.1	24.8
Rouen	21.1	20.4	20.9	22.3	23.1	24.0
<b>Ireland</b>						
Cork	5.4	5.3	5.7	6.0	5.9	6.3
Dublin	6.9	7.0	7.3	7.4	7.7	6.6
Limerick	N/A	N/A	0.7	5.9	6.2	6.4
<b>Italia</b>						
Genoa	N/A	41.9	41.3	42.7	42.0	41.4
Livorno	N/A	14.3	14.7	11.7	18.4	19.0
Naples	17.4	N/A	19.9	19.1	16.5	13.9
Savona	13.1	12.2	12.7	12.8	12.2	13.6
Taranto	32.6	30.1	N/A	32.6	30.0	N/A
Trieste	24.9	N/A	29.1	34.4	35.5	36.7
Venice	26.2	25.4	25.4	24.2	24.9	24.5
<b>Nederland</b>						
Amsterdam	29.6	28.2	28.7	31.3	31.2	33.2
Rotterdam	255.0	272.8	291.9	287.8	290.8	293.1
<b>Portugal</b>						
Leixoes	8.8	10.0	11.3	12.1	11.5	11.9
Lisbon	13.1	13.1	14.0	14.8	16.5	14.6
Sines	N/A	N/A	19.9	22.6	16.1	20.2
<b>United Kingdom</b>						
Belfast	7.8	N/A	8.0	8.9	9.4	9.4
Dover	10.7	N/A	13.5	10.1	13.0	13.1
Felixstowe	12.7	17.0	16.5	16.1	15.9	16.9
Grimsby-Immingham	N/A	33.8	36.8	37.6	38.2	39.1
Liverpool	10.2	N/A	20.2	23.1	24.7	27.8
London	44.2	N/A	54.0	53.9	49.5	44.5
Manchester	N/A	8.4	8.3	8.1	7.6	7.4
Milford Haven	32.8	33.4	33.1	32.3	35.7	35.6
Southampton Fawley	N/A	N/A	26.1	20.0	31.5	29.8
Tees-Hartlepool	33.5	37.0	39.3	39.7	42.8	43.4
Tyne	6.0	6.4	5.9	5.1	4.9	4.5
<b>USA</b>						
Baltimore	27.5	31.8	34.2	25.0	21.7	25.9
Corpus Christi	N/A	N/A	76.5	69.4	70.4	72.5
Duluth	N/A	N/A	37.0	37.0	35.0	35.5
Houston	121.3	N/A	69.0	57.1	87.6	86.7
New York	N/A	56.3	57.2	49.7	42.1	38.0
Philadelphia	68.5	N/A	79.2	75.6	N/A	N/A

**Table 7 (continued) : Sea ports and other sea transport facilities  
Cargo handled in largest ports**

(million tonnes)	1987	1988	1989	1990	1991	1992
Tampa	55.0	56.1	58.7	47.1	N/A	49.1
<b>Japan</b>						
Chiba	153.4	159.2	164.2	170.2	168.6	191.7
Kawasaki	90.4	N/A	N/A	105.1	54.5	N/A
Kobe	N/A	N/A	N/A	171.5	N/A	169.6
Nagoya	109.6	116.3	N/A	128.9	136.8	130.9
Osaka	N/A	86.3	N/A	97.4	N/A	95.1
Tokyo	N/A	N/A	N/A	N/A	27.7	N/A
Yokohama	108.6	N/A	64.3	123.9	120.1	121.4

Source: Maritime Economic Research Centre, Rotterdam

as a success: in particular the 'Distriparks' distribution centres, with nearly all of the allocated land being taken up.

In Belgium, significant investment in port expansion is planned. In Antwerp, the Left Bank development will cost about 37 billion Belgian francs. Further plans are in progress to construct a second container terminal, which will cost about 13 billion Belgian francs, of which the port authority has allocated 750 million Belgian francs in 1993. This second terminal is expected to manage 600 000 TEU a year following completion due in late 1996. Also, plans to renovate existing docks and locks are under way costing another 13 billion Belgian francs. The Port of Zeebrugge authority is investing in a new container terminal, which will provide three berths with an annual capacity of 600 000 TEU. The amount of the investment is put in excess of 10 billion Belgian francs.

In Germany, two operators of Hamburg, HHLA and Eurokai, have invested in improved infrastructure and equipment to boost capacity. Also, a new container complex is under discussion for the Altenwerder area of the port, which would expand the ports throughput to 4.2 million TEU per year by 2000. Bremerhaven is building two new container ship berths by extending the existing container terminal. Completion of this expansion will allow Bremerhaven to offer 12 berths for container vessels.

France's second largest port, Le Havre, is currently expanding by expanding the dock extension, which is due for completion in 1993.

Not only Europe's larger ports have investment plans. Smaller ports also want to improve their position by investing in infrastructure, superstructures and operation facilities.

In Italy, a new multipurpose container terminal recently became fully operational at the port of La Spezia. In Genoa, the new Voltri terminal handled its first containership in May 1994.

In Spain, the Port Authorities of Barcelona and Valencia have initiated major container terminal developments in view of attracting direct liner calls. Barcelona is one of the larger container ports in the Mediterranean, and is planning to construct a new container terminal with multi-modal links that will expand current capacity from 500 to 700 million TEU per year.

In Greece, the port of Piraeus also has ambitious plans: over a five year period the current central harbour facilities will evolve into a pure passenger and cruise terminal, and the cargo handling facilities will continue to be relocated to the 'west-side', where additional investment is in place to expand facilities. The port of Thessaloniki is planning to invest 30 billion Greek Drachmas by 1998 to expand port facilities and land area.

In the UK, the port of Southampton has announced in June 1994 that it will increase by 25 % the area of its container terminal.

### Impact of the Single Market

The impact of the Internal Market on sea ports has so far been relatively muted. The only noticeable effect is a trend towards an increase in the size of the largest ports as a consequence of the reorganisation of distribution and logistics in Europe. Integration means that the European market can now be supplied from a more limited number of distribution centres, a trend which benefits the largest ports because they offer the best potential in terms of logistics. In the long run, the Internal Market is likely to have a marked positive impact on the sector. European integration will translate into a more efficient European economy, faster GDP growth and therefore more trade. In general, the progressive emergence of a more efficient and cheaper transport industry (for all modes) will result in a more transport intensive economy. Sea ports will also benefit from the liberalisation of intra-EU shipping, from the environmental assets of this mode and from an increase in their own efficiency. The Internal Market will continue to have different implications depending on the ports considered. For instance, the progressive liberalisation of rail services will favour those ports which have a good connection to the rail network. Besides, an efficient competition between ports requires a careful monitoring of state subsidies which presently differ depending on the ports and countries considered.

### REGIONAL DISTRIBUTION

With Rotterdam, Antwerp, Hamburg and Le Havre, most of the EU's larger ports are to be found in the Le Havre-Hamburg range. These ports are the most important gateways to industrial and consumption areas on the European continent. This hinterland can be reached easily by way of a high standard infrastructure in terms of road, rail and inland waterways. The Rhine River is especially important for the port of Rotterdam. This connection and its good geographical location on the North Sea have combined to help Rotterdam evolve into the world's largest port.

The importance of German ports has been greatly enhanced by the opening of Eastern Europe. Transit traffic volumes from the Baltic Sea are increasing, as has trade with Russia (mainly through the port of St. Petersburg).

Ports in the United Kingdom and Ireland have their domestic markets as their hinterland, which has typically kept their ports smaller than similar ports on mainland Europe. Good connections (highways, railways) exist from UK ports to the major industrial areas. Inland waterways have declined significantly over the years, plans abound for the revival of these canals. An important activity of UK ports (especially in Scotland) relates to the offshore activities on the North Sea. A

port like Aberdeen, for example, is highly dependant on service provision to oil rigs in the North Sea and on oil handling coming from the North Sea oil wells.

In the Mediterranean, Marseilles and Genoa are important ports, especially for the import of oil and oil products. Their hinterlands can be found in the southern part of France (e.g. Lyon and surroundings) and the North Italian industrial areas (Milan and Turin), respectively. Other goods handling activities are very dispersed over the broad variety of small ports along the coasts of the Mediterranean, Adriatic and Aegean Seas.

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## ENVIRONMENT

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Increasingly, port authorities are taking a stance on environmental issues in their ports. The major issues that cause concern are accidental or illegal discharges of waste, leakage or spillage of fuels, spillage during bunkering, and pollution from in-port hull cleaning and re-coating operations. Port and ship operators will have to comply with environmental legislation that is becoming more stringent each year.

The basic text on marine safety, environmental protection and overall shipping standards is the Paris Memorandum on Port State Control. The agreement makes provisions for non-discriminatory (i.e. not targeting individual flags) inspections of ships visiting the ports of Europe. There has been a clear improvement of the environmental record of European port as a result of port state activity, testified by the fact that the number and amount of oil leakages in European waters has decreased in recent years.

Also shippers, in many cases, want their products transported in an environmentally responsible way in order to avoid negative publicity from environmental pollution and accidents that could be associated with these products. In some cases, the shippers require environmentally friendly transport facilities which exceed those obligatory by national legislation. This acts as a spur to port operators to make additional investments in environmentally sound handling facilities.

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## REGULATIONS

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Port authorities and companies can be either publicly owned or privately owned (or a combination).

In general, three types can be distinguished concerning the principle of exploiting port facilities:

- fully centralised ports, where exploitation is in the hands of the port authority. This authority is a state body. It does not exclude collaboration with private companies, but decisions on investments are mainly with this body. Examples are most Spanish ports, Italian ports, some ports in France and Denmark.
- decentralised ports, where the port authority is a municipal or collective body. Examples can be found in Belgium, the Netherlands, Germany and Portugal.
- fully private ports, where the port authority is a private company. Examples can be found in the United Kingdom, where Associated British Ports is the owner of 21 ports throughout the country, in Germany (e.g. Wilhelmshafen), Greece and Spain.

The different nature of ports in the European Union has sparked a row about port funding by national authorities. Private ports (mainly British ones) complain that state funding to fully or partially publicly-owned (mainly continental) ports actually consists in a subsidy, which distorts competition in the sector.

The issue is complex, as it involves a different conception of the nature and functions of a port. While the British view considers a port as an autonomous transport operator, the

tradition on the continent (particularly in North German ports) is to regard ports as a hub for economic growth at national and regional level.

The European Commission (DGVII) has recently launched an exercise to investigate the subject. The Commission's first step has been to send out a questionnaire to major port authorities to obtain a clearer picture of the system of financial flows of EU ports.

Another very difficult issue is related to this basic difference of nature among EU ports, namely port pricing. Various principles of port pricing are used and depend effectively on the extent of public funding defined in national port policies. On the one hand are policies based on pricing to recover all costs of operations together with depreciation and financing costs of infrastructure and superstructure. On the other hand are policies that port services are public services to be priced at marginal rates. Cost recovery is then made from subsidisation originating from public budgets.

The European Commission proposed in March 1994 a Council Decision on trans-European guidelines for transport networks. The proposed guidelines recognise the role of ports as an essential interface between sea and land (about 90 % of the EU external trade operations and around 35 % of the trade between Member States are carried out by sea) and the need to integrate them into the transport chain. The proposal lists the criteria to be used to identify projects of common interest for the entire Community. These criteria include helping the growth of trade, encouraging the development of short-sea shipping, improving accessibility and strengthening cohesion. EU funding will be available from the Cohesion and Regional funds.

Finally, another issue is cabotage. For the transport sector as a whole, cabotage will become important in the future. New regulations will allow domestic transport by operators from other Member States which may cause shifts in transport flows throughout the EU and, as a consequence, shifts goods handling through EU ports. If this occurs then clearly some ports will benefit whilst others will be harmed. Some of the smaller ports may lose cargoes to the larger hubs, but at the same time may remain competitive for the smaller niche cargoes, that are either required or manufactured for export in the localised hinterland of these ports.

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## OUTLOOK

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The outlook for cargo handling depends heavily on the prospects for world trade and world shipping. As the negative effects of the economic recession which hit Europe in 1993 are slowly fading away, we estimate that growth in European ports may reach about 4 % on average until the end of the decade.

The outlook for container handling in ports is more optimistic. It is expected that liner cargo growth will be about 5-6 % for imports and 2-3 % for exports over the next four years. Also, the penetration of containerisation for general cargo will continue to increase, hence, container handling growth rates are thus expected to somewhat higher.

Individual ports, however, might be able to achieve higher growth rates. This will depend on the increasing tendency to create large trunk lines between major hubs in various regions throughout the world. From these hubs, feeder lines will service container traffic demand in other ports in the region.

Written by: DRI Europe

# Airports and other air transport facilities

## NACE 764

Airports are a key component to air transport industry and to national and regional development. However, congestion in the EU's airspace and at some of the major EU hubs is causing problems for the operating economics of both airports and airlines as well as having an increasing impact on the environment. To overcome this, the EU is developing an improved air traffic management system, whilst some airports are actively investing in infrastructure improvements and additions.

Competition between major European airports for transit traffic is heightening and this is allowing some of the national competing airports to gain share of traffic.

### INDUSTRY PROFILE

#### Description of the sector

This sector comprises supporting services to air transport (airports and airfields). It includes units exclusively or primarily engaged in the activities essential to air transport, without actually transporting passengers or goods. Hence, units exclusively or primarily engaged in the operation of civil airports and airfields (public and private), radio beacons, radar stations, and units that manage air routes and air traffic control are classified in this group. This monograph will focus on airports.

Airports are the focal point of all aspects of the aviation industry. They are where passengers and freight concentrate before departure and after arrival, they provide bases for the airlines, air services related organisations and the physical means of providing air services - the aeroplanes.

#### Recent trends

Following the recessionary pressures on the airline industry, the number of passengers handled at the major EU airports dropped by 3 % in 1991 before rebounding by 10 % in 1992. Cargo (including mail) weathered the recession more effectively in 1991, expanding by 1 %, but accelerated only marginally the year after (2.4 %). In 1993, growth in passenger and cargo again reported differing trends with a slowdown

for passengers (3.9 %) and a solid acceleration for cargo (6.8 %).

For passengers, the largest five airports in the EU are, in rank order, London Heathrow (48 million), Frankfurt (33 million), Paris Charles de Gaulle (26 million), Paris Orly (25 million), and Amsterdam Schiphol (21 million). In terms of cargo, Frankfurt stands as the unquestionable leader (1.14 million tonnes), followed by London Heathrow (0.758 million tonnes) and by Amsterdam (0.695 million tonnes).

In 1993 the individual growth in passengers handled at the major airports varied widely. Whilst 11 airports out of the 24 largest had reported double digit growth in 1992, that number dropped to two in 1993 (Amsterdam and Tenerife). The other airports have reported either medium to solid growth (e.g. London Heathrow, Frankfurt or Manchester), near stagnation (e.g. Paris Orly, London Gatwick, Rome), or even a decrease in passengers handled (e.g. Madrid and Barcelona). London Gatwick, the sixth largest airport in the EU, now remains the only large airport which has still not recovered its 1990 level of loadings.

Individual airport results are still more contrasted for freight. In 1993, six airports registered double digit growth while another six airports reported a decline in the amount of freight handle. The top four ranking in the EU for cargo growth were Luxembourg, London Stansted, London Heathrow and Amsterdam. Heathrow's growth was partially due to taking some of Gatwick's share of London freight.

#### International comparison

When comparing volumes of passengers and freight handled in the three dominant world regions, the USA has the largest share (about 60 % in passengers and about 50 % in freight). In this country aviation has developed into the major transportation mode for domestic connections. The bulk of passenger and freight flows through USA airports are movements within the country. For freight, developments have been particularly influenced by express freight services. The equivalent share of EU airports amounts to just over 23 % for passengers and just under 21 % for freight. A major portion of this is intra-EU or intra-European traffic.

The large South East Asian airports handle about 17 % of passengers and 29 % of freight. In Japan, traffic is dispersed among a number of regional airports due to capacity problems. In the future, some may become major hubs for both intra-regional and intercontinental traffic. Freight handling at Asian

**Table 1: Airports**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of employees
Belgique/België	53	46	2 016
Danmark	18	7	(3) 2 828
BR Deutschland (3)	166	1823	N/A
Hellas (1)	(5) 48	N/A	(6) 3 208
Italia (2)	16	640	(6) 11 897
Luxembourg	1	N/A	127
Nederland	85	339	2 840
Portugal (3, 4)	9	136	2 902

(1) 1988

(2) 1989

(3) 1990

(4) Covers only enterprises with at least 5 employees

(5) Number of local units

(6) Number of persons employed

Source: Eurostat; Mercure



**Table 2: Airports**  
**Traffic at major airports in the USA and South East Asia, 1993 (1)**

	Passenger handled (millions)	Change 1992/93 (%)	Of which international (millions)	Change 1992/93 (%)	Cargo (thousand tonnes)	Change 1992/93 (%)
<b>USA</b>						
Chicago, Illinois	65.1	1.0	5.9	12.9	1 146.5	2.8
Dallas/Ft Worth Airport, Texas	49.7	-4.5	2.1	22.4	657.6	4.8
Los Angeles, California	47.8	1.9	11.9	4.3	1 326.3	7.1
Atlanta, Georgia	47.8	13.6	2.4	8.9	614.8	12.7
San Francisco, California	32.8	0.5	4.6	9.4	616.8	2.8
Denver, Colorado	32.6	5.7	0.3	26.7	365.1	11.6
Miami, Florida	28.7	8.2	12.4	7.5	1 178.7	17.6
New York JFK, New York	26.8	-3.5	14.8	-0.2	1 381.8	2.3
Newark, New Jersey	25.8	6.3	3.4	3.2	696.8	18.5
Detroit, Michigan	24.2	5.8	2.0	9.1	269.0	14.2
Boston, Massachusetts	24.0	4.6	3.6	0.3	379.7	2.2
Phoenix, Arizona	23.5	6.5	0.1	9.8	184.7	14.4
Minneapolis/St Paul, Minnesota	23.4	2.2	0.6	7.4	320.9	6.4
Las Vegas, Nevada	22.5	7.6	0.6	32.2	45.5	3.8
Honolulu, Hawai	22.1	-2.4	5.2	-5.2	387.2	1.7
Orlando, Florida	21.5	1.5	2.7	6.2	191.5	13.7
Houston, Texas	20.3	4.4	2.6	15.7	247.5	5.5
<b>South East Asia</b>						
Tokyo Haneda, Japan	41.6	-2.6	0.7	-7.7	470.4	-4.0
Hong Kong	25.1	10.9	24.4	10.7	1 139.1	19.0
Osaka, Japan	23.4	-0.7	5.2	-2.9	492.4	2.1
Seoul, South Korea	22.9	7.1	10.3	4.8	877.0	18.0
Tokyo Narita, Japan	22.1	0.5	18.9	-0.4	1 443.7	8.1
Singapore, Singapore	20.0	10.4	18.8	11.4	853.1	16.7
Bangkok, Thailand	19.1	14.9	12.8	13.1	504.1	15.0
Taipei, Taiwan	12.5	3.5	11.2	3.0	744.0	2.8
Kuala Lumpur, Malaysia	10.9	9.3	6.0	10.9	221.3	6.5
Jakarta, Indonesia	10.8	10.1	4.0	10.8	214.1	9.0

(1) Airports with over 20 million passengers handled for USA and over 10 million for South East Asia  
 Covers airports participating in ACI Annual Traffic Collection  
 Source: ACI

airports is important for high value electronics shipped to the European and American markets.

Europe, the USA and South East Asia benefited from relatively similar growth rates in 1993, both for passengers and for cargo. Hence, the three regions' respective market shares changed little compared to the year before. The share of the EU increased slightly for passengers (from 23.1 % to 23.3 %) but decreased in the same proportions for freight (from 21.1 % to 20.8 %).

The world's largest airport city is New York. Its three airports handled more than 72 million passengers in 1993. However, a vast portion of this is domestic travel - some 73 %. Of the New York airports the largest is J. F. Kennedy which handles most of the international traffic. New York is also the most important freight centre in the world with close to 2 million tonnes. Second in city rankings is Chicago with two major airports Chicago Midway and O'Hare, which between them handled nearly 72 million passengers in 1993. O'Hare is the world's largest airport in total passenger numbers at 65 million, of which 90 % are domestic. However, ranking on international traffic only, London Heathrow is the world's largest with 40.8 million loadings.

In South East Asia the largest airport city is Tokyo, which handled 64 million passengers and 1.9 million tonnes of freight in 1993. Its major airport for international flights (19 million international passengers) and freight (1.4 million tonnes) is Narita.

## MARKET FORCES

### Demand

The strong growth in demand for passenger and freight air transport during the 1980s was due to the increasing globalisation of trade, the growing internationalisation of companies and demand for leisure. This has led to increasing demand for rapid and reliable air transport for business people and enabled leisure travellers to spend less time reaching both short and long distance holiday destinations. The growth in air freight has benefited from the growing requirement for express freight services, in particular documents, high value goods (of limited weight) like electronic products, and goods for which fast transport is important, for instance perishables such as flowers, and urgent deliveries such as parts required for mechanical repairs. The growth in the air industry has had a direct and proportional impact on the demand for airports.

The type of demand, whether business travel, leisure travel or freight, has tended to partially focus on some airports. Also, airlines, in particular the 'flag carriers', have tended to focus on particular airports. The 'flag carriers' have usually dominated the largest of their indigenous airports, with smaller hubs at the more important indigenous regional airports, due to the nature of the restrictions that used to be prevalent in the EU before liberalisation. The larger non-flag carrying airlines have also based their operations at the larger airports of their countries of origin and the smaller regionals are usually based at regional airports that have a sufficient catchment area to support profitable operations. In non-scheduled serv-



**Table 3: Airports**  
**Largest European airports - Number of passengers handled (1)**

(millions)			1989	1990	1991	1992	1993
Rank	Airport	Country					
<b>EU</b>							
1	London Heathrow	UK	39.9	43.0	40.5	45.2	47.9
2	Frankfurt	D	26.7	29.4	28.0	30.7	32.5
3	Paris Ch. de Gaulle	F	20.7	22.5	22.0	25.2	26.1
4	Paris Orly	F	24.3	24.3	23.3	25.2	25.4
5	Amsterdam	NL	15.7	16.5	16.5	19.1	21.3
6	London Gatwick	UK	21.3	21.2	18.8	20.0	20.2
7	Rome Fiumicino	I	16.0	17.7	16.6	19.1	19.3
8	Madrid	E	14.5	16.2	16.4	18.4	17.5
9	Manchester	UK	10.7	10.8	10.9	12.4	13.5
10	Dusseldorf	D	10.8	11.9	11.3	12.3	13.1
11	Munich	D	10.5	11.4	10.8	12.0	12.7
12	Palma de Mallorca	E	11.6	11.3	11.9	11.9	12.5
13	Copenhagen	DK	12.0	12.1	11.7	12.1	12.3
14	Brussels	B	7.3	8.5	8.5	9.4	10.2
15	Barcelona	E	8.4	9.0	9.2	10.3	10.0
16	Milan Linate	I	8.4	9.4	8.9	9.3	9.5
17	Hamburg	D	N/A	N/A	N/A	6.9	7.3
	Berlin	D	N/A	N/A	N/A	6.7	7.1
18	Tenerife Sur	E	6.4	5.6	6.3	6.4	7.1
19	Gran Canaria	E	N/A	6.1	6.7	7.0	7.0
20	Nice	F	5.6	5.7	5.5	5.9	5.9
21	Dublin	IRL	5.1	5.5	5.3	5.8	5.9
22	Lisbon	P	4.8	5.3	5.3	5.6	5.6
23	Glasgow	UK	N/A	4.4	4.3	4.8	5.2
24	Stuttgart	D	N/A	4.4	4.2	4.8	5.1
	EU		N/A	N/A	N/A	346.5	360.2
<b>Other Europe</b>							
1	Zurich	CH	12.1	12.7	12.2	13.0	13.5
2	Stockholm Arlanda	S	14.2	14.0	11.9	12.9	12.6
3	Istanbul	TR	N/A	6.5	5.3	7.5	9.5
4	Oslo	N	N/A	7.0	6.9	7.5	8.2
5	Vienna	A	N/A	5.7	5.8	6.8	7.2
6	Helsinki	FIN	N/A	7.6	7.0	6.6	6.1
7	Geneva	CH	N/A	6.0	5.5	5.7	5.8
8	Tel Aviv	ISR	N/A	N/A	N/A	4.3	5.0

(1) Airports with over 5 million passengers in 1993 (embark + disembark + direct transit counted once).  
 Covers airports participating in ACI Annual Traffic Collection.  
 Source: ACI

ices, a number of airports in Portugal, Spain and Greece are largely dependant on charter flight handling. In Northern Europe, some airports have also tended to specialise in charter flights (e.g. Manchester, Maastricht). In some cases, however, this specialisation has been due to reasons other than commercial policy. For example, until 1991, charter flights from London were deliberately assigned to Gatwick in order to alleviate capacity problems at Heathrow: these non-scheduled services made up 44 % of all traffic at Gatwick.

### Supply and competition

Airport capacity is determined by several factors, such as runway layout, number of runways and gates at the terminal and number of positions on the apron. Also, within the terminal, the check-in capacity depends on the access to the airport, the number of check-in counters, the capacity of the baggage handling system and the use of modern electronics. Further, juridical conditions are of relevance, such as restrictions on night flights, customs control capacity, etc.

One of the most significant current limitations on capacity, both for airlines and for airports is the present limitations of Europe's Air Traffic Control (ATC). At present, 23 countries of the European Civil Aviation Conference have 31 different

air traffic control systems. These systems rely on 18 different types of computers and 30 incompatible programming languages. According to the Association of European Airlines (AEA), the share of flight delays attributable to ATC in Europe decreased markedly in 1993 but ATC still represent the major source of delays. Although improvements to ATC are being provided, there is still a long way to go in terms of investment capital and time before a harmonised system of ATC will be available that is comparable to the one currently in existence in the United States. One fillip for international airlines, including those of the EU, is the development of satellite navigation system, which if approved by the 33 members of the International Civil Aviation Organisation (ICAO), will move much of the current ground-to-air based navigation and air traffic management to satellite-to-air. Estimates on the savings for airlines reaches as high as ECU 7.8 billion by providing more efficient routing and reducing delays caused by air traffic control.

A recent report from Airports Council International, European Region (ACI Europe) on the Economic Impact of European Airports stresses airports are substantial contributors to regional development and public revenues. The airports contribute to employment through three mechanisms: the first is

**Table 4: Airports**  
**Largest European airports - Amount of freight handled (1)**

(thousand metric tonnes)			1989	1990	1991	1992	1993
Rank	Airport	Country					
<b>EU</b>							
1	Frankfurt	D	1 084.0	1 115.0	1 206.2	1 080.7	1 143.1
2	London Heathrow	UK	692.0	698.0	661.0	757.9	846.6
3	Amsterdam	NL	582.0	604.0	629.8	695.0	775.4
4	Paris Ch. de Gaulle	F	585.0	618.0	588.4	612.2	664.6
5	Brussels	B	279.0	282.0	315.9	313.6	306.2
6	Paris Orly	F	248.0	254.0	264.4	275.3	270.2
7	Rome Fiumicino	I	227.0	237.0	234.2	233.3	252.4
8	London Gatwick	UK	210.0	220.0	202.7	190.3	196.7
9	Madrid	E	208.0	221.0	188.7	188.4	195.0
10	Cologne	D	148.0	163.0	202.5	181.0	189.3
11	Luxembourg	L	127.0	143.0	152.2	150.6	175.2
12	Copenhagen	DK	127.0	139.0	139.0	152.7	169.5
13	Milan Malpensa	I	75.0	72.0	72.6	90.1	97.9
14	Manchester	UK	65.0	73.0	62.7	80.6	88.9
15	Lisbon	P	74.0	75.0	74.2	78.5	74.5
16	London Stansted	UK	30.0	33.0	34.6	54.2	62.4
17	Milan Linate	I	69.0	72.0	52.4	63.0	62.4
18	Munich	D	52.0	57.0	52.3	54.3	59.0
19	Barcelona	E	61.0	66.0	65.6	72.4	57.5
20	Dublin	IRL	47.0	N/A	47.2	58.4	51.2
	EU		4 990.0	N/A	5 246.6	5 382.5	5 738.0
<b>Other Europe</b>							
1	Zurich	CH	258.4	255.5	248.5	271.5	291.6
2	Tel Aviv	ISR	N/A	N/A	N/A	208.1	223.7
3	Istanbul	TR	N/A	N/A	67.5	86.0	106.3
4	Stockholm Arlanda	S	N/A	N/A	88.4	88.4	85.2
5	Vienna	A	N/A	N/A	62.9	68.0	71.1
6	Helsinki	FIN	N/A	59.8	54.0	51.6	60.0
7	Geneva	CH	N/A	55.9	50.5	53.5	57.2

(1) Airports with over 50 000 metric tonnes freight in 1993. Covers airports participating in ACI Annual Traffic Collection.  
Source: ACI

via direct employment in the airport by the airport itself and by the activities carried out by companies operating at an airport; the second is through an indirect impact of services related to the airport's business, for instance hotels and tour operators; and there is a third impact of induced employment which results from a multiplier effect from both the direct and indirect impacts. A case study on Copenhagen Airport showed that of total employment that could be attributed to the airport, 35 % was direct, 27 % was indirect but the balance of 38 % was due to induced employment.

### Production process

The services provided at airports form part of logistic chains. Passengers travel from one location to the other using air transport as one part, albeit major, of their total routing. Air transport involves adequate connections with other transport modes, lounges for waiting passengers, customs facilities for international flights. Further the passenger wants sufficient facilities such as bars, restaurants and shops in order to while away necessary waiting time.

Airlines also require services: they need weather forecasting services, fuel provision, flight catering services, and maintenance facilities. In particular, they need an adequate check-in procedure in which the passenger and its accompanying luggage is well administered and allocated to the correct flights. The Commission adopted an initiative concerning the organisation of groundhandling services at Community airports on 13 December 1994. This initiative will allow for a greater degree of access to the market.

The vulnerability of aircraft to terrorist devices has meant a substantial investment in equipment and personnel to supply adequate security monitoring of passengers and their luggage in the EU.

Local and national government has impacted the process through the provision of facilities such as law enforcement, customs control and aspects of air traffic control.

Similar requirements exist for freight forwarding at airports. Services also form part of logistic chains in particular for industries. These more and more require modern logistic concepts like Just-In-Time and Door-to-Door transportation. Such facilities are comparable to those for sea ports.

## INDUSTRY STRUCTURE

### Strategies

The major airports in the EU are competing with each other for passenger and freight traffic that is not destined for those particular airports, typically traffic that is using one of these airports as an intermediate staging post or hub. Estimates for London Heathrow indicate that about 30 % of passengers arriving from extra-EU flights are transferring to other flights, whether for intra-EU connections or even extra-EU connections. Hence airports such as Paris Charles de Gaulle or Amsterdam Schiphol can easily supply a similar routing. The major airports have been competing aggressively to take a larger share of the transfer market, and this competition has also been supported by the airlines that use these airports as their major hubs.

**Table 5: Airports**  
**Passengers handled at other EU airports (1)**

(millions)	Country	1990	1991	1992	1993
Malaga	E	4.7	4.7	4.9	4.9
Marseille	F	5.0	4.5	4.7	4.8
Birmingham	UK	3.6	3.4	3.8	4.2
Lyon	F	3.8	3.6	3.9	4.0
Cologne	D	3.1	3.0	3.6	3.8
Milan Malpensa	I	2.4	2.6	3.3	3.6
Hannover	D	2.8	2.9	3.1	3.4
Lanzarote	E	2.5	3.0	3.1	3.4
Faro	P	2.8	3.3	3.4	3.1
Alicante	E	2.7	2.7	2.8	2.9
Edinburgh	UK	2.6	2.4	2.7	2.9
Ibiza	E	2.4	2.6	2.6	2.8
London Stansted	UK	1.2	1.7	2.4	2.7
Bordeaux	F	2.6	2.2	2.3	2.4
Aberdeen	UK	2.0	2.0	2.2	2.3
Newcastle	UK	1.6	1.6	2.0	2.2
Naples	I	N/A	1.9	2.1	2.1
Basel-Mulhouse	F/CH	N/A	N/A	2.0	2.0
	EU	N/A	N/A	54.9	57.5

(1) Airports with under 5 million passengers in 1993 (embark + disembark + direct transit counted once). Covers airports participating in ACI Annual Traffic Collection. Source: ACI

Though competition between major hubs is largely international (for instance between London Heathrow and Amsterdam Schiphol), there is a number of examples of competition between hubs in the same country (for instance between London Gatwick and London Heathrow). Besides, major (and minor) regional airports are not confining themselves to the role of feeder of major hubs but are also offering direct point to point services and are even, in a limited number of cases, aiming at developing into hubs. An example is Manchester Airport, which is considering to expand capacity by adding a second runway and supporting infrastructure to attract additional airlines, passengers and freight to capture the traffic generated in a large catchment area in the North of England. A significant portion of the potential traffic used to go (and some still does) via one of London's airports either by flight transfer, or by a combination of travel that would involve a train or car journey to a London airport, or via Manchester's regional competitors. The investment allows Manchester Airport to expand its market share at the expense of the other airports in northern Britain, as well as taking some share of the London airports, and attracting new induced traffic. The success of Manchester's strategy is shown by the numbers of passengers, which have more than doubled from 6 million in 1984 to 13.5 million in 1993. The growth in freight for the same period is even more phenomenal, from 29 000 tonnes in 1984 to 89 000 tonnes in 1993. Whereas Manchester Airport is essentially providing point to point services, it is also developing into a hub in its own right, with around 7 % of passengers hubbing compared to around 2 % six years ago.

Capacity problems, in terms of air traffic control and airport infrastructure, are a major issue in airport strategies. Apart from improvements in air traffic control, airports' improvement of capacity availability takes many forms, including additional runways, additional infrastructure and improved equipment. In addition, ground congestion resulting from too slow improvement of road and rail access is also a problem at a number of airports.

Capacity problems and safety provisions together with the need to keep ahead of competition have prompted airport authorities to invest in new facilities and service improvement.

The attraction of additional traffic has also been achieved by offering higher quality services to all users of the airport. Airports also try, in co-operation with regional authorities, to attract economic activity and to develop into full-fledged business centres. An example is Amsterdam-Schiphol. Together with regional and local bodies this airport drafted a strategic plan for the development of both the airport and the region into a main complimentary port similar in concept to the port of Rotterdam.

There are many investment initiatives by airports. The Airports Council International Europe reckons that its members will invest about 19 billion ECU in modernisation and expansion over 1993-97 alone. The Airport Authority of Copenhagen has drawn up a master plan for a substantial enlargement of facilities including a second terminal due for 1997 and co-operation in the Copenhagen Central to Kastrup rail link. The British Airports Authority is pressing for the development of a fifth terminal at Heathrow to be opened in 2002. In the meantime continental airports such as Paris Orly and Frankfurt have each opened a new terminal respectively in 1993 and 1994, thereby raising capacity by about 10-12 million passengers in each case. Amsterdam Schiphol is in the middle of a ambitious plan which will stretch its capacity to 40 million passengers by year 2015.

Moreover, in the context of the provisions of trans-European transport networks of the Treaty on European Union, the Commission identified the trans-European airport network and defined the guidelines for its development so as to ensure that airport capacity in the Community is able to meet the growth in demand for air transport, while taking account of environmental concerns as well as the objectives of economic and social cohesion (COM(94)106 final of 7 April 1994).

The guidelines are based on a global approach, which made it possible to identify the main functions of the network as well as the development priorities necessary to meet demand, while taking account of the need to ensure a high level of safety and environmental compatibility as well as limit the impact of infrastructure policy on the competitive position of airports.

**Table 6: Airports**  
**Freight handled at other EU airports (1)**

(thousand metric tonnes)	Country	1991	1992	1993
Düsseldorf	D	41.8	47.5	45.6
Marseille	F	32.2	38.2	39.3
Hamburg	D	N/A	38.4	36.1
Gran Canaria	E	38.1	34.0	33.8
East Midlands	UK	N/A	10.7	29.6
Basel-Mulhouse	F/CH	24.5	29.8	26.2
Nice	F	23.3	22.6	21.8
Lyon	F	18.6	21.9	20.9
London Luton	UK	N/A	23.5	20.9
Oporto	P	16.1	20.9	20.3
Shannon	IRL	17.3	18.0	19.6
Glasgow	UK	14.9	15.0	18.2
Berlin	D	N/A	16.4	16.8
Birmingham	UK	26.0	18.5	16.5
Nuremberg	D	9.1	9.2	15.8
Maastricht	NL	26.2	10.8	15.2
Tenerife Sur	E	17.7	18.3	14.3
Palma de Mallorca	E	16.8	14.7	13.7
Stuttgart	D	14.4	14.6	12.4
Prestwick	UK	N/A	N/A	11.3
Turin	I	13.7	14.8	10.7
	EU	N/A	N/A	459.0

(1) Airports with freight between 10 000 - 50 000 metric tonnes in 1993.  
Covers airports participating in ACI Annual Traffic Collection.  
Source: ACI

The key functions of the network are to provide links between the Community and the rest of the world, links within the Community and access to the core of the network and/or links to remote areas.

In order to ensure that the trans-European airport network can fulfil its function of providing the necessary infrastructure capacity for air transport, development priorities for airports of common interest have been identified. These include the enhancement of existing capacity, development of new capacity, enhancement of environmental compatibility and enhancement and development of airport access.

This framework should provide the necessary guidance, so that the investments in airport capacity in the Community take place where they have the best possible impact on airport capacity.

### Impact of the Single Market

The airports environment has recently changed, due mainly to two factors: the free movement of persons and the airlines deregulation. These measures have led to an increased number of passengers and traffic, leading to an increase in the airports activities. However, some problems have arisen from this situation. Indeed, large investments are needed in order to distinguish EU passengers from non-EU passengers in the airports. In addition, the airlines deregulation has also increased the competition between airports, though at the same time the major airports compete for transit extra-EU traffic and so become hubbing centres, allowing them to gain share of traffic. To overcome the problems of congestion, which might result from the strong increase in the number of passengers and traffic, the EU has developed an improved air traffic management where airports are classified in three categories depending on their importance in international traffic. In the future, the sector in the EU has three priorities: the complete suppression of identity checks, the continuation of the duty and tax free allowances for passengers travelling

within the EU (which have been postponed until 1999) and an intensification of the relations with non-EU destinations.

### ENVIRONMENT

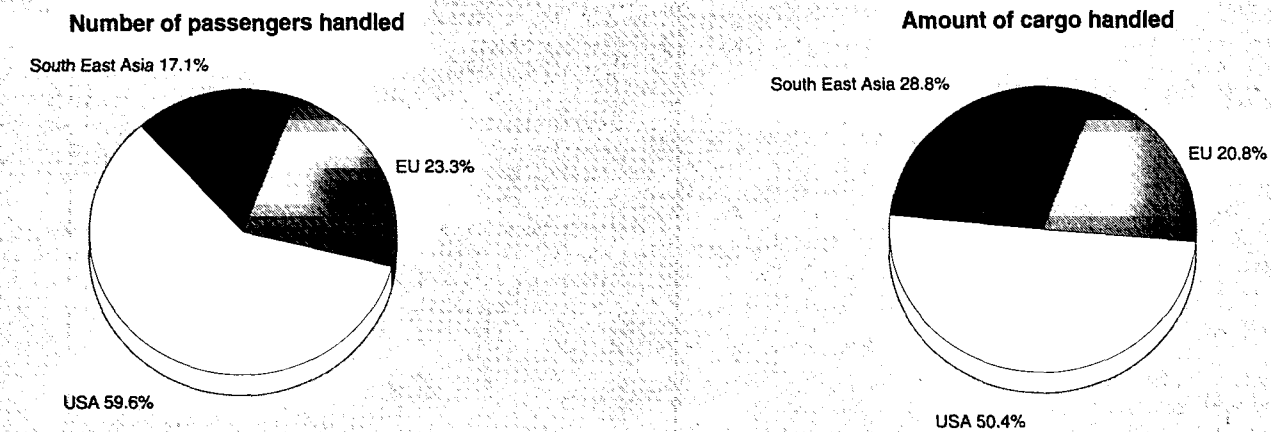
The conflict between air transport's major contribution to economic growth and its impact on the environment remains somewhat unresolved as policies (at both governmental and operator level) to minimise the environmental impact should also work hand in hand with growth in the sector.

The major negative environmental impacts of airports are air and ground pollution, substantial land use and noise. These impacts are both directly attributable to the airport itself and its users, and indirectly attributable to factors such as the external infrastructure required and other forms of transport used to and from the airport.

The major cause of air and ground pollution is the emissions from the engines of the aeroplanes and the land service transport. Advances in jet and turboprop technology has produced engines that are substantially more efficient than their earlier counterparts. However, congestion at the busy airports can lead to an excess fuel burn and hence emission that is 30-50 % higher than would be the case in the absence of congestion. The requirement by the end of the century that jet engines conform to Chapter III regulations will help reduce the amount of emissions (and noise), but the overriding issue that is likely to have a major positive impact in the short term is a reduction in congestion. The Chapter III regulations apply to:

- subsonic jet aeroplanes, with an application for certificate of airworthiness for the prototype accepted on or after 6 October 1977;
- propeller-driven aeroplanes over 5 700 kg, with an application for certificate of airworthiness for the prototype accepted on or after 1 January 1985 and before 17 November 1988; and

**Figure 1: Airports and other air transport facilities**  
**Passengers and cargo handled at major airports as a share of EU, USA and South East Asia total (1)**



(1) Airports with over 10 million passengers in 1993.  
 Source: ACI

- propeller-driven aeroplanes over 9 000 kg. with an application for certificate of airworthiness for the prototype accepted on or after 17 November 1988.

Improvements in congestion can be achieved by improving the air traffic control system and expanding available infrastructure, but this will in turn for the major airports allow additional flights so that some of the gain will be used up.

Concerning noise pollution, estimates included in the Commission's Green Paper on The Impact of Transport on the Environment suggest that the percentage of the population exposed to aircraft noise above 55 db(A) varies from 35 % in the Netherlands to 1.7 % in Denmark, and above 65 db(A) from 1 % in Germany to 0.3 % in Denmark. Hence, the location of airports close to residential areas is a key factor in noise pollution. Estimates released by the AEA show that the modern jets generate about the same level of noise as a TGV, but for a comparatively minute distance (some 4 kilometres). However, the discussion about noise continues at full pace, and most services that land or take off at airports near residential areas have strict requirements about night flights and the levels of thrust that can be used. This has a detrimental impact on the airlines costs as it can take much longer for an aircraft to reach optimum cruising altitude and hence the fuel burn and the time taken for a particular stage length is higher, which in turn has negative implications for emissions.

Land use and noise tend to receive more public attention than air and ground pollution due to the direct and observable impact on people. Many applications to increase or change land-use go through a lengthy negotiation process at national and local governmental levels as well as public enquiries.

Both airport and airport services have become very aware of their responsibility to the environment. The service suppliers are taking increasing responsibility to minimise pollution in maintenance and repair facilities for aircraft, fuel provision services and catering services.

## REGULATIONS

Community legislation on the liberalisation of air transport makes a distinction between two categories of airports. Category 1 airports are the major hubs or capital airports such as London, Paris, Frankfurt, and Amsterdam. The second category are the regional airports and covers all airports which are not category 1 airports.

On the problem of air traffic control (ATC), the Ministers of Transport of the European Civil Aviation Conference (ECAC)

established the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) in 1990. In 1993, the Commission issued a directive (65/93/EEC) mandating the use of standards set by Eurocontrol throughout the Community. Eurocontrol is also responsible for implementing EATCHIP. These efforts will go a large way in improving the management of flows of aircraft in the EU (and Europe), as more cohesion and compatibility will be brought to the various national air traffic control networks. The gradual global movement towards a Single Air Traffic Management System and the future development of a Global Navigation Satellite System (GNSS), which, if approved, will move much of the current ground-to-air based navigation and air traffic management to satellite-to-air, will act as a fillip to Europe's air traffic control improvements. Both ATC and GNSS are part of the Trans-European Network as proposed by the Commission in 1994 (COM(94) 106). They are also explicitly mentioned in the Commission White Paper on "Growth, competitiveness and employment". The Commission has recently stressed its determination to provide funds for both initiatives (COM(94) 218). In addition to ATC, the development of a trans-European airport network will also provide for the allowance of European funds for the development of airport capacity.

In January 1993, the Council adopted the regulation on common rules for the allocation of slots at Community airports (95/93/EEC). This regulation forms the basis for allocating slots on neutral, transparent and non-discriminatory rules for Community carriers. It aims to allocate slots among existing carriers as fairly as possible, given severe congestion at some airports, and it also allows new entrants a fair opportunity to slots. It has a caveat on provisions for third country relations, in that if a third country does not allocate slots to Union carriers on a similar footing, then Union allocation of slots to carriers from the third country can be constrained or withdrawn. The regulation comes up for review in three years from adoption.

In July 1992, the Council adopted the regulation on licensing of air carriers (2407/92/EEC). This regulation per se has marginal impact on most airports, but it does have an impact on the small regional airports that cater for international flights. It is these airports that will host some of the new entrant airlines operating small niche point to point services, and the regulation requires that new entrants operating small aeroplanes (less than 20 seats or under 10 tonnes MTOW) maintain a net cash at hand balance of at least 80 000 ECU. The regulation is designed to ensure the financial fitness of air carriers in a commercial environment that has been shaken by company failures. However, niche start-up airlines initial outlay of start-

up capital is huge by most industry standards. This initial outlay includes plane purchase or lease, landing rights, purchasing access to computer reservation systems, hangerage and maintenance options, etc., and is estimated to be in excess of 350 000 ECU. The heavy initial investment coupled with the minimum requirements does not bode well for new entrants which, in turn, will severely reduce the small regional airports ability to attract additional business.

As to the use of airport infrastructure, the European Commission also plans to present, early 1995, a consultation paper on how best to ensure non-discriminatory, transparent and cost effective provision of airport services. Finally, the Commission adopted on 13 December 1994 a proposal for a Directive on the opening up of groundhandling markets.

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## DUTY AND TAX FREE SALES

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Duty and tax free (DTF) sales have become highly important for airports (and airlines) as a source of revenue, accounting for about 15-20 % of airports' income in Europe. Also, passengers want to benefit from low-priced products available in the DTF shops on the airports. The Commission originally envisaged abolishing DTF allowances for passengers travelling within the EU with the advent of the Single Market. Estimates on the impact of DTF abolition concluded that landing and passenger charges would have to rise by 13 to 25 % to compensate airports for lost income. In turn, airlines would pass these higher charges onto the traveller in higher fares, possibly causing a negative effect on traffic demand especially in the leisure market. The effect of DTF abolition would also be exacerbated by airline companies, especially charter airlines, losing revenues from on-board DTF-sales. This would cause another cost push on fares. Due to strong lobbying from many sections of the international transport industry, the abolition of DTF has been postponed within the EU until the 1st July 1999. In the meantime the DTF industry has developed a system of vendor control, in which the vendor checks compliance with DTF allowances. This system is necessary as customs control for travelling within the EU will disappear, but it has increased the allowance to travellers within the EU, for each intra-EU stage is counted as one for DTF purchase. Previously, a passenger travelling from the UK to Denmark, then to Italy and returning to the UK was only allowed to import one allowance into the UK, however the equivalent for this route is now three times as purchases are possible and legal at each stage for importation into the UK.

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## OUTLOOK

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The outlook for airports depends on the demand for air passenger and freight, which is expected to be fairly buoyant in the future. However, in the short term, some of the larger congested airports will not be able to take full advantage of potential growth as congestion will be the limiting factor. As the EU's air traffic control improves, part of this constraint will disappear temporarily. However, this will not be enough and expanding infrastructure remains necessary though adding capacity is a thorny problem at most of the largest airports close to dense populations. The medium sized airports will continue to expand, especially those which have positioned themselves as competitors to the major hubs. The small regional airports will see some growth, but the major limiting factor for these will be the size of the catchment area.

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## Overview

### NACE 81, 82, part of 83

The financial services industry currently finds itself in a decade of fundamental change. Intensifying competition, a new regulatory framework, the burgeoning role of technology and increasingly sophisticated, and mobile customers - in combination - are placing pressure on traditional credit institutions. As a result, these institutions are paying greater attention in areas of marketing and operations yielding more cost-efficient operations, product innovations, and market-oriented strategies. These industry-wide developments, in turn, have blurred the lines of demarcation that traditionally have distinguished providers of financial services

and administrative regulations allowed acquisitions, mergers and other alliances to occur, both within domestic markets and across national frontiers. Such a deregulatory environment within the EU has impelled the creation of a single market in financial services which, in turn, is expected to create opportunities for financial services companies to compete in previously inaccessible foreign markets.

Technological advances have also had significant impact on the way in which financial services are provided. By lowering the cost of entry, new technologies have enabled institutions to enter or compete in new markets. Examples include telephone or screen-based banking, the sharing of ATM networks, and prepaid microcircuit cards.

Additionally, the recent economic downturn, in general, has resulted in a weak demand for financial services and the introduction of international supervisory agreements, in particular, has forced banks to focus more closely on returns on capital. As a result, firms have scaled down or sold off activities which were not deemed to be 'core' business. For others, the sale of these businesses has offered opportunities to develop strategic focus.

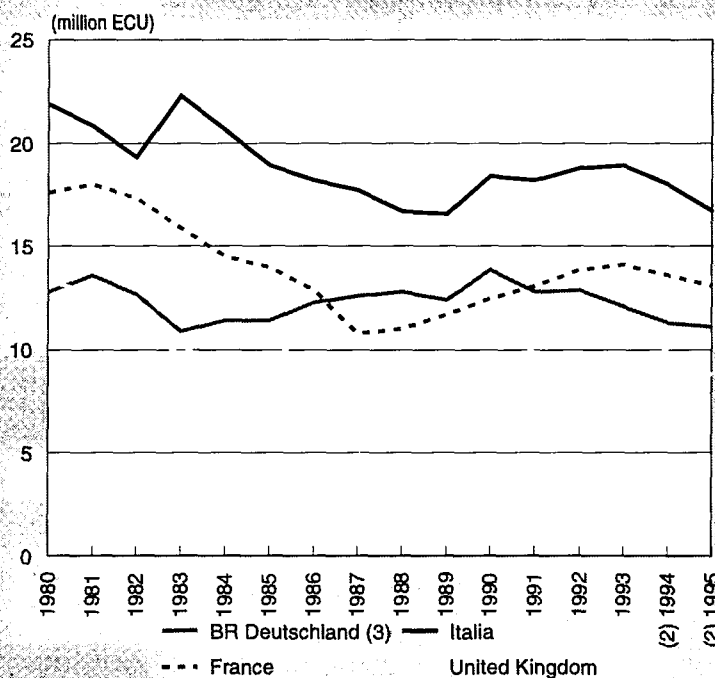
These political, economic, and technological developments made it more difficult to provide discriminatory definitions for the individual financial market segments. For example, it has become harder to define what is meant by a "bank" as the barriers between different types of financial institutions break down and the basic business of banking is invaded by non-banking institutions. Moreover, the increasing interdependence of markets worldwide is further blurring the distinctions between bank credit and securities issues, domestic

## INDUSTRY PROFILE

### Description of the sector

The last decade has witnessed dramatic changes within the international banking and financial services industries. In this regard, changes in market structure have been particularly prominent. Indeed, deregulation and the abolition of protectionist market structures were worldwide trends in the 1980s, causing major structural changes within the European, American, and Japanese financial services industries. Important examples of these trends included moves to abolish exchange control regulations. Moreover, the removal of legal barriers

**Figure 1: Financial services Household gross saving rates (1)**



(1) As a share of disposable household income according to national definitions.

(2) Estimates

(3) Net saving rate

Source: OECD: Economic Outlook

**Table 1: Financial services**  
Gross value added at market prices as a share of country's total (1)

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	4.6	5.8	6.2	6.3	6.1	5.7	5.0	5.2	5.3
Danmark	3.1	3.0	3.8	3.5	3.2	3.6	3.0	2.1	1.7
BR Deutschland	4.5	5.5	5.2	5.0	5.0	5.0	4.9	5.2	N/A
Hellas (2)	2.4	2.4	2.5	2.5	2.4	2.5	2.5	2.3	N/A
España	5.8	6.0	6.0	6.3	6.6	6.9	7.2	N/A	N/A
France	4.6	5.0	5.5	5.8	5.5	5.3	4.6	4.5	4.3
Ireland	5.2	6.0	6.3	6.1	6.6	6.2	6.0	6.6	N/A
Italia	5.0	4.9	5.2	4.6	4.6	4.7	5.0	5.0	5.7
Luxembourg	10.2	21.2	20.2	19.3	16.8	13.0	12.9	13.6	14.8
Nederland	5.0	5.4	5.1	5.1	5.1	5.3	4.8	4.8	5.0
Portugal	5.4	5.9	6.1	6.8	7.3	7.7	8.6	(2) 8.6	N/A
United Kingdom	3.0	3.8	3.9	4.0	4.0	4.2	4.5	4.5	4.5
EU (2)	4.4	5.0	5.1	5.0	5.0	5.0	5.0	5.0	5.0

(1) Excluding auxiliary activities to financial services (NACE 70: 831, 832).

(2) Estimate

Source: Eurostat: National Accounts

**Table 2: Financial services**  
Employment in the financial sector as a share of total employment (1)

(%)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	3.7	3.7	3.7	4.0	3.9	4.0	3.9	3.9
Danmark	3.0	3.2	3.4	3.6	3.7	3.6	3.4	3.5
BR Deutschland	3.5	3.5	3.4	3.3	3.4	3.4	3.5	3.3
Hellas	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.1
España	N/A	2.6	2.4	2.5	2.5	2.3	2.5	2.5
France	2.8	2.9	3.0	3.0	3.0	2.9	2.8	2.8
Ireland	2.9	3.0	3.2	3.2	3.2	3.0	3.3	3.5
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.8
Luxembourg	6.6	7.2	7.2	7.9	8.5	8.3	9.3	8.7
Nederland	3.2	N/A	2.8	2.9	2.8	2.9	2.8	2.8
Portugal	N/A	2.0	1.9	1.8	1.9	2.1	2.1	2.6
United Kingdom	3.4	3.3	3.6	3.5	3.7	3.8	3.9	3.6
EU	3.2	3.1	3.1	3.1	3.2	3.2	3.2	3.1

(1) Excluding auxiliary activities to financial services (NACE 70: 831, 832).

Source: Eurostat: Labour force survey

**Table 3: Financial services**  
Gross value added at market prices (1)

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	3 684.5	5 864.3	6 792.9	7 352.5	7 439.7	7 598.5	7 143.6	7 913.9	8 521.8
Danmark	1 271.2	1 988.6	2 777.8	2 721.7	2 547.7	3 025.1	2 749.0	1 908.3	1 628.1
BR Deutschland (2)	25 500.6	43 868.4	45 873.7	46 273.2	49 064.8	52 261.9	55 587.7	64 793.6	N/A
Hellas (3)	614.6	957.8	897.6	879.3	955.5	1 085.2	1 140.0	1 141.4	N/A
España	9 017.1	13 649.7	14 280.5	15 957.5	19 309.6	23 978.2	28 108.6	N/A	N/A
France	20 889.3	33 069.7	39 512.9	42 707.9	43 156.1	44 852.2	41 213.4	41 830.6	42 134.6
Ireland	689.3	1 387.1	1 563.7	1 552.7	1 786.8	1 849.8	1 952.4	2 236.2	N/A
Italia	16 048.6	27 344.1	31 939.9	30 044.0	32 322.3	36 290.0	42 759.9	45 509.5	53 794.0
Luxembourg	343.0	1 113.1	1 151.7	1 126.9	1 040.6	870.1	940.5	1 046.8	1 223.7
Nederland	5 750.9	8 188.3	8 739.3	9 032.8	9 356.3	10 415.5	10 176.7	10 712.0	11 615.5
Portugal	1 005.6	1 652.0	2 046.6	2 216.5	2 454.6	3 230.9	3 975.7	(3) 4 696	N/A
United Kingdom	11 351.9	22 496.5	21 840.8	23 105.5	27 647.8	31 096.1	33 610.2	35 227.7	34 901.6
EU (3)	96 166.6	161 579.6	177 417.4	182 970.5	197 081.8	216 553.5	229 357.7	242 494.0	255 260.0

(1) Excluding auxiliary activities to financial services (NACE 70: 831, 832).

(2) Includes only former West-Germany.

(3) Estimate

Source: Eurostat: National Accounts

and international paper, cash instruments and derivatives, and between different categories of derivative products (futures, options and swaps).

Therefore, it is more appropriate to describe the financial services industry by function and by type of institution. The following functions can be identified:

- Payment services;
- Saving products;
- Fiduciary services;
- Lending to business (corporate);
- Lending to consumers (retail);
- Underwriting/issuance of equity;
- Underwriting/issuance of debt;
- Insurance and risk management products.

These functions are provided by an array of institutions, including insured deposit institutions, insurance companies, finance companies, securities firms, pension funds, mutual funds, diversified finance firms and specialist firms.

For the EU as a whole, the gross value added of financial services at market prices as a share of total value added was 5.0 % in 1992. This share has increased by 0.6 % since 1980. The deviation between most Member States is not large. Only in Luxembourg does the financial sector appear to be disproportionately important to the economy as Table 1 shows.

Four large EU countries account for 75 % of gross value added in financial services: Germany constituting the largest share, followed by Italy, France and the UK. These figures, however, do not provide information about the relative importance of each country on the different financial markets, since value added measures the contribution to the 'real' and not the 'financial' economy. In order to measure the 'financial' economy, figures on assets, premiums written, and stock turnover are more appropriate. Based on the latter figures, the UK appears to be the most important financial market within the EU. Over the past decade the British financial service sector showed an enormous growth in value added. However, because of the rationalisation which started in the UK, the employment in financial services has been decreasing in recent years.

## Recent trends

The 1993 monetary turmoil established that the European Monetary System (EMS) rules were politically motivated and underscored the need for changes in economic practices. Specifically, in an attempt to fight the wave of speculation hitting their respective currencies, the Member States of the EMS decided to protect their exchange reserves either through allowing their currency to float within broader bands vis-à-vis their reference rate (August 1993) or else by leaving the EMS altogether. Such was the case when, in July 1993, attacks against the Belgian and French francs as well as the Danish crown occurred. This untenable situation forced the authorities to widen the floating bands by 15 % on the 2nd of August (formerly established at 2.25 % and 6 % around reference rates). Only Germany and the Netherlands provided for an exception such that the bandwidth of 2.25 % between the Dutch guilder and the Deutsche Mark remained unchanged. Although the EMS was in a sense "rescued", it remains doubtful that the EU Member States are still willing to establish the Economic and Monetary Union (EMU) before the end of the century. It should be noted, however, that the majority of Member States have confirmed their intention to finalise the Monetary Union in 1999 at last, as stipulated in the Maastricht Treaty.

Free competition in the EU has been the explicit and chief aim of that portion of the single market legislative program governing the provision of financial services. However, credit institutions and investment firms providing services in other Member States still have to comply with some domestic regulations of their host markets.

On January 1, 1994, the European Economic Area Agreement (EEA) came into force, extending the single market to the five countries of the European Free Trade Association (EFTA), thereby creating the world's largest free trade area. EU financial services rules now also apply throughout the EEA, as do services regulations. The agreement will have far-reaching effects on business in Europe.

The availability of current and emerging technologies offer the opportunity to restructure relationships by "wiring" the customer into the suppliers' service channel. In a world where the convergence of telecommunications and computing technologies is already opening up global financial markets to new players, the suppliers of financial services have a duty to orient - or reorient - their business along technology lines. Technology is generating new, electronic delivery channels

**Table 4: Financial services  
Employment structure, 1992 (1)**

(%)	Share of female workers	Share of employees	Share of part-time workers
Belgique/België	42.6	91.3	9.6
Danmark	51.4	98.5	17.6
BR Deutschland	51.8	93.6	13.1
Hellas	42.5	93.3	3.2
España	25.2	95.4	4.7
France	53.8	99.0	8.1
Ireland	51.4	99.0	4.3
Italia	32.0	89.7	4.6
Luxembourg	46.9	98.6	4.2
Nederland	43.7	99.6	20.1
Portugal	29.8	97.8	1.7
United Kingdom	53.5	97.7	14.3
EU	46.4	95.3	10.6

(1) Excluding auxiliary activities to financial services (NACE 70: 831, 832).  
Source: Eurostat: Labour force survey



**Table 5: Financial services**  
**Direct investment in the EU by sector, 1991 (1)**

(million ECU)	Extra-EU outward	Extra-EU inward	Intra-EU
Energy	-3 700	-609	-3 171
Manufacturing	-10 126	8 593	-11 678
Building, construction	-644	272	-535
Services, total	-11 564	11 957	-19 821
Credit institutions	-9 034	-444	-6 987
Insurance	489	16	-3 201
Trade, hotels, catering	-288	5 683	-2 666
Transport, communication	-1 464	409	-372
Real estate	-869	1 336	-1 747
Other services	-397	4 957	-4 848
Not allocated	-726	1 032	-192
All sectors	-26 761	21 245	-35 396

(1) A positive figure indicates a net disinvestment and a negative figure a net investment. Reinvested profits are excluded. All figures are estimates.  
 Source: Eurostat: Direct investment in the European Community

that challenge conventional supplier-client relationships in all areas of financial services.

### International comparison

The leading financial centres are clearly New York, London and Tokyo. Although trade in financial products is to a large extent international, the international part of trade primarily originates from large (private as well as official) financial institutions or multinational firms. National regulations, conventions and culture still create distinct national markets. For instance, the consolidation of financial services in Europe - linking banking, insurance and other financial services - makes Europe the laboratory for new products and merged companies.

Japanese banks dominate the world market in terms of reserves. This is the result of a decade of exceptional growth during which Japanese banks pursued an aggressive policy of market share expansion, aiming for leading positions in terms of deposit size. However, such growth has been counterbalanced to a large extent by significant devaluation of the yen vis-à-vis the dollar, the European currencies and the ECU.

The comparatively poor performance of US banks, in this regard, is the result of restrictive regulation, which limits the field of activity of the banks both geographically and commercially. The US banking system is fragmented and poorly diversified.

Deregulation and the revolution in communication technology has enabled a substantial degree of internationalisation in the provision of financial services. The resulting integration of financial markets has extended the free choice of participants: issuers have gained a better access to foreign markets to raise capital, whilst investors have tended to internationalise their portfolios.

Compared to the USA and Japan, the European insurance market - except for the UK - is less developed in terms of premiums per capita. With premiums per capita of 996 ECU, the European market is lagging far behind the USA and Japan with corresponding per capita figures of 1 807 and 1 909 ECU respectively. Also, if gross premiums are taken as a percentage of GDP, it is seen that the insurance market in the USA and Japan with percentages of 10.13 % and 8.39 %, respectively, are more developed than the European market (6.53 %). In terms of 1992 market share, the USA had almost 40 % of the world insurance market while the EU and Japan accounted for 32.1 % and 20.3 %, respectively. With current high growth rates in the EU, however, the gap with the USA is closing.

The currency turmoil in 1992 (and in 1993) stimulated securities trading in so-called safe-haven currencies at the expense of high-yield sectors. It also triggered a dip in bank credit. Lower long term interest rates stimulated demand for capital through financing and refinancing in longer-term instruments to the detriment of short term paper. The greater risk associated with the variability of exchange rates and short term interest rates stimulated the use of derivative instruments as a means to hedge against these risks or to exploit opportunities to profit from these risks.

### MARKET FORCES

#### Demand

Demand for financial services is determined by demographic and savings trends, deregulation and liberalisation of capital markets, and changing patterns of consumption. In general, the population of Europe is ageing. Such implies that, in the future, a relatively smaller workforce will be available to generate the social security and pension benefits in pay-as-you-go systems. In anticipation of inadequate social security payments, many people are saving in order to ensure sufficient retirement funds. Through the late 1980s, personal savings rates had been declining in many countries, thereby constraining the financing of economic growth, and stimulating competition between banks, insurance companies, mutual funds and securities to attract savings. Since the late 1980s, however, the fraction of saving in disposable income has taken an upward trend in several countries. Should this trend continue, the supply of savings on the financial markets will increase, raising the question of which financial instruments will be in demand.

Households have changed their investment behaviour in the past decades. The high inflation during the 1970s made them fully aware of the phenomenon of monetary erosion. They have demanded higher yields on savings and have become actively involved in securing the best investment opportunities. This has stimulated the success of more sophisticated saving instruments, including insurance products with a 'financial component' and mutual funds.

Retail banking, including investment of savings, portfolio management, consumer credit and mortgages, payment services and a wide range of advisory services, constitutes one of the most important branches of the financial services sector. Because the retail banking sector has grown enormously since the 1960s, the market is saturated in many countries. This is seen in the significant decrease in certain Member States of

the number of banks branch-offices. Banks can often only gain new business by directly luring it away from their competitors.

In the area of financial services for the industrial sector, three main trends can be identified. The first is an increasing demand for very specialised services for the management of assets and liabilities. Financial management increasingly relies on computer assistance and uses a wider range of instruments, such as options and new fixed-term instruments. Additionally, the traditional role of banks has been challenged by large companies, who have set up their own systems of financial management. The second trend is a growing intervention by banks in the management of businesses. Banks are increasingly being asked to assist with financial restructuring and reorganisation, mergers and acquisitions, take-overs and leveraged management buy-outs. The third trend is the emergence of a capital market to finance small and medium-sized enterprises that have a solid track record but are unable to meet the criteria for an official market listing. These enterprises are served by risk capital companies, as well as by new segments of the official stock markets, such as secondary markets or over the counter markets.

Financial services linked to shares (especially the issue of shares, brokerage services, share transactions and portfolio management) have become one of the more important segments of financial markets since the beginning of the 1980s. Around 1982, during a period of high exposure to liquidity and country debt risks, financial institutions reoriented their activities towards stock-market based operations, especially the underwriting of international bond issues and the intermediation of international transactions.

Consumers are also becoming more conscious of the wide range of products and services which are offered in the insurance industry. As the number of product varieties increases, the need for independent advice is also growing. This trend is reflected in a growing importance of independent intermediaries.

The market for derivative instruments has grown exponentially. The function of derivatives is to hedge against risks. Consequently, the trading of these instruments involves a degree of speculation. At present, there is a debate between banks and supervisors (e.g. BIS, Bundesbank, Federal Reserve) about the risk of the derivatives markets. The Group of Thirty asserts that these markets provide an important service and are not excessively vulnerable. Supervisory organisations, however, emphasise the substantial undiversifiable market risks inherent in these instruments. These risks could materialise when the liquidity of the markets dries up.

## Supply and competition

The banking and financial services industries clearly have a financing need, and more specifically a desire for wholesale money. A secular shift in retail banking patterns seems to have occurred with savers now much more conscious of opportunities in other vehicles such as equity-linked investment through mutual funds. A significant proportion of the Euro-market's biggest borrowers are banks with strong retail bases such as Deutsche Bank, Abbey National and Crédit Lyonnais.

Since the mid-1980s deregulation has liberalised capital markets, thereby permitting the introduction of many new products, and has blurred the demarcation lines between different market players. In particular, deregulation involves:

- an end to brokers' monopolies within stock exchanges and other organised markets accompanied by free negotiation between brokers and clients, which led to a reduction in commissions;
- reorganisation of the market for treasury bonds, with the appearance of specialists whose role is to stimulate the market and assure its liquidity;
- development of secondary markets;
- computerisation, resulting in improvements in market liquidity and in the precision and speed of information;
- creation of markets in derivative products, notably the United Kingdom's LIFFE and France's MATIF, respectively the fifth and sixth largest derivative markets in the world.

The result has not only been a more intense competition, but also a wave of acquisitions, mergers and alliances. Competition in new products and, to a lesser extent, price intensified, competition in territory (through building and extending a network of banking outlets) was less severe from the beginning of the 1980s as new organisational features such as home banking and automated banking facilities diminished the need for extensive branch networks. Product competition became particularly intense in the investment of household savings, with the appearance of a greater number of market participants including traditional banks as well as insurance companies and investment funds.

One of the major trends in Europe has been financing with securities rather than with (bank) loans. Examples include credit notes negotiable on the market in national currency, bonds issued by business firms, negotiable gilts issued by national treasuries and deposit certificates issued by banks. In line with this trend, financial disintermediation has spread. Increasingly, firms bypass banks by going directly to the capital market (for an over-the-counter loan from for instance a life-insurance company, or the issue of bonds or commercial paper).

**Table 6: Financial services  
International acquisitions and joint ventures**

	National (1)			Community (2)			International (3)			Total		
	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92
Acquisitions of majority holdings	81	66	82	41	20	36	37	17	10	159	103	128
Acquisitions of minority holdings	53	38	44	57	33	35	30	16	11	140	87	90
Joint ventures	16	12	14	14	13	17	11	5	4	41	30	35
<b>Total</b>	<b>150</b>	<b>116</b>	<b>140</b>	<b>112</b>	<b>66</b>	<b>88</b>	<b>78</b>	<b>38</b>	<b>25</b>	<b>340</b>	<b>220</b>	<b>253</b>

(1) Operations of firms from the same Member State.

(2) Operations of firms from different Member States.

(3) Operations of firms from Member States and third countries with effects on the Community market.

Source: Data gathered by the Commission from the specialist press



**Table 7: Financial services  
Chronology of principal financial innovations in Europe**

Year	Country	Reform undertaken
1978	France	SICAV
	Italia	Creation of secondary market
	Nederland	Creation of options market (EOE)
	United Kingdom	SICAV, deposit certificates
1979	France	Creation of joint investment funds
	United Kingdom	Removal of exchange controls
1980	United Kingdom	Creation of unlisted securities market (USM)
1982	Italia	Issuance of deposit certificates, creation of inter-bank market
	United Kingdom	Opening of futures (LIFFE) and options (LTOM) markets
1983	France	Creation of secondary market
	Italia	Lifting of credit controls
1984	France	Removal of framework credit restrictions
	Italia	Creation of variable capital investment funds
1985	United Kingdom	Interest-bearing current accounts
1986	BR Deutschland	Creation of secondary market
	France	Issue of negotiable credits notes (deposit certificates, treasury bills, negotiable treasury bonds), end to monopoly of brokers and the creation of stockbrokerage houses, reform of the publicly-quoted stock market, creation of futures market (MATIF)
1987	Nederland	Liberalization of capital market: bullet loans, floating rate notes, commercial paper and bank issues of certificates of deposit are allowed, introduction of green-based system for block-trading according to the market-making principle (AIM)
	United Kingdom	Big Bang stock market reforms: system of brokerage commissions and rules relaxed, end of enforced separation of brokers and jobbers, deregulation of stock exchange membership, creation of international SEAQ and reform state funds, issue of treasury bills in sterling
	BR Deutschland	Creation of secondary market
1988	France	Creation of share options market (MONEP), reform of the government securities market
	Italia	Plan to reform the stock market: computerization and complete integration of the different functions, centralization of all stock trading
	Nederland	Creation of futures market
	United Kingdom	Introduction of the Building Societies Act
1989	BR Deutschland	Creation of DAX stock index
	France	Opening of an options market in MATIF and a market for contracts on the CAC 40 index and on the OMF 50
	Italia	Reform of the publicly-quoted stock market
1990	Nederland	Creation of automated transactions information system (HOS)
	BR Deutschland	Introduction of stop-loss and stop-buy orders
1991	BR Deutschland	Creation of DTB futures and options market
	France, Italia	Last phase of the removal of exchange controls
	Nederland	Introduction of system for professional trade in government bonds (OOB), stamp duty abolished
1992	BR Deutschland	Introduction of electronic transactions system (IBIS), abolition of stock exchange transactions tax
	France	Foreign companies are allowed to issue corporate paper on the French market without prior Treasury approval
	United Kingdom	Launch of futures and options contracts on the FT-SE Eurotrack 100 index measuring developments in the main European stock markets
	Italia	A new type of multi-functional investment firms, incorporated as public limited companies becomes optional

Source: OECD

As banks made less money out of 'normal' on-balance business, they had to seek other income sources. Such sources were found in off-balance activities thereby bringing commercial banks and investment banks into direct competition.

The supply of insurance within Europe has traditionally been dominated by domestically owned insurance companies. Domination on a European scale used to be difficult as many insurances are comparatively standardised products, leaving little opportunity for product differentiation. In life insurance and pensions a greater possibility for differentiation exists, but regulation in some European countries has tended to inhibit

product innovation. Moreover, since there are no patent laws in insurance, new products could and still can be copied relatively quickly, especially as production systems are not complex.

Foreign direct investment (FDI) has responded to the developments in financial services markets. The level of FDI has increased substantially when comparing the 1987-89 period with the period of 1984-86. The share of insurance in intra-EU investment has increased considerably, but those of banking and real estate have lost a few percentage points. In banking and insurance, there is a redirection of direct investment flows

towards other EU countries and away from the rest of the world. Accordingly, the intra-EU share of total direct investment flows in banking and insurance has increased significantly. In real estate, virtually all foreign investment by the EU remains within the EU. The strong decline in the ratio between outward and inward extra-EU FDI-flows indicates that the EU has become an attractive location for direct investment, originating from non-EU countries. Measured by this ratio, both banking and insurance appear to be much more attractive for FDI than the industrial sector.

### Production process

Three developments keep the financial system vulnerable to excesses. Firstly, there has been a flight of investment away from traditional institutions with the enormous growth of mutual funds. A second development includes the increasing deregulation, securitisation, the greater use of new instruments and trading techniques, and the growing numbers of high-octane portfolio managers. The third development concerns the tremendous infrastructure of banks and non-banks in industrial countries which may result in a rapid expansion of credit mostly outside the control of central banks.

The decade of the 1980s was marked by the liberalisation of financial markets resulting in the removal of brokers' monopoly, the authorisation of new products and the removal of credit restrictions. This triggered the expansion of markets and the introduction of innovative new products. Moreover, the distinction between brokers, banks, exchanges and electronic markets has become less clear, and in several instances even obsolete. All compete to provide services to the suppliers and demanders of capital.

An indispensable factor behind the explosion in market activity and the proliferation of products permitted by deregulation has been the availability of enhanced information and communications technology. From a cost perspective, as a mass processing tool, computers permit significant increases in employee productivity. Productivity related to administrative functions is growing in the banking sector at a rate of 5 % to 7 % per annum. At the same time, computers' importance manifests through minimising manual intervention, using real time operations, keeping customer files updated to the minute, reducing delays and making deadlines more reliable. Finally, technology is necessary for the provision of new services such as remote banking.

Technology and competition have resulted in organisational changes within financial institutions. The most important changes concern the overall responsibility of employees for good performance and cost control; the improvement of working conditions; the increased direct contact between employees and customers; and better internal control.

New technologies and methods presuppose new staff skills. Financial establishments that hired large numbers of untrained staff during the expansion race in the 1960s and 1970s are now faced with major investments in training and writing off redundancies. Furthermore, the additional costs of investment in computerisation diminish the profits of banks and insurers. Set against a background of growing competition, the way institutions handle these changes will be critical for their future success.

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## INDUSTRY STRUCTURE

### Companies

The fifteen major European banks, ranked by Tier One capital, include French, Swiss, UK, Dutch and German banks. Tier One capital includes common stock and declared reserves. In short, Tier One capital measures only the core of the banks' solvency. If banks are ranked according to their assets, German banks figure more prominently. There are over 10 000 banks in the EU.

In 1992 there were some 4 343 insurance companies operating in Western Europe against 4 246 companies in 1991. The number of independently controlled groups was less than 2 500 and is declining. When insurance companies are taken over, the acquiring companies often do not incorporate them into their own structure for marketing and/or tax reasons. As a result of the ongoing mergers and takeovers, it is possible that the total number of insurance companies is increasing, while the number of independently controlled groups is further declining. The average size of insurance companies is measured in terms of gross premiums divided by the number of undertakings. In 1992, within the EU, the average size was 80 million ECU against 66 million ECU in 1990.

### Strategies

The large financial services groups follow two main strategies. The first is diversification: offering a complete financial service package ("Allfinanz"). The second strategy is cross-border expansion or linkage (global player). Allfinanz (also named 'bancassurance', although there the emphasis lies on insurance products) offers benefits to banks and insurance companies, especially in the life insurance sector. The life insurance market offers banks attractive prospects for improving the return from their distribution network. The scope of the banks' networks is also an attractive feature for the insurer in that a larger volume of customers can be accessed at lower cost. The strategy of the global player is pursued through acquisitions, mergers and alliances.

Other financial intermediaries, such as securities brokers, must first determine if they want to be an international, regional or niche player. To be an international operator the successful strategy seems to be to invest in international networks of offices. Goldman Sachs, Credit Suisse First Boston and S.G. Warburg all have invested heavily and all are leading advisers.

A strategy of innovation can create competitive advantages for all players in the financial services sector, especially for the stock exchanges. International capital investments increasingly use new financial instruments, simply because they offer a better performance.

### Impact of the Single Market

The creation of the Single Market has prompted a major reorganisation of the sector in the late 1980s and early 1990s, including a number of mergers and acquisitions. EU regulation has been extended, or is being extended, to cover freedom of establishment for banks and other financial institutions, harmonisation of banking supervision, accounting and a number of other subjects relevant to the business of financial services. The obvious advantages of the creation of the Single Market (trade facilitation, removal of inefficiencies, fair competition, etc.) are considered very important. For some elements, however, the importance can only be transformed into advantages if national economic, fiscal and legal differences are effectively removed and if the EU measures are translated into national regulations. Harmonisation in implementation is considered a very important priority for the industry, especially in the field of taxation. Liberalisation in all markets, deregulation and a greater access to financial sources for SME's are all considered high priorities, as is the achievement of the Economic and Monetary Union (EMU).

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## REGULATIONS

In all Member States, governments regulate the functioning of financial services activities for a variety of reasons including market failures. Regulatory instruments are usually divided into two broad categories: those that effect the structure of the industry, and those that impinge upon conduct of industry participants. The former govern the entry of new firms into the industry, while the latter control the behaviour of existing industry members. Banking and insurance have traditionally



been subject to a high degree of both structural and conduct regulations. In the financial services industry as a whole, the government role has been indirect even though some Member State governments used to be or still are major shareholders of financial institutions. Still, regulatory rules have been stringent, mostly (but not exclusively) for prudential reasons.

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## OUTLOOK

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The newly adopted EU directives will encourage competition and stimulate cost-efficient company operations. Therefore, attention is turning to improving operations in a cost-efficient way. Some cost savings will be reached in the distribution of financial services.

Market deregulation, increasing competition and new technology have made firms reassess their strategic objectives. For the rest of this decade, the following promising segments can be recognised as participants in the financial services industry:

- Traditional banking; interest-differential lending and deposit-taking for consumers, small business, agricultural firms, and the lower end of middle-market corporations;
- Financial intermediation and advisory services; underwriting debt - and in a lesser degree equity and securitisation - primarily to the upper end of the middle market and to larger corporations;
- Investment management; trust, mutual funds, broker/dealer activities, money-management;
- Insurance; as agent, underwriter, or both;
- Fee-based operational services; usually with a high-tech component area such as automated clearing houses (ACH)-processing, data-processing services, cash-management, letters of credit, and stock transfer;
- Trading; customer and proprietary trading for securities, foreign exchange;
- Merchant banking and equity investment; venture capital, equity "kickers", mezzanine financing, leveraged buy-outs (LBOs).

However, the landscape is unlikely to change radically in the longer run, despite the continued revolution in technology and the high cost of market-entry.

Written by: Netherlands Economic Institute



# Credit institutions

## NACE 81

European banking and financial markets currently find themselves in a decade of fundamental change. Intensified competition, a new regulatory framework, the increasing role of technology and more sophisticated and mobile customers all place pressure on traditional credit institutions.

### INDUSTRY PROFILE

#### Description of the sector

Banking involves an array of functions: management of deposits, loans, credit payment systems, and clearing mechanisms; providing services with capital transactions; performing various other services like the provision of guarantees and insurance. These functions are not performed by banks alone. For example, consumer and industrial credit are provided by finance companies (many of which have links with banks) and mortgage loans by life insurance companies. Banks' traditional status is being further eroded by a recent trend towards deregulation and disintermediation. In addition, the new EU-rules have created, at least in principle, the concept of a single passport for financial institutions offering services across the Member States. The new rules also effectively eliminate historical distinctions between different kinds of banks. All are now credit institutions.

In this regard, credit institutions can be classified along the following lines:

- Universal banks: multi-purpose banks which can offer the whole range of financial services. In most countries, there are universal commercial, savings, cooperative and public banks;

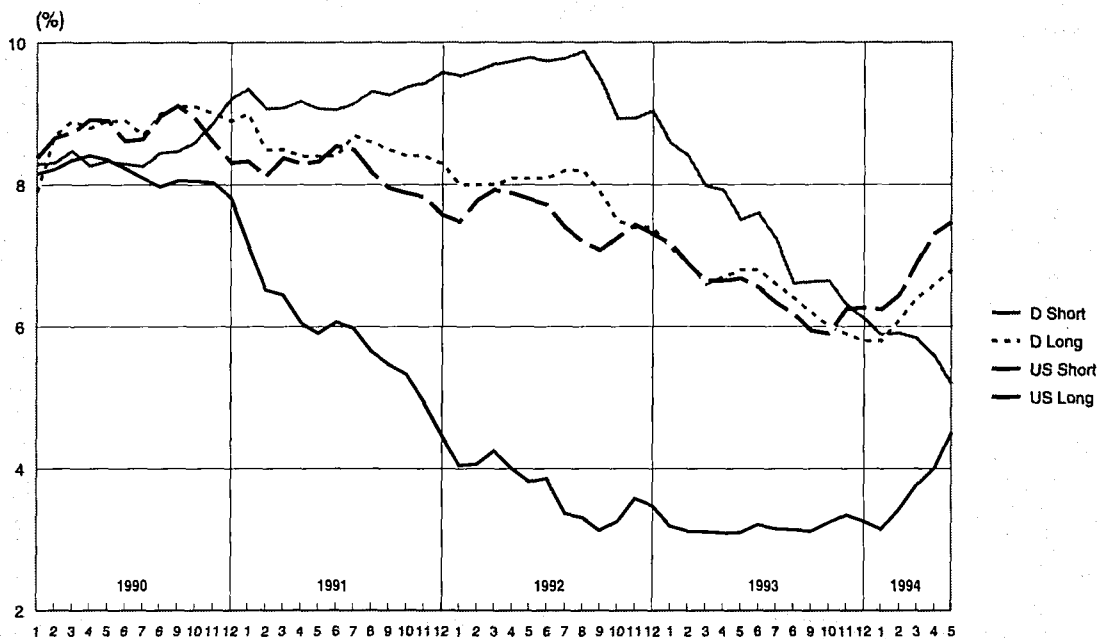
- Specialised banks: among them are the merchant banks, investment banks, mortgage banks, industrial banks, etc. which offer types of finance according to their scope (cf. industrial banks), or their financial techniques (cf. mortgage banks).

Mortgage credit plays a fundamental role in the EU economy, accounting for more than 80 % of all household debts. Outstanding mortgage debt accounts for 33 % of GDP in the EU as a whole. The mortgage debt to GDP ratio differs widely across Member States, from just 6 % in Greece and Italy to as much as 92 % in Denmark. Legal traditions are very important, and every country differs from the other in this respect. Notwithstanding the Second Banking Directive, the EU market for mortgage credit remains by and large the sum of the twelve national markets. National differences in the tax treatment of mortgage interest effectively obstruct the international expansion of banks engaged in mortgage credit. In general, financial markets have become internationalised. The same cannot be said for mortgage credit, however, where as yet no Single Market exists.

There are also institutions which offer some type of specialised credit, but are not credit institutions according to EU directives, and which are called "financial institutions" because they do not attract their funding from the public; such institutions are particularly active in consumer credit, industry credit, factoring, leasing and car financing.

Finance companies that specialise in providing credit to consumers and industry are also known as Finance Houses. Mostly, they are subsidiaries of larger credit institutions. New credit granted by Finance Houses in 1993 is distributed as consumer credit (46.2 %), car financing (40.0 %) and industrial credit (13.8 %). Industrial credit (to be distinguished from leasing) is common in Germany, France, the United Kingdom and Sweden. Transactions with private customers represent in general more than 50 % of the total volume. With the exception of own funds, the banks and the money markets represent the principle sources of funding in the majority of European

Figure 1: Credit Institutions  
Interest rates (1)



(1) Short term interest rates: Germany 3-month FIBOR; USA certificates of deposit. Long term interest rates: Germany 7-15 year public bonds; USA US Government bonds ("composite" over 10 years)  
Source: OECD: Financial Market Trends

**Table 1: Credit institutions**  
**Other monetary institutions - Main indicators, 1992 (1)**

	Number of enterprises	Number of local units	Number of persons employed	Turnover (2) (million ECU)	Net income (million ECU)
Belgique/België	133	(6) 16 405	(6) 60 304	(3) 45 728	N/A
Danmark	113	2 467	52 000	12 666	727
BR Deutschland	3 635	45 991	647 900	235 400	(4) 16 669
Hellas	49	1 660	49 777	(4) 4 423	(4) 379
España	317	35 314	253 135	72 509	18 185
France	618	N/A	322 100	220 490	29 686
Ireland (3)	46	1 140	N/A	N/A	N/A
Italia	1 024	20 789	327 992	(3) 86 631	(3) 31 962
Luxembourg (4)	177	N/A	16 535	27 934	N/A
Nederland	210	N/A	(7) 113 100	(7) 11 200	(7) 7 798
Portugal	259	3 209	65 151	14 212	4 563
United Kingdom (5)	518	(4) 12 547	394 800	(4) 80 164	(4) 10 758

(1) Other than central banks (NACE 70: 812).

(2) Interests and commissions received.

(3) 1991

(4) 1990

(5) Excluding building societies

(6) Including banks and savings banks.

(7) Including also central banking

Source: Eurostat; Mercure

countries. Funding takes place in the short and medium term in most countries (with the exception of the UK, where demand for long term funds is widespread). The market is characterised by intense external competition in most countries, particularly from savings banks: in most cases, finance companies have reacted to this situation by becoming more specialised or by reducing their costs.

The UK has the largest banking sector, measured by total assets, followed by Germany and France. The German banking sector employs the most people. The number of banks in Germany is overestimated because all of the cooperative banks are counted as individual banks, whereas in other countries (e.g. France or the Netherlands) they are subsumed under the heading of their central or regional cooperative bank. Cooperative banks figure prominently in Austria, France, Germany, and the Netherlands, and savings banks in Italy, Portugal, Spain, Germany and Belgium. However, although the largest bank in Europe is a French cooperative bank, except in this country, Austria, Germany and Spain, most assets are held by straight commercial banks.

### Recent trends

Banks are confronting the strategic challenge of diminished loan income. This development has had its impact on valuation of bank stocks. Investors often distinguish between trading

income derived from serving a bank's customers, and that earned by risking the bank's own capital (so-called proprietary trading). The former is seen as inherently more stable, and therefore more valuable, than the latter. This perception benefits banks with many corporate customers. In spite of the generally poor economic situation in the EU during 1993, mortgage lending in fact performed strongly, boosted by lower interest rates. In particular, residential lending increased sharply in Denmark, Germany, the Netherlands and Belgium, while performance was less strong in Italy and Ireland. In the UK, mortgage lending stabilised after a difficult year in 1992. On the funding side, the level of mortgage bonds outstanding increased by 20 %, while there was also an increase of activity in issue of mortgage backed securities, notably with the issues in the Netherlands and in Spain.

Despite some differences in history and legal structures, savings and co-operative banks show some important common characteristics. The main characteristics are: firm roots in the regions and communities, no exclusion of any customer groups, and a business focus on small and medium-sized enterprises.

General trends among the Member States in housing and mortgage credit markets include an increased owner occupation and a diminished number of inhabitants per dwelling, a trend that has certainly influenced the development of mortgage

**Table 2: Credit institutions**  
**Market share of non-banker deposits, 1993 (1)**

(%)	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK	EU
Savings banks	29.3	16.0	37.6	10.0	41.9	15.6	4.4	23.2	5.5	6.9	22.4	2.9	23.3
Cooperative banks	6.8	N/A	20.3	N/A	3.8	28.2	N/A	15.2	0.9	28.2	4.1	2.0	17.1
Building societies	0.0	N/A	36.9	0.0	0.0	0.0	24.5	0.0	0.0	0.0	0.0	40.1	8.6
Other banks	68.5	N/A	5.2	90.0	54.3	46.0	57.6	45.8	93.3	64.9	73.5	47.7	44.9
Postal sector	2.2	N/A	0.0	0.0	0.0	10.2	13.5	15.8	0.3	0.0	0.0	7.3	6.1
Non-banker deposits (billion ECU)	256	13	1402	46	387	753	28	545	167	227	57	684	4565

(1) Amounts owed to customers, not to credit institutions, as of January 1st.

Source: European Savings Banks Group, European Association of Cooperative Banks

**Table 3: Credit institutions**  
**Commercial banks - Main indicators, 1993 (1)**

	Number of banks (2)	Number of branches (3)	Total assets (billion ECU) (2)	Number of persons employed
Belgique/België (4)	151	7 925 (5)	563	77 088 (6)
Danmark (7)	112	2 340	138	45 465
BR Deutschland	330	7 604	826	221 000
Hellas (8)	41	1 554	53	40 867
España	168	17 580 (9)	470	153 638
France	425	10 442	1 184.8 (10)	226 847
Ireland	43	919	61	21 500
Italia (11)	315	19 722	796	315 120
Luxembourg	218	315	397	16 143
Nederland	176	7 191	631	109 200 (12)
Portugal	42	3 144	117	59 748
United Kingdom	491	12 800 (13)	1 927	378 700 (13)
EU	2 512	91 536	7 163	1 665 236

(1) As of December, 31st.

(2) Including also foreign bank branches and subsidiaries.

(3) Excluding foreign bank branches.

(4) Figures for 1993 are not comparable with those for previous years due to the introduction of a new accounting system.

(5) Figures do not include tied or independent agents and only cover banks which are members of the Belgian Banking Association.

(6) Figures obtained by extrapolation from various sources.

(7) Commercial, savings and cooperative banks whose capital exceeds 13.2 million ECU.

(8) Figures not comparable to those for the previous years.

(9) Figures do not include branches of savings banks and cooperative banks.

(10) Domestic operations only.

(11) Figures include commercial banks and former savings banks, but exclude rural and artisanal banks and central institutions.

(12) Figures do not include employees working abroad.

(13) Estimate.

Source: ECBF

lending. The continued use of mortgage credit as a means of financing home ownership will represent a challenge which both national and European authorities will have to address over the next decade.

### International comparison

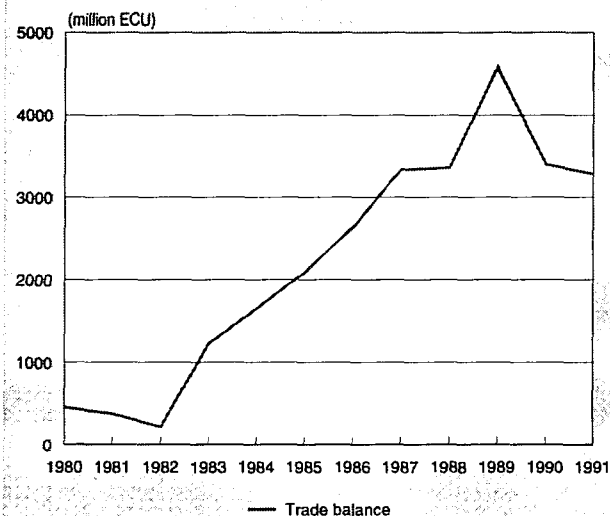
According to the results for 1993 Europe's banks appear to be on the road to recovery. While banks in France and Spain still manifest the impact of recession, elsewhere banks seemed to have emerged from the recession, with British banks leading

the way. An indication of the regaining strength of the European banks is their pre-tax profit against Tier One Capital-ratio of 13.7 %. This figure is starting to approach generally accepted standards. In the long run, a return of around 15 %-17 % is regarded as necessary to provide a proper dividend to shareholders and maintain necessary capital strength.

The Japanese banks still dominated the world market in terms of assets (size), with Japanese banks representing the first six places in the world's Top 1000. However, the profitability and capital strength of the Japanese banks is very weak, relative to their international competitors. With a pre-tax profit to Tier One Capital-ratio of 5.1 %, the Japanese banks are among the weaker banks within the Top 1000. Japanese banks have been slow to recover from problems with bad-debt. Standard & Poor's, a rating agency, reckons that it could take five to ten years before Japan's banks reconcile all of their bad debts. Because the earnings environment remains severe at home, Japanese banks are looking all the more to the USA market. Japanese banks operating in the USA have become more aggressive in lending, which shows signs of recovery from a long slump. The banks also are becoming more involved in securitisation (loans transformed into securities) and derivatives such as forwards, swaps and futures (forward-based contracts), and options, caps and floors (option-based contracts).

Banks in the USA have succeeded in restoring their health. Capital strength has been rebuilt, problem lending is being worked off, costs have been cut, margins and profits have recovered and prospects are opening for renewed expansion at home and abroad. For many USA banks, 1993 was a record year, with a pre-tax profit to Tier One Capital-ratio of 22.6 %.

**Figure 2: Credit institutions**  
**External trade balance at current prices (1)**



(1) Extra-EU exports less imports. Estimates based on balance of payments.  
 Source: Eurostat: International trade in services

### MARKET FORCES

#### Technology

Technology, especially computerisation, is crucial to banking productivity, cost effectiveness, and product development. The

**Table 4: Credit institutions  
Savings banks - Main indicators, 1993 (1)**

	Number of banks	Number of branches (2)	Total assets (billion ECU)	Number of persons employed
Belgique/België	31	(3) 5 211	105.7	18 832
Danmark	115	690	20.9	10 000
BR Deutschland	703	19 875	608.5	318 064
Hellas	1	(4) 925	5.8	987
España	51	14 253	209.0	83 333
France	31	4 242	134.9	35 600
Ireland	1	69	1.5	980
Italia	78	5 275	273.2	78 600
Luxembourg	1	104	14.2	1 640
Nederland	11	823	21.6	8 060
Portugal	1	(4) 1 493	20.3	9 955
United Kingdom	1	1 349	39.9	23 000
EU	1 025	54 309	1 455.5	589 051

(1) As of December, 31st.

(2) Excluding mobile branches.

(3) Including also post offices, agencies of the national bank, discount houses, etc. which operate savings service on behalf of the ASLK-CGER Bank.

(4) Including also post offices.

Source: European Savings Banks Group

financial revolution, brought about by technological improvements is by no means over. What is over, however, is the misguided notion of the 1980s that inspired almost unlimited financial investment in technology. In a cost cutting environment, credit institutions are more aggressively looking to get value for money. Considering that the financial sector dedicates between 12 and 16 % of its expenditure on computer systems, there is little wonder that credit institutions are seeking greater utilitarian function from the technology they buy. It is therefore the new utility that can be derived from the information technology (IT) expenditure which will fuel the continued growth.

Current trends in the implementation of computing are not new. They form a continuation of a general path marked by decentralisation, a shift to client server architecture (where

the applications and business data are held separately), open systems, and object-oriented programming.

These developments will enable credit institutions to have what they seek - a flexible information processing infrastructure that is more adaptable to change, which better reflects the organisational structure of the firm, which allows for quicker product development and greater customer orientation while keeping costs under control.

## INDUSTRY STRUCTURE

### Companies

The twenty major European banks, ranked by Tier One capital include six French, three UK, three Swiss, three German,

**Table 5: Credit institutions  
Cooperative banks - Main indicators, 1993 (1)**

	Number of banks	Number of branches	Total assets (billion ECU)	Number of persons employed
Belgique/België	(2) 375	1 602	24.6	4 753
Danmark	43	78	0.5	316
BR Deutschland	2 773	20 277	392.6	140 000
Hellas	10	22	0.1	28
España	160	5 763	34.3	19 984
France	3 020	13 957	388.9	123 797
Ireland	(3) 523	573	2.4	(4) 623
Italia	669	2 231	67.4	18 208
Luxembourg	40	127	1.7	302
Nederland	665	1 989	116.9	38 475
Portugal	204	473	0.7	(5) 3 500
United Kingdom	1	3 109	4.3	3 886
EU	(6) 8 472	50 201	1 034.3	(4) 353 872

(1) As of December, 31st.

(2) Covers only Banque CERA Bank

(3) Covers only Irish League of Credit Unions

(4) Excluding Irish League of Credit Unions

(5) Estimate

(6) Excluding B: Codep; GR: IRL: ACCBank, Bórd Iascaigh Mhara; UK:

Source: European Association of Cooperative Banks

**Table 6: Credit institutions**  
**Finance houses - Main Indicators, 1993**

	Number of enterprises	Number of branches	New credit granted in 1993 (million ECU)	Number of persons employed
Belgique/België	70	6 500	9 034	75 000
BR Deutschland	51	938	24 074	492
España	75	492	4 462	3 300
France	83	N/A	23 051	14 500
Ireland	17	98	1 934	1 416
Italia	33	270	5 360	3 795
Nederland	32	91	8 339	1 300
Portugal	21	50	905	430
United Kingdom	834	1 391	54 130	37 015
EU (1)	1 216	(2) 9 830	131 289	137 248

(1) Excluding DK, GR and L

(2) Excluding F

Source: Eurofinas

two Dutch, two Italian and one Spanish bank. The relevant Tier One capital definition (BIS strict definition) covers only the core of a bank's strength - the shareholders' equity available to cover actual or potential losses. This includes common stock and declared reserves plus the increasing number of perpetual, irredeemable and non-cumulative preference shares. However, this definition excludes hybrid forms of capital, items such as goodwill and revaluation reserves.

In terms of capital adequacy the Tier One capital to unweighted assets ratio for the Top 20 banks is 4.2 %. The ranking would change if banks were ranked according to this capital adequacy ratio in which case Italian and Spanish banks would advance at the expense of French and German banks. In terms of mortgage credit, national markets have become significantly more concentrated in recent years. Nine UK Building Societies, as well as three Danish mortgage banks, three Dutch and four French institutions feature among the 20 largest mortgage lenders.

The major retail banks in France are Crédit Agricole (biggest European bank), Crédit Lyonnais, BNP, Paribas, Société Générale and Groupe Caisse d'Épargne. The disaster at Crédit Lyonnais continues to colour the country's sector and the bank's 770 million ECU loss in 1993 does little to help the overall performance of the banks. Perhaps the ongoing privatisation process and restructuring of Crédit Lyonnais among other factors will help lift the laggard French profitability ratio of 5.6 %.

The German banking industry is dominated by such commercial banks as Deutsche Bank, Dresdner Bank and Commerzbank. These are all universal banks. Westdeutsche Landesbank Girozentrale, a savings bank, is another important player in the German banking market. German banks showed a modest improvement in returns, rising to 14.5 % following a flat performance the previous year. Market leader, Deutsche Bank, showed a strong 23.9 % return on Tier One capital. The German banks appear to prosper notwithstanding the recession within the German economy in 1993.

The UK banking market is dominated by HSBC Holdings, Barclays Bank, National Westminster Bank, Abbey National and Lloyds Bank. In terms of profitability, the UK aggregate return on Tier One capital has risen the most in the EU, nearly doubling to 20.9 % in 1993. The growth in operating profits in 1993 was driven particularly by trading activities.

The Italian banking market is more fragmented than the British and German markets. Only two Italian players, Cariplo savings bank and San Paolo Bank, are among the top twenty European banks. Other major players in Italy are Banca di Roma, BNL,

Istituto Mobiliare Italiano and Banca Commerciale Italiana. Despite convoluted Italian regulations, banks have been improving their returns. Moreover, banks dominate the Italian government's privatisation program. Six of the country's biggest banks are offered for sale. Thus far, Credito Italiano and Istituto Mobiliare Italiano are two formerly state-owned banks that have been privatised.

The most prominent non-EU Member State in banking is Switzerland. Union Bank, Crédit Suisse and the Swiss Bank dominate the Swiss banking market. The Swiss banks showed a sizeable improvement in profitability with average ratio rising to 14.6 % in 1993 from 10.5 % the previous year. Strong trading profits contributed to this improvement.

### Strategies

Banks today compete in the broad-based financial services industry, not just in banking. Bankers recognise that the industry's future revenue streams will be quite different from the past. Beside traditional banking, there are at least six promising segments for banks to play a role of importance in. Those segments are: financial intermediation and advisory

**Table 7: Credit institutions**  
**Mortgage lending institutions - Outstanding loans against mortgage, 1993**

(million ECU)	Residential and commercial property	Residential property
Belgique/België	49 418	(3) 38 966
Danmark	(1, 2) 123 354	N/A
BR Deutschland	803 306	(4) 671 136
Hellas	N/A	3 519
España	91	69
France	N/A	252 394
Ireland	10 681	9 112
Italia (1)	65 621	53 116
Nederland	285 674	188 166
Portugal	13 065	9 617
United Kingdom	N/A	456 075

(1) Covers only members of European Mortgage Federation.

(2) Outstanding mortgage bonds.

(3) Estimate

(4) Including loans for residential property not secured by mortgage.

Source: EMF

**Table 8: Credit institutions**  
**Commercial banks - Income as share of average balance sheet total**

(%)	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Net income</b>									
Belgique/België	N/A	0.67	0.76	0.65	0.75	0.62	0.54	0.61	0.68
Danmark (1)	N/A	4.69	0.02	1.06	2.04	1.14	0.94	1.48	0.59
BR Deutschland	0.68	1.30	1.36	1.04	0.97	1.11	1.16	1.05	1.16
Hellas (2)	1.37	0.67	0.76	0.62	0.56	0.85	1.45	2.52	1.63
España	1.63	1.56	1.55	1.86	2.13	2.15	2.08	2.25	1.78
France (3)	N/A	0.87	0.91	0.91	0.89	0.87	0.75	0.82	0.79
Italia	1.52	1.44	1.78	1.31	1.47	1.60	1.73	1.73	1.69
Luxembourg	N/A	1.06	1.00	0.84	0.77	0.68	0.74	0.67	0.72
Nederland (4)	1.03	1.10	1.08	0.97	1.02	1.00	0.80	0.80	0.80
Portugal (6)	1.66	0.95	1.13	1.91	2.18	2.61	N/A	3.32	2.56
United Kingdom	N/A	1.64	1.73	1.81	1.77	1.79	1.65	1.72	1.77
USA	1.32	1.58	1.58	1.54	1.70	1.75	1.68	1.77	2.10
Japan	N/A	0.48	0.56	0.64	0.70	0.51	0.38	0.39	0.39
<b>Net interest income</b>									
Belgique/België	N/A	1.53	1.62	1.49	1.38	1.32	1.35	1.34	1.41
Danmark (1)	N/A	3.03	2.63	2.86	2.78	2.55	2.61	3.39	3.56
BR Deutschland	1.89	2.44	2.58	2.30	2.19	2.04	2.04	2.16	2.21
Hellas (2)	2.47	1.35	1.27	0.68	0.83	1.36	1.79	2.41	1.88
España	4.32	3.57	3.72	3.83	4.06	4.04	3.92	3.96	3.39
France (3)	N/A	2.44	2.29	2.23	2.15	1.97	1.81	1.65	1.48
Italia	3.37	3.01	3.26	3.15	3.27	3.30	3.41	3.54	3.72
Luxembourg	N/A	1.18	1.13	1.04	0.95	0.82	0.77	0.83	0.84
Nederland (4)	2.27	2.20	2.42	2.31	2.30	2.08	1.82	1.78	1.83
Portugal (6)	2.69	2.37	2.76	3.41	3.66	4.12	N/A	4.97	4.11
United Kingdom	N/A	3.11	3.17	3.19	3.25	3.14	2.95	2.97	2.86
USA	3.08	3.47	3.34	3.36	3.50	3.49	3.45	3.57	3.85
Japan	N/A	1.22	1.27	1.20	1.17	1.00	0.90	1.11	1.26
<b>Net provisions</b>									
Belgique/België	N/A	0.30	0.31	0.28	0.40	0.43	0.20	0.31	0.40
Danmark (1)	N/A	0.97	0.39	0.70	1.09	0.87	1.21	1.49	1.79
BR Deutschland	0.24	0.47	0.55	0.44	0.25	0.42	0.53	0.47	0.69
Hellas (2)	0.52	0.33	0.32	0.25	0.24	0.36	0.50	0.76	0.36
España	0.88	0.84	0.74	0.87	0.77	0.57	0.55	0.69	0.66
France (3)	N/A	0.66	0.69	0.59	0.61	0.61	0.54	0.52	0.47
Italia	0.90	0.55	0.58	0.49	0.56	0.51	0.54	0.51	0.67
Luxembourg	N/A	0.73	0.66	0.51	0.37	0.37	0.52	0.42	0.40
Nederland (4, 5)	0.54	0.36	0.34	0.19	0.42	0.36	0.30	0.29	0.30
Portugal (6)	1.15	0.62	0.84	1.35	1.43	1.59	N/A	1.79	1.58
United Kingdom	N/A	0.55	0.54	1.53	0.31	1.60	0.95	1.31	1.45
USA	0.25	0.67	0.78	1.27	0.56	0.97	0.95	1.01	0.75
Japan	N/A	0.02	0.04	0.03	0.05	0.04	0.03	0.07	0.13
<b>Profits before tax</b>									
Belgique/België	N/A	0.37	0.45	0.37	0.34	0.19	0.33	0.31	0.28
Danmark (1)	N/A	3.72	-0.37	0.35	0.96	0.28	-0.27	-0.01	-1.20
BR Deutschland	0.45	0.83	0.81	0.60	0.73	0.70	0.63	0.58	0.47
Hellas (2)	0.85	0.34	0.44	0.37	0.32	0.50	0.96	1.77	1.28
España	0.76	0.72	0.81	0.99	1.36	1.58	1.53	1.56	1.12
France (3)	N/A	0.21	0.22	0.32	0.29	0.27	0.21	0.30	0.31
Italia	0.62	0.89	1.20	0.82	0.91	1.09	1.18	1.22	1.03
Luxembourg	N/A	0.33	0.33	0.32	0.40	0.31	0.22	0.26	0.32
Nederland (4)	0.49	0.74	0.74	0.78	0.60	0.64	0.51	0.50	0.53
Portugal (6)	0.52	0.33	0.29	0.56	0.75	1.02	N/A	1.53	0.98
United Kingdom	N/A	1.09	1.19	0.28	1.46	0.18	0.70	0.40	0.32
USA	1.07	0.90	0.80	0.28	1.14	0.78	0.73	0.77	1.35
Japan	N/A	0.46	0.52	0.60	0.64	0.46	0.36	0.32	0.26

(1) Data refer to commercial and savings banks. Break in series in 1991.

(2) For 1981-85 and 1987-88, data refer to large commercial banks.

(3) Data refer to large commercial banks. Change of methodology from 1986.

(4) Data refer to all banks. From 1986 onwards Postbank is included.

(5) From 1988, net provisions consist of transfers to the provision for general business risk

(6) Data refer to all banks.

Source: OECD: Bank Profitability

**Table 9: Credit Institutions****Savings banks - Top 10 ranking by non-banker deposits, 1992 (1)**

Rank		Country	Deposits (million ECU)	Market share (2) (%)
1	Cariplo SpA, Milano	I	44 734	31.7
2	CA y Pens. de Barcelona (3)	E	33 482	20.6
3	ASLK - CGER, Brussels	B	32 196	41.5
4	CA y MP de Madrid	E	18 954	11.7
5	Caixa Geral de Depositos	P	15 116	100.0
6	CERA, Leuven	B	13 614	17.5
7	CE Ile de France-Paris	F	13 447	9.1
8	Hamburger Sparkasse	D	13 358	2.8
9	Landesgirokasse Stuttgart	D	10 774	2.3
10	Banca CRT, Torino	I	10 554	7.5

(1) Excluding UK.

(2) Share of total deposits of all savings banks in the country concerned.

(3) Excluding insurance department

Source: European Savings Banks Group

services, investment management, insurance, fee-based operational services, trading, and merchant banking and equity investment. Because traditional banking, alone, will not provide enough revenue to serve as a viable strategy. As such, a bank's most important strategic decision may reside in choosing which segment to pursue and which to avoid. In today's broad-based financial services industry, performing only as well as the competition is not sufficient. It is increasingly important to determine - and sharpen - the skills needed for success in the segment(s) selected.

In general, four strategic elements are critical to the health of banking's future:

- managing current opportunities and risks;
- dealing with the impact of mergers and acquisitions;
- adding value through superior-quality services and products;
- raising human and financial capital.

Because it is so much within the purview of a bank manager's influence, strategic planning is clearly among the most important factors determining banking success.

### Impact of the Single Market

EU regulation has been extended, or is being extended, to cover freedom of establishment for banks and other financial institutions, harmonisation of banking supervision, accounting and a number of other subjects relevant to the business of

financial services. In spite of these efforts the Single Market in financial services does not really exist by now, as Member States continue to enforce national privileged positions. However, the process of bringing the Single Market into effect continues, especially regarding the translation of the measures adopted at Community level into national legislation. Harmonisation in implementation is considered a very important priority for the industry, especially in the field of taxation. Horizontal policies which aim to minimise the administrative and financial burden and encourage investment in SMEs are supported by the industry because of the high potential of those companies for the economy in general and for the financial services sector in particular. The creation of the European Monetary Institute (EMI) at the beginning of 1994 is seen as a milestone for achieving an Economic and Monetary Union (EMU). The change to a single currency is considered a high priority by the industry.

### REGULATIONS

In recent years, the Basle Accord on capital adequacy has been seen as a positive attempt to help level the global playing field through the establishment of a common framework leading to convergence. However, more and more the traditional business of banking is conducted by non-banks, such as finance companies, insurance and securities firms that are entirely outside the Basle framework. Although the Basle Committee

**Table 10: Credit institutions****International acquisitions and joint ventures**

	National (1)		Community (2)			International (3)			Total			
	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92
Acquisitions of majority holdings	65	51	73	23	13	17	25	11	7	113	75	97
Acquisitions of minority holdings	40	28	36	33	21	22	23	8	8	96	57	66
Joint ventures	10	7	6	12	7	10	8	2	3	30	16	19
Total	115	86	115	68	41	49	56	21	18	239	148	182

(1) Operations of firms from the same Member State.

(2) Operations of firms from different Member States.

(3) Operations of firms from Member States and third countries with effects on the Community market.

Source: Data gathered by the Commission from the specialist press



**Table 11: Credit institutions  
Top 20 European banks by Tier 1 capital, 1993**

Rank	Country	Tier 1 capital (ECU million)	Change (%)	Assets (ECU million)	Rank	Change (%)	World ranking 1993	World ranking 1992
1	F	13 036	7.5	250 585	4	1.2	8	7
2	UK	12 942	26.4	270 340	3	11.3	9	10
3	CH	11 748	5.3	186 341	13	16.7	12	8
4	D	10 384	10.9	285 602	2	13.5	14	11
5	F	9 199	3.9	300 131	1	5.0	19	12
6	NL	9 029	18.8	224 080	6	9.5	22	15
7	F	8 626	12.3	221 827	7	-5.8	24	14
8	CH	8 270	44.3	207 431	9	39.0	26	32
9	F	8 223	6.8	203 665	10	20.3	27	18
10	CH	8 095	13.7	123 907	17	3.0	28	23
11	UK	8 020	4.7	217 804	8	4.0	29	21
12	UK	7 717	5.5	200 557	11	-0.4	31	26
13	NL	7 008	8.5	115 563	18	9.0	35	28
14	F	6 959	8.3	230 436	5	10.7	36	27
15	D	6 268	21.0	195 360	12	17.3	37	40
16	D	5 895	7.5	170 660	14	24.1	39	75
17	F	5 567	2.6	143 364	15	0.2	41	34
18	I	5 388	2.7	78 434	19	9.3	43	36
19	I	5 244	4.5	130 267	16	5.2	46	48
20	E	4 634	15.1	72 469	20	15.4	51	43

Source: The Banker

of bank supervisors has agreed on common minimum capital requirements for banks, there remains a lack of agreement among international regulators about the right approach to setting capital requirements, both for banks and non-banks.

In general, three regulatory approaches can be distinguished. The first method, the "comprehensive" approach, is used in Japan and the USA. It requires a firm to set aside a proportion (USA 15 %) of the value of long plus short positions. The second method, the "building block" approach preferred by the EU and the Basle Committee, uses both the gross value of a firm's positions (as in the USA) and its net exposure (long positions less comparable short ones) in fixing capital requirements. For example, the EU rules, which will be in force from 1996, require a minimum capital requirement of 4 %, i.e., 2 % of the gross value of the position on each side to reflect divergence and execution risks plus 8 % for the overall net position in an equity market. The third method, the "portfolio" approach, which has been used since 1988 in the UK, ties the amount of capital to a simple calculation of the overall riskiness of a firm's securities portfolio. It looks at the net position only, and defines riskiness as the extent to which, on past form, the value of a portfolio is likely to fluctuate from week to week (the more it does, the riskier).

## OUTLOOK

Given the various credit markets' development of more standardised underwriting and loan portfolios, and the increasing preference among depositors for mutual funds, annuities, and other "off balance sheet" investment products, it is clear that past notions of the synergism or interdependencies of bank assets and liabilities is vanishing. In the past, banks used deposits to fund loans. Asset and liability management techniques were used to mitigate the differences in demand between two markets, as banks held the position of "intermediary" or "manufacturer". In the future, banks will play more the role of value-added distributor. Banks will be less involved in turning deposits into loans, and more involved in providing their customers value-added access to various capital markets.

Most traditional banks already have been deriving an increasing proportion of their earnings through fee income and trading-related services. As the banking market worldwide matures, credit institutions attempt to move to more sophisticated areas where higher margins and fees have been available. Surveys suggest that banks and capital markets players will increasingly derive revenue from low-volume, high margin products rather than high-volume, low-margin ones. On the other hand, discount brokers among German banks and savings banks show an opposite tendency.

Strategic planning is the most important determinant of banking success. As the banking industry matures further it will be extremely important to position for the future. Choosing which segments to pursue - and those to avoid - will be a bank's most important strategic task. In this regard, the future of banking will be shaped by decisions made by individual bank management, not by macro events or transient changes in policy.

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# Insurance

## NACE 82

After several years of restructuring, a certain degree of rationalisation is taking place within the insurance industry. Induced by the recently adopted Directives and the resulting intensifying competition, attention is increasingly shifting towards marketing and operations with particular emphasis on more cost-efficient operations, more product innovations and market-oriented strategies. In this context, the distribution of insurance products is expected to play an increasingly important role from strategic (structuring of product supply), cost-efficient (reduction of intermediation costs) and/or market-oriented (customer-services) points of view. The high growth rates of premium income since 1985 are expected to continue in the short and medium terms.

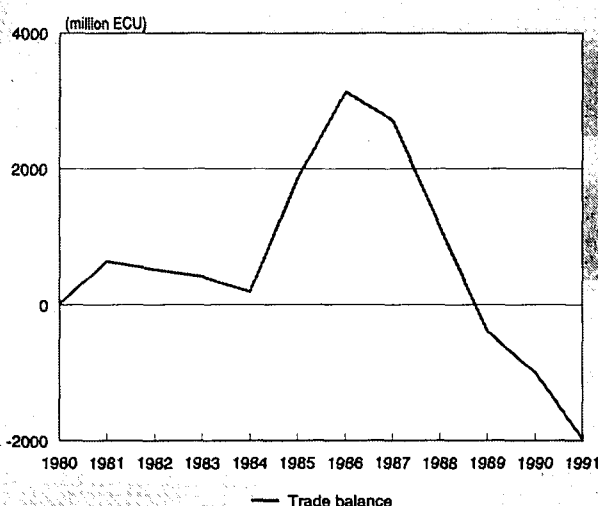
### INDUSTRY PROFILE

#### Description of the sector

The NACE classification defines the insurance sector as embracing all units "exclusively or primarily engaged in insurance," i.e. converting individual risks into collective risks. Compulsory social security is not included.

Insurance is thus defined in terms of the economic functions of converting and mutualising risks. NACE 82 distinguishes three main groups of insurance: life insurance, non-life insurance and composite insurance. Life insurance risk relates to the decease of the insured person. It embraces conventional life insurance contracts, annuities, unit-linked insurances and private insured pension schemes. Non-life insurance risk is defined as everything not included in the previous category. It includes assets or liability insurance covering either individuals or organisations. According to the EU's insurance directives there are 18 main classes of non-life insurance risks, ranging from health insurance to physical assets property damage, through transportation to credit insurance. Composite insurance risk comprises life and non-life risks. Composite insurance undertakings, however, are not allowed in all Member States and Community rules have banned the creation of new ones.

**Figure 1: Insurance**  
External trade balance at current prices (1)



(1) Extra-EU exports less imports. Estimates based on balance of payments.  
Source: Eurostat: International trade in services

The NACE classification does not consider reinsurance as a separate activity as most of the general insurance companies also underwrite reinsurance business, called 'accepted reinsurance.' It is assigned to one of the three groups according to the type of risk reinsured. The reinsurance market supplies capital support to the direct insurers and a variety of technical services under specific reinsurance treaties or contracts. As such, the activity in reinsurance is an important indicator of insurance activity as a whole. Reinsurance activity can be evaluated by two indicators: the rate of accepted reinsurance and the retention rate. The reinsurance rate is calculated by dividing the premiums on reinsurance accepted by total gross premiums. The retention rate expresses the percentage of total gross premiums written that is retained by the insurers; the remainder represents premiums ceded.

The EU-market is dominated by Germany, the United Kingdom and France. In terms of gross premium income, these countries accounted for nearly 75 % of the total EU-market in 1993. At 103 billion ECU, Germany recorded the highest gross pre-

**Table 1: Insurance**  
Main indicators, 1993

	Number of enterprises	Turnover (1) (million ECU)	Number of persons employed
Belgique/België	266	9 209	27 007
Danmark	248	6 084	13 900
BR Deutschland	798	102 819	256 000
Hellas	151	1 186	10 000
España	408	16 446	46 374
France	599	88 651	122 000
Ireland	97	3 346	9 716
Italia	274	26 300	48 500
Luxembourg	73	802	1 140
Nederland	491	22 844	39 400
Portugal	85	2 674	13 700
United Kingdom	828	102 658	266 100
EU	4318	383 019	853 837

(1) Total premium income  
Source: CEA



**Table 2: Insurance  
Gross premiums written (1)**

(million ECU)	1989	1990	1991	1992	1993
<b>Life insurance</b>					
Belgique/België	2 280	2 437	2 667	2 915	2 947
Danmark	N/A	1 912	2 200	2 464	3 116
BR Deutschland	23 963	26 233	30 507	34 183	39 888
Hellas	278	342	440	531	552
España	3 405	3 622	5 121	6 135	5 021
France	28 569	29 835	33 736	39 379	50 552
Ireland	1 977	1 878	1 900	1 706	1 890
Italia	4 902	5 701	6 912	7 846	7 918
Luxembourg	79	111	146	334	478
Nederland	7 362	9 118	10 429	11 056	11 777
Portugal	263	382	527	717	842
United Kingdom	44 340	47 882	57 674	59 263	61 581
EU	N/A	129 453	152 259	166 529	186 562
<b>Non-life insurance</b>					
Belgique/België	4 399	4 860	5 241	5 626	5 633
Danmark	N/A	2 695	2 654	2 771	2 968
BR Deutschland	30 533	44 194	50 124	54 896	62 931
Hellas	406	493	521	571	634
España	7 998	9 543	11 292	12 337	11 424
France	27 211	29 192	30 768	34 189	38 100
Ireland	1 152	1 224	1 341	1 426	1 455
Italia	14 955	16 761	19 016	20 602	18 384
Luxembourg	191	235	238	267	323
Nederland	8 253	8 499	8 752	9 711	11 066
Portugal	1 009	1 221	1 456	1 753	1 833
United Kingdom	25 253	31 052	34 828	38 701	41 078
EU	N/A	149 969	166 231	182 850	195 829
<b>Life and non-life insurance</b>					
Belgique/België	6 679	7 297	7 907	8 541	8 580
Danmark	4 232	4 607	4 854	5 235	6 084
BR Deutschland	54 496	70 427	80 631	89 079	102 819
Hellas	684	834	960	1 102	1 186
España	11 403	13 165	16 413	18 472	16 445
France	55 780	59 027	64 504	73 567	88 652
Ireland	3 129	3 102	3 242	3 132	3 345
Italia	19 857	22 463	25 928	28 447	26 302
Luxembourg	270	346	383	601	801
Nederland	15 615	17 616	19 181	20 768	22 843
Portugal	1 273	1 603	1 983	2 470	2 675
United Kingdom	69 593	78 934	92 502	97 964	102 659
EU	243 011	279 421	318 488	349 378	382 391

(1) Due to different coverage, figures differ from corresponding OECD figures.

Source: CEA

mium income, thereby employing 256 000 people. The United Kingdom and France followed with total turnovers of 103 and 89 billion ECU, respectively.

The Southern-European insurance markets are still relatively small. The density of insurance (premiums per capita) in countries like Spain, Portugal, Italy and Greece is rather low compared to other Member States such as Germany, the Netherlands and the United Kingdom.

If labour productivity is considered for each Member State, some other differences can be observed. While labour productivity was highest in Italy and France, these figures for Greece and Portugal were considerably lower in the same year.

#### Recent trends

Over the period 1985 to 1992 the EU-average direct gross premiums per capita has increased at a rapid pace. With an

average annual growth rate of more than 10 %, premiums per capita almost doubled in 7 years time. If related to Gross Domestic Product (GDP), it appears that gross premiums have increased at a rate faster than GDP. Gross premiums written as a share of GDP increased from 4.86 % in 1985 to 6.53 % in 1992. Recent years still demonstrate high growth rates, which are even slightly higher than the average annual growth over the 1985-1992 period. From these developments, one can conclude that the European insurance market has still not reached a level of saturation.

#### International comparison

With premiums per capita of 996 ECU the European market is lagging far behind the USA and Japan with corresponding figures of 1,807 and 1,909 ECU, respectively. In terms of gross premiums as percentages of GDP, it is seen that the USA and Japan, with 10.13 % and 8.39 % of GDP, compare favourably to the European market (6.53 %). In terms of mar-

**Table 3: Insurance  
Density of insurance (1)**

(ECU)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	457.4	515.2	578.1	611.4	659.0	714.7	772.3	846.6
Danmark	671.0	690.9	743.6	830.5	834.1	904.0	932.9	1 022.3
BR Deutschland (2)	750.9	828.1	911.7	971.7	1 027.5	847.5	970.0	1 103.2
Hellas (3) (4)	52.4	47.8	52.0	62.6	70.8	82.5	92.0	107.1
España	120.6	195.1	242.7	448.2	374.0	350.3	430.9	465.3
France	550.4	625.9	695.1	805.1	927.6	975.5	1 053.1	1 184.8
Ireland	642.1	669.6	776.5	758.6	890.4	903.2	952.3	926.7
Italia	200.5	233.7	268.7	295.1	341.3	395.1	456.0	498.4
Luxembourg	420.7	534.5	541.7	630.0	727.9	914.2	1 041.0	1 109.3
Nederland (3)	623.8	715.3	792.1	872.7	946.7	1 079.2	1 097.5	1 232.6
Portugal	70.8	79.3	84.9	104.0	129.8	163.4	200.9	250.4
United Kingdom (3)	855.7	929.7	995.8	1 130.7	1 362.4	1 390.2	1 632.6	1 756.4
EU	501.9	563.9	622.8	713.8	794.2	793.9	899.8	996.1
USA (5)	1 644.6	1 582.0	1 475.0	1 704.0	1 883.4	1 757.0	1 830.3	1 807.3
Japan	916.0	1 177.6	1 325.1	1 889.2	1 993.2	1 592.8	1 822.2	1 909.0

(1) Direct gross premiums written per capita.

(2) Net written premiums basis for life insurance

(3) Net written premiums basis

(4) Net written premiums basis until 1991

(5) Total gross premiums basis in 1987 for life insurance

Source: OECD: Insurance Statistics Yearbook

ket share, in 1992 the USA had almost 40 % of the world market whilst the EU and Japan accounted for 32.1 % and 20.3 %, respectively. With current high growth rates in the EU, however, the gap with the USA is closing.

### Foreign trade

An indication of the foreign influence on domestic insurance markets is provided by the number of branch offices of foreign insurers and the number of foreign-owned insurance companies. In 1990 within the EU, a total number of 1 103 foreign branch offices and foreign-owned insurance companies (both EU and non-EU based) accounted for 23 % of all insurance companies. Their market share was estimated at 13 %.

The ongoing trend towards internationalisation and the recently adopted directives will further stimulate intra-EU cross-

border trade. From Figure 1 it can be deduced that insurance companies have been concentrating on the EU-market in recent years. Non-EU insurance companies, especially Swiss insurers, have entered the single market thereby increasing extra-EU imports. EU-insurers have actively restructured their activities within the EU. At the same time, they have consolidated their extra-EU activities. As a result, since 1989 the extra-EU trade balances have been negative.

### MARKET FORCES

#### Demand

The ageing of Europe's population has played and is still playing a decisive role in the growth of premium volume in life insurance. The need for comprehensive insurance coverage

**Table 4: Insurance  
Gross premiums written as a share of gross domestic product**

(%)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	4.3	4.5	4.7	4.7	4.7	4.7	4.9	5.1
Danmark	4.5	4.2	4.3	4.6	4.5	4.6	4.6	4.8
BR Deutschland (1)	5.7	5.6	5.8	5.9	5.9	5.7	6.0	6.5
Hellas (2) (3)	1.2	1.2	1.3	1.4	1.4	1.6	1.7	1.8
España	2.1	3.2	3.7	6.0	4.2	3.5	4.0	4.1
France	4.4	4.7	5.0	5.6	6.0	5.9	6.2	6.7
Ireland	9.2	9.2	10.5	9.5	10.0	9.4	9.6	8.8
Italia	2.1	2.2	2.3	2.4	2.5	2.6	2.8	3.0
Luxembourg	3.4	3.9	3.8	4.1	4.2	4.9	5.4	5.3
Nederland (2)	5.4	5.7	6.2	6.6	6.8	7.2	7.1	7.6
Portugal	2.6	2.6	2.7	2.9	3.1	3.4	3.6	3.8
United Kingdom (2)	8.1	9.2	9.5	9.1	10.2	10.4	11.6	12.7
EU	4.9	5.1	5.4	5.7	5.9	5.7	6.1	6.5
USA (4)	7.5	8.9	9.2	10.2	9.9	10.2	10.2	10.1
Japan	6.3	7.1	7.8	9.5	9.4	8.5	8.4	8.4

(1) Net written premiums basis for life insurance

(2) Net written premiums basis

(3) Net written premiums basis until 1991

(4) Total gross premiums basis in 1987 for life insurance

Source: OECD: Insurance Statistics Yearbook



**Table 5: Insurance**  
**Gross premiums written in the EU, USA and Japan, 1992 (1)**

	Gross premiums written (million ECU)	Nominal change 1991/92 (%)	Share of the OECD market (%)
<b>Life and non-life insurance</b>			
EU	385 743.0	16.9	32.1
USA	475 756.1	0.4	39.6
Japan	243 555.2	5.2	20.3
<b>Life insurance</b>			
EU	174 196.9	10.9	29.8
USA	185 582.0	3.3	31.7
Japan	179 590.2	6.0	30.7
<b>Non-life insurance</b>			
EU	211 546.1	22.2	34.3
USA	290 174.1	-1.3	47.1
Japan	63 965.0	2.9	10.4

(1) Due to different coverage, figures for EU differ from corresponding CEA figures.  
 Source: OECD: Insurance Statistics Yearbook

increases with advancing years, especially when social security benefits relating to pensions and medical treatment appear progressively inadequate. In an effort to compensate for the erosion of state benefits, the public is turning increasingly towards life-insurance related products.

In addition, there is a growing tendency for earlier retirement. The legal or accepted retirement age in every European country is now between 60 and 65 years (except Denmark, with a retirement age of 67 years). The effective retirement age, however, is below the age prescribed. Additional insurance for the years of earlier retirement is stimulating demand.

Improvements in living standards emerge as an essential factor in the shifting patterns of non-life insurance consumption. The population insures not only itself but also its growing number of possessions. In this respect, it is worth noting that the demand for passenger cars in the EU increased from 3 million in 1960 to more than 12 million in 1989, amounting to a stock of 128 million passenger cars (excluding eastern Germany). There are also now 150 million homes. Non-life insurance is coming to be regarded as a commonplace product. Here, a distinction has to be made between mandatory insurance coverage on the one hand (car insurance, workplace accident insurance, and so on) and other categories of insurance (health, legal etc.) which are currently marketed. It is above all in the former category that price sensitivity plays a key role.

Additionally, consumers are becoming more conscious of the wide range of products and services which are offered in the insurance industry. As the number of product varieties increases, the need for independent advice is also growing. This trend is reflected in a growing importance of independent intermediaries.

### Supply and competition

The supply of insurance within Europe has traditionally been dominated by domestically owned insurance companies. Domination on a European scale used to be difficult as many insurances are comparatively standardised products, leaving little opportunity for product differentiation. In life insurance and pensions a greater potential for differentiation exists, but regulation in some European countries has tended to inhibit product innovation. Moreover, since there are no patent laws in insurance, new products could and still can be copied relatively quickly, especially as production systems are not complex.

However, since the mid-1980s, there have been signs of a greater willingness to change. In 1985 the EU passed the Single European Act, which laid the foundations for the integration of the EU financial and other markets. This has resulted in increasing competitive pressures from the impact of new information technologies and from the entry of banks and foreign insurance companies into local markets.

The recently adopted Directives will pave the way for further integration. Competition is expected to intensify. The deregulatory impact of the Directives, however, will not only lead to more competitive pricing but also to product innovations and market development. The competitive challenge for the 1994-1998 period will come from all providers of insurance services: insurance companies, banks, and the bancassurers.

### Production process

The recession in the early 1990s had an adverse impact on profitability which in turn has made management look more carefully at their costs, particularly staff costs, because of the labour-intensive nature of the business. This growing attention for cost-efficiency is further stimulated by the integration of the European insurance markets. The intensifying competition is resulting in a pressure on tariffs and a search for cost savings.

In addition, the increased concentration within the insurance markets caused by take-overs has led to some rationalisation in the insurance labour force. When insurance companies merge into larger enterprises, there is usually some reduction in staffing levels as job duplication is eliminated.

The cost saving strategies concentrate on internal processes, entailing the introduction and development of cost-efficient administrative procedures, and on distribution costs. As far as operational costs are concerned, marketing and distribution costs rank immediately after policy payments in terms of size. Not surprisingly, a lot of attention is given to less expensive modes of distribution. The various approaches open to distribution include:

- salaried employees (particularly in the life sector);
- tied company agents: an intermediary between a client and an insurance company, who is contractually bound to, but not employed directly by, a specific company; remunerated on a commission basis;
- independent brokers, which are mandated by the client and usually do not have any link to an individual insurer; remunerated on a commission basis;

**Table 6: Insurance**  
**Foreign companies' market share in the domestic market, 1992 (1)**

(%)	Life insurance	Non-life insurance
Danmark	9.5	34.5
BR Deutschland	11.4	14.3
España (2)	17.1	39.1
France (3)	8.2	12.1
Nederland	23.3	29.0
Portugal	27.9	25.7

(1) Market share of foreign-controlled enterprises and branches/agencies of foreign enterprises in total domestic business (gross premiums written basis).

(2) 1991

(3) 1990

Source: OECD: Insurance Statistics Yearbook

- direct-writing by the companies themselves;
- banks, in which case there is a great variety to market insurance products (e.g. distributed under the bank's own name or that of the insurer, sold by insurance salesmen on recommendation by bank staff, sold partly by the bank staff and partly by the insurance salesmen);
- others, e.g. retail chain stores.

The preferred strategies vary from one country to another, depending on the regulatory environment, the companies' strategy, the influence of shareholders and the market structure. Brokers dominate the markets in Anglo-Saxon model (UK and the Netherlands), whereas agents are more common in the continental model (Germany and France).

From the point-of-view of cost efficiency there is also a trend towards direct-writing. Through direct writing the expensive costs of distribution are saved. However, distribution is becoming increasingly important for the achievement of other goals. Reflecting the growing need among consumers for independent advice, the importance of the independent brokers as distributors of insurance services will increase. Furthermore, the growing demand for more convenience has been met by a concentration of supply within the distribution channels. As a result, a wide range of products can be offered at one place (one-stop shopping), bancassurance being the best example of this development.

## Companies

In 1993 there were some 4 318 insurance companies operating in Western Europe against 4 343 companies in 1992. The number of independently controlled groups was less than 2 500 and is declining. When insurance companies are taken over, the acquiring companies often do not incorporate them into their own structure for marketing and/or tax reasons. As a result of the ongoing mergers and takeovers, it is possible that the total number of insurance companies is increasing, while the number of independently controlled groups is further declining. In 1992, within the EU, the average size of insurance companies, measured in terms of gross premiums divided by the number of undertakings, was 80 million ECU against 66 million ECU in 1990.

During 1993, all European insurance companies increased their market capitalisation through rate increases and favourable stock markets. At the end of 1993, the German Allianz Group retained its leading position with a market capitalisation of more than 27 billion ECU against 17.4 billion in 1992. Allianz was followed by Generali (I), Munchener Ruck (D) and Prudential (UK). Not included in the top ten is AXA (F). AXA - with a market capitalisation of 7.4 billion ECU - is marked as a 'diversified holding company' but is very active in the insurance market.

## Strategies

Since the passing of the Single European Act in 1985, most of the leading European insurers have increasingly derived premium income from European countries other than their own. A combined total of one-fifth of the premiums of Europe's biggest insurer, Allianz, now come from Italy, France and Britain. This is largely owed to its purchase, since 1986, of stakes in Riunione Adriatica di Sicurtà, Italy's second-largest private insurer, Britain's Cornhill and France's Via.

Privatised in May, 1994, Union des Assurances de Paris, France's biggest insurance company, is even more European. It earns more than half of its premiums abroad, mainly from its neighbouring countries. It has purchased Colonia, Germany's third-biggest insurer; a controlling stake in Belgium's Royale Belge; and 50 % of Sun Life, a British insurer. AXA, the France's second insurance company bought the big British insurer Equity & Law.

Underlying the strategies of many insurers is the belief that owning an established firm is the only worthwhile approach for market entry into other European markets. Insurers fear that the tax treatment of investment in different countries

**Table 7: Insurance**  
**Productivity as direct gross premiums written per employee**

(thousand ECU)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	150.4	168.6	188.5	199.8	216.3	239.4	265.4	304.7
BR Deutschland	N/A	N/A	282.0	298.9	311.3	319.3	315.9	347.2
Hellas (1, 2)	79.3	67.9	65.2	69.6	76.3	88.2	102.0	110.1
España	137.1	N/A	275.5	479.5	373.6	318.3	363.2	388.7
France	244.0	279.4	312.6	367.4	425.4	448.4	485.3	549.2
Irland	267.0	273.2	312.7	292.4	343.1	341.7	341.7	324.8
Italia	266.9	306.8	347.1	373.7	427.3	483.6	546.1	587.7
Luxembourg	181.5	N/A	N/A	248.6	272.4	316.7	350.0	363.6
Nederland (1)	216.3	232.6	233.2	247.6	261.4	294.9	294.8	319.9
Portugal	50.5	56.6	59.8	72.5	89.5	108.8	139.9	165.0
United Kingdom (1)	207.4	219.9	219.8	245.5	300.1	303.1	387.4	390.8

(1) Net written premiums basis

(2) Net written premiums basis until 1991

Source: OECD: Insurance Statistics Yearbook

**Table 8: Insurance  
Retention ratio (1)**

(%)	1985	1986	1987	1988	1989	1990	1991	1992
<b>Life insurance</b>								
Belgique/België	92.2	93.7	94.9	93.8	92.5	94.1	94.3	94.3
Danmark	97.4	97.1	97.4	98.0	97.5	98.6	98.7	98.8
BR Deutschland	93.4	93.4	93.3	91.9	92.8	91.6	91.2	91.2
España	87.9	96.8	97.8	98.9	98.1	96.6	97.4	96.9
France	93.7	95.1	95.4	96.0	96.7	96.5	96.7	96.2
Ireland	95.8	95.8	98.4	98.2	98.4	95.9	96.9	82.4
Italia	82.8	82.6	83.3	83.1	82.3	81.6	81.6	81.5
Nederland	94.8	94.4	95.8	94.8	95.4	95.6	95.7	95.2
Portugal	88.9	88.2	90.8	95.0	95.5	95.2	95.9	97.4
United Kingdom	100.0	100.0	N/A	N/A	N/A	N/A	N/A	N/A
<b>Non-life insurance</b>								
Belgique/België	78.6	80.4	80.6	80.8	80.9	80.3	79.8	80.4
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	75.7	75.4	75.7	75.7	75.9	77.5	77.2	74.5
España	75.7	78.1	80.3	79.8	81.2	81.7	82.6	82.3
France	79.7	80.4	82.9	84.1	86.9	82.8	82.8	84.2
Ireland	72.3	74.1	78.0	81.1	82.5	83.9	82.3	81.7
Italia	76.2	77.9	77.9	78.9	79.7	79.9	79.4	78.4
Nederland	82.5	85.0	85.5	85.6	85.8	84.9	84.0	85.4
Portugal	79.2	82.4	82.4	82.9	83.8	85.1	85.5	86.2
United Kingdom	76.3	77.7	75.0	81.2	80.0	74.9	74.1	77.2

(1) Net premiums written/gross premiums written.

Source: OECD: Insurance Statistics Yearbook

(which is not covered by the new rules) will still favour certain kinds of products especially those which are already provided by local companies. Another potential barrier to entry is the caveat in the new European regulations that allows countries to restrict the sale of some policies in the "common good." This could encourage the protection of national firms by Member States.

The third generation of insurance directives, which came into force in July 1994, has been heralded by a fierce Euro-battle for control of Groupe Victoire, France's sixth-largest life-insurer. Britain's Commercial Union triumphed over Assicurazioni Generali, Italy's biggest insurer.

The newly adopted Directives also pave the way for non-EU insurance companies. The Swiss company Zürich insurance, for instance, plans a fierce assault on the German market through direct advertising and telephone sales. Following their success with tele-marketing in the Anglo-Saxon markets of the United Kingdom and the Netherlands, the company also hopes to attack the Italian market. Furthermore, the US company General Reassurance has acquired a majority stake in the Kolnischer Rückversicherung.

Through a series of take-overs and mergers between banks and insurance companies, the phenomenon of bancassurance has emerged in recent years. Bancassurance offers advantages not only in distribution of insurance products, but also on the product side itself as it provides low-cost access to a

**Table 9: Insurance  
Insurance tax on insurance premiums, 1993 (1)**

(%)	Motor	Fire	Health	Life
Belgique/België	9.25	9.25	9.25	0.00
Danmark	50.00	0.00	0.00	0.00
BR Deutschland	12.00	10.00	0.00	0.00
Hellas	10.00	15.00	10.00	(2) 4.00
España	0.50	0.50	0.50	0.00
France	18.00	30.00	7.00	0.00
Ireland	2.00	2.00	0.00	0.00
Italia	12.50	21.25	2.50	2.50
Luxembourg	4.00	4.00	4.00	0.00
Nederland	7.00	7.00	0.00	0.00
Portugal	0.35	0.35	0.35	0.10
United Kingdom	2.50	2.50	2.50	0.00

(1) Basic rates

(2) Tax exempted for contracts longer than 10 years

Source: CEA

**Table 10: Insurance  
International acquisitions and joint ventures**

	National (1)			Community (2)			International (3)			Total		
	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92	1989/90	1990/91	1991/92
Acquisitions of majority holdings	16	15	9	18	7	19	12	6	3	46	28	31
Acquisitions of minority holdings	13	10	8	24	12	13	7	8	3	44	30	24
Joint ventures	6	5	8	2	6	7	3	3	1	11	14	16
Total	35	30	25	44	25	39	22	17	7	101	72	71

(1) Operations of firms from the same Member State.

(2) Operations of firms from different Member States.

(3) Operations of firms from Member States and third countries with effects on the Community market.

Source: Data gathered by the Commission from the specialist press

large volume of customers. Through the emergence of bancassurance a clear distinction between insurance companies, banks and bancassurance companies can no longer be made. The need for such a distinction is also fading as the financial companies increasingly focus on products, markets and their combinations.

### Impact of the Single Market

The overall impact of the Internal Market programme on the insurance sector is considered to have been positive. Every company has adapted its strategy as result of increased European integration. Competition within the EU has increased and has become fiercer. Most companies think more internationally and everybody is more 'single market minded'. Internal barriers still exist with respect to contract law, taxation and exchange rates, however. The harmonisation of contract laws is considered to be a highly relevant issue. Fiscal problems are often an obstacle for the freedom to provide services. The still existing national currencies require the matching of national risks in national currencies, which is inefficient and costly. The removal of the remaining internal barriers concerning contract law and taxation should have priority, as should the creation of a single European currency.

### REGULATIONS

In July 1994, the third generation of insurance directives (92/49 for non-life insurance and 92/96 for life insurance services) came into force. These directives seek to provide a single structure for business conducted either on an establishment or on a cross-border basis. Such implies that personal-insur-

ance policies can be freely sold throughout the European Union. The most significant feature of these directives is the attempt to move the regulatory focus from host-country control to home-country control. The acceptance of the principle of a single licence represents an important breakthrough and should facilitate the European integration. These directives will be supported by the implementation of the Insurance Accounts Directive. More standardised accounting systems will give confidence to the regulatory authorities within the Member States to operate within the single licence principle.

The new directives will be important to insurance companies not just because they increase the potential for cross-border business but mainly because they will be accompanied by changes which more directly address competitive policy within Member States. The minimum price restrictions, for instance, are phased out and some national regulations are removed. The consequence is a major deregulatory effect on the market. Furthermore, there is greater freedom for investment policy, which will be important for product innovation in the areas of life insurance and pensions.

Still, a complete free Single Market has not yet been reached. With respect to life insurance contracts, national laws often only contain fiscal advantages for contracts with domestic insurers or branches of foreign insurers. These fiscal differences have to be reconciled if a free Single Market is to be established - as do differences in indirect taxation. In Germany for example a 12 % tax is levied on life insurance by the Government. This tax, however, only applies to domestic insurers and not to foreign insurers.

**Table 11: Insurance  
Top 10 insurers by market capitalization (1), 1993**

Rank		Country	Market capitalization (million ECU)	Profit (million ECU)	Number of employees
1	Allianz	D	27 077	771	74 504
2	Generali	I	16 094	619	33 311
3	Münchener Rück	D	12 259	191	3 510
4	Prudential	UK	8 620	529	23 619
5	UAP	F	8 408	408	44 299
6	Zurich	CH	6 993	506	36 385
7	AGF	F	6 306	429	21 945
8	Alleanza	I	5 342	115	3 326
9	Allianz Leben	D	5 171	78	4 983
10	Swiss Re	CH	5 017	301	28 246

(1) Market capitalization, i.e. the number of a company's shares multiplied by the price of its shares

Source: Financial Times



## OUTLOOK

The third generation EU directives will contribute to the creation of a single insurance market. The insurance companies have already anticipated the single market by taking over existing insurance companies. Mergers and acquisitions are expected to continue, though to a smaller extent than in the early 1990s.

The newly adopted directives will encourage competition and stimulate cost-efficient company operations. As such, attention is turning to improving operations in a cost-efficient manner. Some cost savings will be realised in the distribution of insurance services. In this respect, direct writing will increasingly be used by the insurers.

From a market strategic point of view, however, insurers are increasingly concentrating on their markets, product innovation, and the distribution of their products. The number of new products and new product varieties in some segments is expected to grow, causing the need for independent, custom-tailored advice. In other segments, demand for more convenience is increasing, thereby further stimulating the importance of one-stop shopping.

In the coming years, gross premium income is expected to increase at the same rapid pace as in recent years. This continuing growth is motivated by the economic recovery, the still relatively less developed European insurance market, and the market stimulance by the newly adopted directives. In addition, insurers will try to develop further the insurance markets in Southern Europe and the Eastern Europe.

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# Financial intermediaries

## NACE 831

Since 1980, various changes in regulation have served to liberalise the provision of services and increase competition. In this regard, financial intermediaries have become increasingly more important during the last decade as the large growth in demand and supply of funds on the financial markets (mainly fuelled by privatisations, mergers & acquisitions and the dismantling of barriers to cross-border trade), as well as the spate of new financial instruments have had a profound effect on demand for their services. The liberation of capital markets since 1986 has led to the emergence of sizeable financial intermediary groups.

### INDUSTRY PROFILE

#### Description of the sector

Financial intermediaries play a supporting role in the world's capital markets. They assist in the investment of savings with particular emphasis on portfolio management. Their activities include brokerage, advice, research, dealing in securities, market-making, clearing and settlement and more general organising of the "marketplace". Stock exchanges, brokers, and large investment banks operate in this industry. Financial intermediaries perform functions that are both complementary to and competitive with banks and insurance companies. However, the overall distinction between financial intermediaries, banks and insurance companies is becoming more and more vague.

As such, it is more meaningful to describe the main financial market forms as follows instead of focusing on unclear differences among various providers of financial services.

- money markets (short term instruments: call money, on-sight deposits, checking accounts) and capital markets (long term: securities, loans, mortgage loans);
- primary markets (issues of securities);
- regulated secondary markets (like stock exchanges) and non-regulated secondary markets (like over-the-counter markets, in which dealing takes place off the record)

- spot markets (operations and payments are carried out immediately) and forward markets (traded currency securities will be remitted later, and will be paid at the agreed time upon remittance of those securities).

The activities of financial intermediaries serve investors in equity, debt and derivative markets. By providing their services, financial intermediaries make the market for short- and long-term securities and, to a lesser extent, loans. Today, a very large proportion of the investment banks activities consists of advice and assistance on (cross-border) mergers and acquisitions (M&A).

#### Recent trends

Globally, economic growth was unevenly distributed in 1993. Whereas the USA, Canada and the UK showed encouraging signs of economic recovery, most of the countries of continental Europe struggled with economic stagnation and recession. The countries of the Asia region, with the exception of Japan, enjoyed among the largest percentages increases in the world. The stock indexes, on the other hand, performed extremely well worldwide and, especially in Europe, irrespective of the countries economic performance. Stock market performance in 1993, measured by the market capitalisation of stock exchanges, recorded an increase of 28.1 % compared with 1992.

Since 1989, several drastic changes have affected the securities markets world-wide, among which includes structural modernisation, with the introduction of the improvement of automated systems, the internationalisation of their activities, the derivatives products and the emergence of stock markets in developing countries. These changes have been accompanied by a shift in market value and turnover distribution among world regions. Investors involved in Japanese stock markets have transferred their portfolio from Japan to the USA and Europe where they found greater profit opportunities, as well as emerging stock markets, like Latin America. Such investment activity can explain the regional redeployment in turnover value.

Mergers and acquisitions (M&A) activity in the USA has been high and the debt market has derived some benefits. Yet, the predominant source of capital for European takeover activity has been shareholders equity rather than debt. For example, Europe's biggest takeover of 1993-4, Akzo's (NL) 2.65 billion ECU acquisition of Nobel Industries, was entirely equity based. What will underpin the debt market in the me-

**Table 1: Financial intermediaries  
Stock exchanges, 1993**

	Total	Number of companies listed (1)		Shares turnover (2) (million ECU)
		Domestic	Foreign	
Bruxelles	304	165	139	12 081.2
Kobenhavn	217	206	11	23 181.3
BR Deutschland	1 297	664	633	512 799.6
Barcelona	346	342	4	2 796.4
Bilbao	360	359	1	3 679.8
Madrid	378	374	4	37 075.4
Paris	934	726	208	148 206.7
Italia	246	242	4	56 940.5
Luxembourg	217	56	161	970.9
Amsterdam	482	239	243	57 653.3
London	2 412	1 927	485	734 910.3
NYSE	1 946	1 788	158	1 949 948.4
Tokyo	1 775	1 667	108	668 417.9

(1) Excluding investment funds

(2) Including investment funds

Source: FIBV



**Table 2: Financial intermediaries**  
**Medium-term borrowing facilities in the international capital markets**

(billion ECU)	1990	1991	1992	1993
Note issuance facilities (1)	3.4	1.5	1.2	1.3
Other committed facilities	2.1	4.7	3.9	5.7
Euro-commercial paper programmes	37.9	29.0	22.3	32.8
Euro-note programmes	12.6	34.9	75.4	96.7
Other non-underwritten facilities	1.5	0.9	0.8	0.3
Total	57.5	70.9	103.7	136.8

(1) Including multiple-component facilities  
 Source: OECD: Financial market trends

dium term is the market's ability to provide financing structures. The three main sources of demand for this type of financing will be M&A and restructuring, project finance and, more controversially, junk bond borrowers.

A development that is viewed with concern in the financial world is the continuously growing trading activity in over-the-counter derivatives. The area of over-the-counter trading in derivative products has the attention of regulators, supervisors and media because of the systemic risks it imparts to the financial system. The biggest problem in assessing the risk of derivatives markets in financial instruments and the potential exposure of international banks lies in measuring the actual size of the business in fast-changing markets. One difficulty in identifying the actual sums involved is that derivatives activity is divided between the organised exchanges and the over-the-counter (OTC) markets. Independent in the way it is measured, there is no doubt that the volume of derivatives business continues to rise.

#### International comparison

The New York Stock Exchange (NYSE) is the world's largest stock exchange. The year 1993 was the best year in the exchange's 201-year history. The NYSE reported unprecedented operating and financial results resulting from record-breaking levels of trading volumes. In 1993 its value of share trading (turnover) was 1.7 times larger than in London, and 1.9 times larger than in Tokyo. In terms of market value of shares of domestic companies (capitalisation) the NYSE is 50 % larger

than the Tokyo Stock Exchange and 2.5 times larger than the London Stock Exchange.

In Europe, Italian stocks were outperformers in terms of price-earnings (PE) ratio, more than doubling its 1992 figure to 58.6 % in 1993. In Europe all PE-ratio were up in comparison with the 1992 figures. The only exception was Stockholm where the PE-ratio fell from 60.0 % in 1992 to 31.0 % in 1993.

London is undoubtedly the most important European financial market in terms of turnover and capitalisation. However, from a global perspective in 1993, London lost its leading position in terms of average value of transaction to Mexico. In this regard, investors looked with interest at the Latin American markets. For example, the Mexican stock market saw a surge in its market value by 44.8 %. This good performance can mainly be attributed to international factors, such as the ratification of the North American Free Trade Agreement (NAFTA) Treaty, rather than domestic ones.

The position of Asian-Pacific region is declining in terms of share turnover value. The Tokyo Stock Exchange, which accounted for 60.1 % of the region trading value in 1989, now represents only 39.5 %. The rapid growth of other stock exchanges in the Dynamic Asian Economies (DAE), such as Hong Kong, Singapore, Malaysia, Taiwan and Thailand, has not compensated for the significant decline in the Tokyo Stock Exchange's market value since 1989. However, the highest price-earnings ratio among the major stock exchanges is still for Tokyo with 64.9 % in 1993.

**Table 3: Financial intermediaries**  
**Insurance brokers and agents, 1992 (1)**

	Number of brokers	Market share (%)	Number of agents	Market share (%)
Belgique/België (2)	3 939	60.0	10 000	15.0
Danmark (2)	80	9.5	N/A	N/A
BR Deutschland	3 000	10.0	359 000	75.0
España	2 500-3 000	18.0	24 000	60.0
France	2 400	(4)	18 300	(4)
Ireland	1 798	N/A	1 703	N/A
Italia	1 980	12.0	23 000	71.0
Luxembourg	9	N/A	5 500	(5)
Nederland (3)	8 000	75.0	N/A	5.0
Portugal	68	20.0	31 734	67.0
United Kingdom	4 750	(6)	N/A	(6)

(1) Most of the figures are estimates.

(2) 1991

(3) 1994

(4) Brokers: life 7%, non-life 18 %; agents: life 17%, non-life 45%.

(5) Life 95%, non-life 98 %.

(6) Brokers: life 40%, non-life 54 %; agents: life 40%, non-life 7%.

Source: BIPAR

**Table 4: Financial intermediaries**  
**Top advisers on completed European deals (1)**

	Value (million ECU)	Number of deals
Lazard Houses	1 940.5	10
Credit Lyonnais	1 265.2	1
S.G. Warburg	898.0	7
Morgan Grenfell	600.7	10
UBS Phillips & Drew	528.4	1
MeesPierson	514.3	2
Swiss Bank	448.6	1
Lehman Bros	405.0	5
Kleinwort Benson	382.8	5
Wertheim/Schroder Group	336.9	8
Societe de Banque Occidentale	327.6	1
Goldman Sachs	304.0	6
Barclays de Zoete Wedd	194.6	4
Wasserstein, Perella	174.6	1
Citicorp	129.3	1
<b>Total</b>	<b>10 096.6</b>	<b>698</b>

(1) Mergers and acquisitions between January 1 and March 31, 1993.  
 Source: Securities Data Co; secondary Source: Financial Times

### Foreign trade

A substantial expansion of international activities was driven by deregulation and the revolution in communication technology. The resulting integration has broadened the choices of market participants: issuers have looked to foreign markets to raise capital, while investors have tended to internationalise their portfolios.

Indicators of activities in the international capital markets showed a remarkable growth of Euro-note programs, Euro-commercial paper programmes and other committed facilities in 1993. The growth was spurred by falling interest rates in a number of major markets and the large funding requirements of governments and corporations.

### MARKET FORCES

#### Demand

The increase in equity market valuation in 1993 implied that companies preferred to raise equity finance rather than debt. It is unlikely that this will change in the near-term even if

stock markets weaken substantially. There may be potential for hybrid equity-linked debt products such as convertibles and warrants. Convertibles have proved popular among Asian issuers while the Japanese equity-warrant market has begun to stir once again.

Still, a principle driving force behind debt financing has been largely absent in Europe. Many European companies - under pressure of recession - have become increasingly concerned about their debt/equity ratios. This underscores a greater effort to float shares rather than to borrow. Beyond the questions of demand, the huge majority of companies cannot bring issues of the size and frequency sought by those investors for whom secondary-market liquidity is a cause of concern.

Emerging-market corporations and banks have begun to borrow in increasing numbers and volumes. Apart from the biggest names, these issuers are little known to international investors and are tapping flight capital. This kind of institution should dominate both the demand and supply sides of the market, further consolidating the linkages between the exchanges and the OTC vendors. That pattern will tend to force the pace of innovation because institutions are much more demanding customers than retail investors.

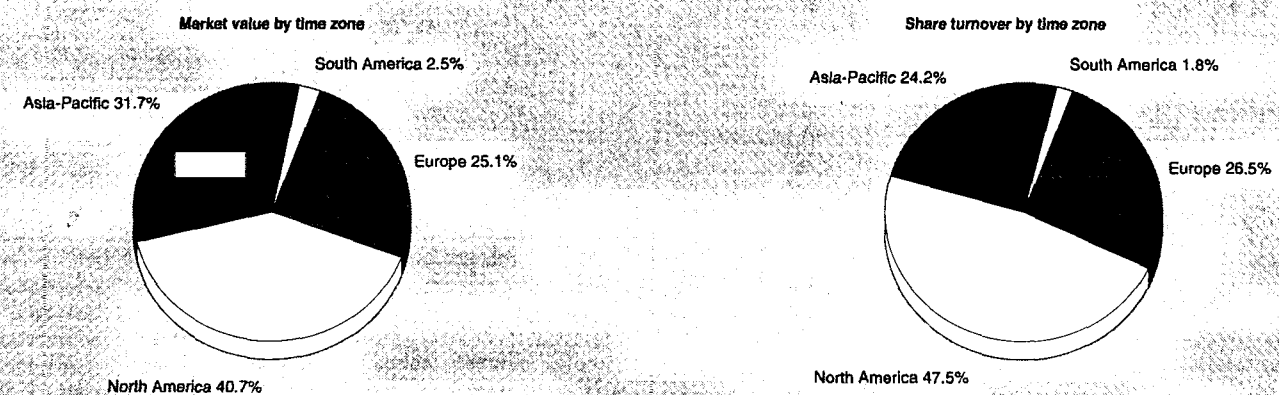
Another driving force emanates from mergers, acquisitions, privatisations and management buy-outs, which require services from financial intermediaries in various forms. The demand for services involving management of corporate assets and liabilities has increased, especially in situations involving financial and corporate restructuring. Furthermore, the need for advice and support for cross border alliances and take-overs has grown.

#### Supply and competition

Financial services can be divided into two groups according to their target markets: institutional versus private markets and international versus local markets. Institutional lenders and borrowers have different needs, and it is within these markets that international competition mainly takes place. Local markets will keep their role, however, largely because many private persons and companies prefer the indigenous financial market to the foreign markets for borrowing and investing. Most domestic shares will be bought by the inhabitants of the country and not by foreign investors.

With respect to institutional markets, stock exchanges compete with each other to hold or increase their share of trading. An exchange's competitiveness is based on its technology and procedures for trading, clearance and settlement. In Europe, the London Stock Exchange has attracted much trade of foreign

**Figure 1: Financial intermediaries**  
**Market value and turnover share, 1993**



Source: FIBV



**Table 5: Financial intermediaries  
Ranking of European brokers, 1993**

	Rank 1	Equity research Rank 2	Rank 3	Rank 1	Equity execution Rank 2	Rank 3
Belgique/België Danmark	Petercam Danske Securities	Dillon Read Enskilda	Warburg Carnegie	Petercam Danske Securities	Dillon Read Alfred Berg	Warburg Carnegie
BR Deutschland	Deutsche Bank	Sal Oppenheim	Warburg	Deutsche Bank, Commerzbank		Warburg and BHF
Hellas España	Schroder FG Inversiones	Baring Securities Carnegie	Sigma Asesores Bursátiles Paribas	FG Inversiones	Carnegie	Warburg
France	Chevroux de Virieau	Warburg/ Bacot Allain		Chevroux de Virieau	CCF	Warburg
Italia Nederland	CIMO MeesPierson	Warburg ABN-AMRO	Euromobiliare James Capel, Warburg	CIMO ABN-AMRO	SIGE	Euromobiliare
Portugal	Midas	Schroder	Carnegie, Singer & Friedlander Warburg	Midas	Carnegie	Schroder
United Kingdom	James Capel	BZW		James Capel	Warburg	BZW, Smith New Court
Pan-European	Warburg	Morgan Stanley	BZW	Goldman Sachs	Morgan Stanley	Warburg

Source: Euromoney

shares of non-United Kingdom companies. The other European exchanges have also been investing heavily to make markets more efficient, in order to boost liquidity on their local markets. Although the London Stock Exchange was forced to abandon its investment in the computerised settlements system, Taurus, in March 1993, London's SEAQ International remains an important trading centre for many leading German, French, Dutch and Swedish companies. Regulation is very important to the competition between exchanges, both as an instrument or as a constraint in making exchanges attractive. Stamp duty, capital gains taxes, brokers' fees, trading hours and the delivery-clearing systems all determine competitiveness. It is thought that this is one of the main reasons that a level regulatory playing field should be achieved as a matter of policy.

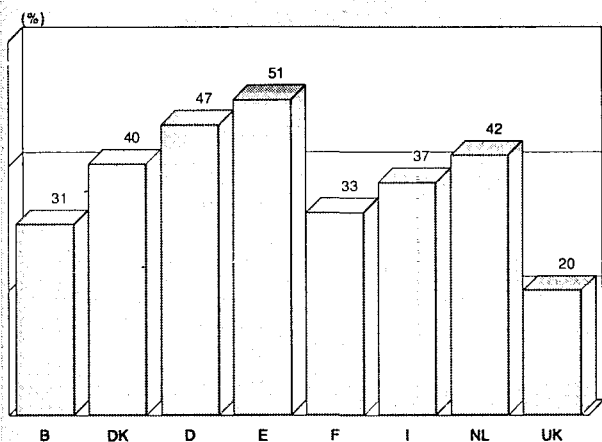
Proprietary Trading Systems (PTS) operated by large international brokers compete with the stock exchanges, and with each other, in order to gain the business of the institutional

investors. They attempt to attract customers primarily with the advantages of one-stop shopping--institutions can deal with just one large broker via PTS. Through the large broker, investors can benefit from superior services such as 24-hour trading in stocks. Brokers compete with exchanges, because they can offer a customer a deal outside the exchange and directly through the broker with another customer. Only brokers with a sufficiently large customer base can offer such a service.

Electronic markets also threaten the more traditional stock and foreign exchanges. They allow investors and intermediaries to deal anonymously on an electronic system. Participants enter bid and offer prices directly into the system and can either trade instantly against these prices, or negotiate on screen on order size. Instinet (owned by Reuters) is a leading example of such an electronic market. Instinet works like an exchange, but is registered and acts as a broker, with membership on several stock exchanges including London, Frankfurt and Paris. As many as 35 % of the deals in the foreign exchange market are conducted to brokers who bring together bank buyers and sellers. There are now three competing systems: Reuters 2000-2; Electronic Broking System (EBS), owned by a consortium of banks and the information group Quotron; and Minex, a Tokyo-based company which operates mostly on the Yen market. Also, bond trading will increasingly be screen-based. Electronic trading has already begun in the USA Treasury bond market and recently CS First Boston began trading on European government bond markets through its on-line trading system. Electronic markets blur the distinction between brokers and exchanges.

The reorganisation of stock markets has also played an important part in stimulating the supply of financial services and the competition between financial intermediaries. Its aim was improving efficiency while ensuring stability and investor protection. Key elements include: an end to brokers' monopoly and liberalisation of commissions; a reorganisation of the market for treasury bonds, with the consequent adoption of a secondary market in such stocks to reflect the needs of investors; the creation of secondary listings, allowing medium-sized businesses, unable to meet the conditions for full listing, to improve their access to capital; and the computerisation

**Figure 2: Financial intermediaries  
Stock market performance, end-1992 to end-1993**



Source: FIBV

of stock markets and market operations in all European exchanges boosting market liquidity through more rapidly available and accurate information.

## INDUSTRY STRUCTURE

### Companies

Competitors in this industry consist of different groups of which brokers are the most important. They can be divided into large, international brokers, small, national ones and niche players. The stock exchanges themselves are engaged in competition, each positioned either as an international player or as a domestic one. Private electronic markets are becoming progressively more significant and, in some instances, Instinet already plays a leading role. Finally, the (investment) banks are also active in this industry.

In the past decade, large groups of financial intermediaries have emerged, consisting of combinations of brokers and banks. Monitoring these groups is a difficult matter, as they engage in activities that fall under different supervisory authorities in most European countries.

Stock exchanges can be compared by their stock index performance and value of share trading. Merchant banks and securities firms can typically be compared by their engagement in take-over deals. This measure underscores the dominance of Lazard Houses (UK), Crédit Lyonnais (F, a bank), and S.G. Warburg (UK). The role of financial intermediaries in insurance products can be seen by way of distribution. The distribution of insurance products via insurance brokers and agents shows a different pattern in the different European countries. In this regard, it is possible to distinguish two extremes: market domination by brokers versus market domination by agents. One extreme is represented by the Netherlands and Belgium, with a brokers' market share of respectively 75 % and 60 %. At the opposite end of the scale, one finds the market dominated by agents, with Germany (75 %), Italy (71 %), Portugal (67 %) and Spain (60 %).

### Strategies

The collapse of communism and the worldwide rise of free market economics brought the spread of privatisation which has created new openings and new dangers. For a financial intermediary to be a global operator, a successful strategy seems to involve investment in international relationships. Global distribution power is essential in this regard. Another important factor is the financial condition or soundness of the company itself.

The top USA securities firms, with a wealth of experience in a highly competitive market at home, are rapidly building up their presence around the world. They are exploiting their home market experience on a global level. They make use of the fact that countries from Latin America through Europe - west and east - to south-east Asia are opening their doors for foreign advisers.

Indeed, the privatisation trend can warrant a local strategy, coupled with an global presence. Local knowledge is needed in order to bring state enterprises to the market successfully. Global presence is needed to manage the typically large size of privatised companies. However, the USA investment banks illustrate that global distribution power becomes the more important factor for success.

Stock exchanges will compete with each other on market-making or order-driven trading systems. Brokers and electronic markets are offering more linkages between exchanges as Amsterdam has done for wholesale investors.

SWIFT, acting in its capacity as secretariat to the maintenance agency of the only recognised international message standard for the securities industry (ISO 7775), proposed that a new framework be established. One of the major components is

the establishment of an internationally recognised authority in the securities business industry, the Securities Standards Advisory Board (SSAB). Its objective is to promote the use of industry-wide standards by ensuring the timely availability of such standards and their relevance in meeting industry needs. The SSAB shall determine the strategic direction and priorities for the development of industry-wide message standards in the area of securities.

## REGULATIONS

The objective of the Investment Services Directive (ISD) which was adopted on 10 May 1993, is to create one single market for securities firms. The ISD must be transposed into national law by 1 July 1995 and be effective from 31 December 1995. A securities firm will then need a licence only in a single Member State to operate in all Member States. Investment firms and banks will, however, have to respect conduct of business rules on a host-Member State basis. The directive provides that banks and securities firms may become stock exchange members in their own name in each Member State, subject to a transitional period for France, Italy and Belgium until the end of 1996, and for Greece, Spain and Portugal until the end of 1999.

Furthermore, under certain conditions a Member State is allowed to force market participants to handle securities transactions on the regulated market. The investor, however, can demand that the transaction will be executed outside the regulated markets. A Member State can then require the investor to ask permission for such a transaction. This rule represents a compromise between countries with highly regulated markets and countries with less regulated markets.

Together with the Capital Adequacy Directive (CAD) of 15 March 1993, the ISD regulates the EU securities market. The CAD stipulates minimum capital requirements, as well as a minimum starting capital. The ISD stipulates that securities firms and banks need to fulfil the CAD requirements.

The Fédération Internationale des Bourses de Valeurs (FIBV) and the Federation of European Stock Exchanges (FESE) state that a level regulatory playing field between electronic and floor based markets should be achieved. Electronic markets performing similar functions should be regulated in a similar manner whether or not operated by an exchange. However, regulation should be appropriate to the system and to the constituencies served rather than identical regulation.

The International Capital Markets Group (ICMG), which is a cooperative arrangement between the International Bar Association, Section on Business Law (IBA), International Federation of Accountants (IFAC) and the FIBV, is dealing with a number of important issues including international regulatory issues, disclosure to investors in the secondary markets, regulation of electronic markets and, harmonisation of securities regulation.

### Impact of the Single Market

The impact of the creation of the Single Market on financial intermediaries is considered to have been generally positive. Freedom to provide services, the right of establishment and the free movement of capital are of extreme importance to this sector. In European exchanges, generally one transaction in seven involves at least one foreign counterpart. The field of taxation has a tremendous impact on the location of trading and on trading volumes. Tax measures that contribute to higher costs divert transactions to non-EU exchanges. Free movement of goods is also of great importance to the financial intermediaries, notably in the area of technical harmonisation, mutual recognition of rules and prevention of new barriers. Advance on an increasingly fluid and integrated capital market is considered a priority by the European securities industry.

## OUTLOOK

The leading investment banks face a serious diminution of their own role in the hugely profitable new issue business. Already a core group of 25 super-investors - mainly split between the USA and the UK but with some in continental Europe, Australia and Asia - are coming to dominate the business. Lead managers will increasingly syndicate deals to the super-investor, not to other investment banks. A future step will be the super-investors to deal directly with the issuers as disintermediation will become a big topic for investment banks. Even if the super-investors fail to organise an underwriting cartel to take control of the primary business, they will still dictate the pricing of new offers.

The lack of transparency that seems to be an inevitable component of the OTC markets will propel business to the exchanges. Over-the-counter derivatives will become more tightly controlled in terms of how they are sold and accounted for. As derivatives dealers find more of their products replicated on the world's exchanges, their search will continue for OTC deals that preserve their profit margins.

The tendency among the smaller exchanges favours full automation. In the next century they will link with the hubs electronically, offering local derivatives to a wider customer base while major markets will provide their smaller counterparts with capacity to trade international products. As a result, the gap between emerging markets and the established ones will close at an increasing pace.

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# Real estate

## NACE 833

The European real estate sector is going through a severe downturn, which has set in after a long period of strong growth in rental and capital values. The downturn started in London and spread over the continent. Now, German cities are also affected. The recession in the property market has partly been caused by the general economic slowdown and high real interest rates, and partly by rental and capital values that have over-appreciated. The withdrawal of Swedish and Japanese investors has only worsened the situation. Falling rentals and rising vacancy rates underscore the difficulties within the commercial property market. However, in the UK the first signs of recovery are apparent. The residential property market already had its turning-point in 1993.

### INDUSTRY PROFILE

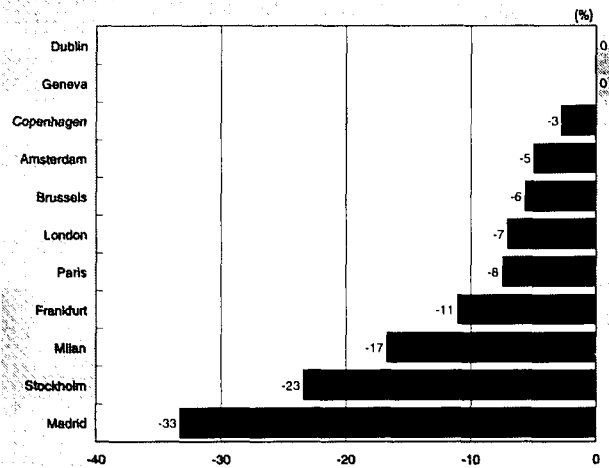
#### Description of the sector

The various professions active within the property sector attest to the dual nature of the industry, implicit in its primary and secondary markets. Certain activities relate to primary demand and the completion of property development, whereas other activities relate to the functioning of the secondary market. Within the first category are builders, developers and consultants specialising in feasibility studies. Real estate agents operate in the secondary market, with their expertise in surveying and valuation of properties, and their role in sales transactions and estate management. In addition, the property market sector may also be divided along two alternative lines: residential property and commercial property, where the latter includes office property, retail property and industrial property.

#### Recent trends

All over Europe a spectacular expansion occurred during the past decade, peaking in the first quarter of 1991. Since then the property sector has slumped, because of economic recession, high real interest rates and unaffordable office rents.

Figure 1: Real estate  
Growth of office rents, 1993 (1)



(1) Prime rentals  
Source: ICIPA

With respect to the housing market (residential property), the overall level of transactions in the eight countries where such information is available for 1993 (B, DK, D, F, IRL, I, NL and UK) rose by 8 %, principally as a result of a 17 % increase in the German figures as well as a 38 % increase in Dutch figures annually. The number of building permits issued (excluding I and UK) rose by 5.4 %. Housing prices rose in most Member States in nominal terms, with the exception of the UK where they continued their downward trend, albeit at a slower rate than in the past. On the basis of 10 year census data, homes occupied by their owners increased in most EU Member States. There are no recent figures available for Germany.

The office sector suffered more than either retail or industrial property; values within the office sector fell by 23 %, according to the Jones Lang Wootton property index. In other than prime locations, office rentals declined between mid-1992

Table 1 : Real estate  
Main indicators, 1991

	Number of enterprises	+ Turnover (million ECU)	Number of employees
Belgique/België	14 605	2 253	14 520
Danmark	1 589	298	(3) 4 977
BR Deutschland (4)	(3) 31 686	(3) 18 185	174 059
Heilas (2)	942	N/A	(8) 1 429
España (3)	10 562	N/A	(8) 42 322
France	49 151	22 879	102 929
Ireland (2)	733	N/A	2 423
Luxembourg	421	N/A	687
Portugal (3, 5)	509	(3) 212	8 734
United Kingdom (6)	42 333	N/A	N/A

(1) Covers dealers in real estate, and house and estate agents.  
(2) 1988  
(3) 1990  
(4) Excluding house and estate agents.  
(5) Covers only enterprises with at least 5 employees.  
(6) including also letting of real estate by the owner.  
(7) Number of local units  
(8) Number of persons employed  
Source: Eurostat; Mercure

**Table 2: Real estate  
Number of employees (1)**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	11 770	11 965	12 269	12 694	13 637	13 843	14 483	14 520
Danmark	2 701	4 281	4 703	4 901	4 903	4 889	4 977	N/A
BR Deutschland (2)	122 040	129 600	131 501	136 653	140 167	148 639	160 598	174 059
España (3)	23 329	N/A	N/A	N/A	N/A	N/A	42 322	N/A
France	N/A	80 152	78 333	80 419	89 850	99 210	103 480	102 929
Luxembourg	219	251	280	361	383	455	557	687

(1) Covers dealers in real estate, and house and estate agents.

(2) Excluding house and estate agents.

(3) Number of persons employed

Source: Eurostat: Mercure

and mid-1993 by on average 14 %, hence less of a decline than that which prime rental values experienced. The industrial rental prices declined roughly in line with the decline of the prime office rents. Prime retail rentals experienced the sharpest drop. Interest rates on mortgage loans fell considerably throughout the EU during 1993, as national governments progressively eased the tight monetary policies, although rates again started to rise in 1994.

Still, Europe's property markets have continued to perform sluggishly in the first half of 1994 although there are clear signs of a turnaround in office property values, with rental levels generally stabilised for the first time since the early part of the decade. The index of prime office capital values rose by 2.5 % in the second quarter of 1994, although it still stands 2.7 % below last year's corresponding value.

While the overall trend is still mainly negative, there are large differences between cities and regions. Stockholm and South-European cities have been hit particularly hard in 1993. The Spanish cities were also hard hit; there, the combination of a sharp recession and overbuilding in the early 1990s has produced rental drops ranging from 33 % in Madrid and Barcelona to 12 % in Valencia. Germany seemed for a long time invulnerable to the downturn in the property markets elsewhere in Europe, but now rates for prime space in Munich, Frankfurt and Hamburg fell, respectively, 28.6 % and both 11.1 % in 1993. In Berlin, Düsseldorf and Leipzig rates remained stable.

Paris' property market saw a further downturn, with office rents falling in one year by 7.5 to even 20.7 % in La Défense. While there have been signs of stabilisation in Central Paris, increasing vacancy rates render the market still vulnerable to

further rental decline. Outside Paris the office rents are far more stable. Other EU cities also saw rental performance deteriorate as their economies continued to slow down. However, in the UK, the picture improved considerably. In London, rents fell only 7.1 % compared to 26.3 % in 1992.

Against a backdrop of a gradual economic upturn, decreasing vacancy rates and limited development activity, there is now the prospect of a return to rental growth in some areas in 1995; slightly ahead of the continent in its economic cycle, such growth will develop earlier in the UK.

#### International comparison

The commercial property markets in the USA are very large compared to other markets. 1993 marked a decisive turnaround for office property, with the national vacancy rate dropping nearly two full points to 17 %. However, the office market is quite far from equilibrium and cannot yet be termed a healthy sector. Retail property improved, although, on average, rents remained on a downward path, falling 1 %. The best performance came from the more buoyant economy in Atlanta, where shops rents rose 12 %. In 1993, industrial property in the USA continued weak; rents and prices are stagnant in the majority of markets.

In Japanese markets severe problems were felt in 1993. Office occupancy in Tokyo's prime areas slipped in 1993. Negligible until recently, the vacancy rate is now 5 % to 7 %. Rents have dropped by over 50 % in the prime area of Maranouchi; with a 23 % increase in supply, a tenant's market has emerged. The national drop in consumer spending hit rents in retail property, both the prime and secondary areas. However, rents

**Table 3: Real estate  
Number of housing transactions**

(units)	1990	1991	1992	1993
Belgique/België	99 800	99 700	104 900	104 100
Danmark	56 800	52 400	60 100	62 700
BR Deutschland	554 000	543 000	595 000	697 000
Hellas	93 100	43 900	59 900	N/A
France	754 000	712 500	633 400	600 900
Ireland	34 800	37 100	44 400	45 400
Italia	517 100	555 900	465 400	501 900
Luxembourg	2 900	3 100	N/A	N/A
Nederland	202 100	211 100	245 400	339 000
Portugal	170 400	235 100	N/A	N/A
United Kingdom	1 398 000	1 305 000	1 138 000	1 195 000
EU (1)	3 883 000	3 798 800	N/A	N/A

(1) Excluding España

Source: European Mortgage Federation



**Table 4: Real estate**  
**Share of transactions made with the assistance of real estate agents**

(%)	1990	1991	1992
Belgique/België	60	N/A	60
Danmark	80	80	N/A
BR Deutschland	50	60	60
Hellas	20	N/A	40
España	20	25	N/A
France	55	50	55
Irèland	86	86	90
Italia	36	35	35
Luxembourg	80	80	80
Nederland	60	60	60
Portugal	N/A	10	N/A
United Kingdom	72	84	N/A

Source: FIABCI

are likely to remain stagnant over the coming year. Industrial companies in Japan have had another difficult year. As a result, demand for industrial space has been weak. However, rents have only gone down marginally, as industrial land in the immediate Tokyo area remains in very short supply. In other areas, rents have slipped further. Japanese banks' non-performing real estate loans continue to burden the whole banking industry. The government has encouraged the establishment of an agency to hold and dispose of these debts. However, this route has remained ineffective while banks and owners prefer to hold assets with the long-term expectation that values will return.

#### Foreign trade

The increase in the proportion of international investment in the property market has slowed down in the economic recession. At the moment, the German and Dutch investors are in the front line of cross-border property investment in Europe; Middle Eastern and Far Eastern money is playing a supporting role; Italian and Spanish financial groups are taking their first steps. Meanwhile, USA and UK institutions will take longer to be coaxed into European real estate. Japanese and Swedish players, who dominated the cross-border market in the 1980s, are on the sidelines for the medium term.

A survey by Jones Lang Wootton (JLW) estimates that around ECU 65 billion of European real estate is held by cross-border investors. When one looks at the time period 1987-1993 a pattern emerges. Investors have concentrated on northern Europe. The UK, Germany and France account for nearly three-quarters of total deals. In addition, the Benelux countries have seen a high level of inward real estate investment relative to the size of their economies. Cross-border activity has been highly concentrated by nationality. Swedish, Dutch and British investors account for two-third (by number) of cross border holdings. Of the other Europeans, only the French and German have a significant number of property investments outside their own countries. Belgian and Southern European investors are virtually absent. Only 12 % (by number) of cross-border holdings are non-European, with the Japanese accounting for most inward investment from outside Europe. However, Japanese have tended to focus on prime locations, so in terms of value, they are likely to be of higher importance. However, there have been major changes in the origins of those buying European real estate. The Swedes and Japanese dominated the boom years of 1980-90, accounting for two-thirds of transactions. During 1992-1993 it was German investors who came to the fore, with most of their investments going into the UK. Middle and Far Eastern investors also increased their activity during this period, while Dutch and UK players have accounted for a fairly consistent level of demand over time.

## MARKET FORCES

### Demand

Property demand is, of course, largely determined by local factors. The most important among these are: economic growth, replacement demand, luxury demand (upgrading) and locational preferences. Economic growth creates a need for more space for offices, shops and factories. Replacement demand is the basis of demand for commercial property. Its volume is dependent on the average lifetime of real estate. Upgrading occurs in a favourable economic climate and when the existing stock of real estate is estimated to be of poor quality. Finally, other factors can increase the attractiveness of a particular location and create an additional demand for property.

Another important factor which influences demand is the availability of mortgage credit which is connected with the interest rate on mortgage loans, especially in case of residential property. For example, in 1993 the Netherlands enjoyed a relatively low interest rate of 6.7 % on new mortgage loans, while over the same period the number of housing transactions increased from 245 400 to 339 000, an increase of 38 %. With government budgets under increasing strain, mortgage credit has taken on a more important social dimension, in that it represents the principal means by which the population can obtain access to housing.

The rental market is less dependent on economic fluctuations. Unlike the sales market, it is not bound by investment logic; rental is not investment in, but rather, consumption of, real estate. Therefore, interest rates are less crucial in the rental market than in the property market.

Transfer duties are levied at the time of sale of a property. At present, France has the highest such taxes in the world with 18.2 %, compared to between 6 % and 12.5 % in most other European countries. The United Kingdom and Germany are the exception, with transfer duties of 1 % and 2 %, respectively.

The level of infrastructural provision and planning also influences demand. The three regions of Greater London, the Rhine-Ruhr and Ile-de-France comprise the principal focuses of wealth of the EU. When cities are ranked according to several factors of attractiveness, Paris and London stand out ahead of others. These cities have an outstanding infrastructure and benefit from a strong presence of multinational firms.

In the commercial property market, the shift in business demographics towards the services sector increases the demand for office properties to the detriment of industrial sites. In addition, the demand for offices is becoming more sophisti-

**Table 5: Real estate**  
**Share of all homes occupied by their owners**

	Year	Share (%)	Year	Share (%)
Belgique/België	1981	61	1992	65
Danmark	1983	55	1992	54
BR Deutschland (1)	1985	43	1988	40
Hellas	1981	70	1991	75
España	1981	73	1991	78
France	1982	50	1992	54
Ireland	1980	76	1993	80
Italia (2)	1983	65	1991	75
Luxembourg	1981	59	1991	64
Nederland	1981	42	1993	47
Portugal	1981	57	1991	66
United Kingdom	1983	60	1992	66

(1) Partly estimated by the "Verband Deutscher Hypothekenbanken"

(2) 1991 estimated

Source: European Mortgage Federation

cated, with the development of large luxurious American-style complexes, such as the Quarter de la Défense in Paris. The domestic property market is still a sector that appears resistant to the kind of factors noted above. In this case, other factors are at work that are sometimes less pragmatic and more personal.

### Supply and competition

National and even urban markets still have distinct evolutions. However, because of the growing activities of internationally operating firms, developments in the different national or urban markets are coming more in line with each other. However, the UK market, with London at the forefront, still is trend-setting for the developments in office space.

Currently, there is an oversupply in the property market. The boom in Europe's property values during the 1980s stimulated construction, often funded by large amounts of bank debt. Economic slowdown and high real interest rates hit these markets hard. Many countries have seen office vacancy rates rise. Overcapacity in property has been even more pronounced to the extent that foreign investors, notably from Japan and Sweden, have pulled out: Japanese investors because of too low rates of return and Swedes because of home market problems. Indeed, the slump in the Swedish property market has even undermined the Swedish banking system. Sales agents were the first to be hit by the property recession. Seduced by seven years of market growth, they counted on the rapid and highly profitable turnover of property and borrowed, in some cases, up to 100 % from the banks. The recession brought major losses, aggravated by the withdrawal of the banks.

The evolution was different in central business districts and outlying areas. In central business districts, the recession initially only reduced shortages as rents remained stable, whereas outlying areas were hit more severely. As the recession continued, however, rents in the central business districts also dropped sharply.

The property investment market has gone through the same developments, but in a more pronounced way. Investors have preferred to postpone their activities while markets are gripped by uncertainty. The degree of speculation that has characterised the investment climate in the 1980s and the early 1990s caused a severance of the link between supply and demand, exacerbating the current recession.

### Production process

Office supply is fed simultaneously by the arrival on the market of new buildings (60 to 65 % of supply) and the recycling

of older ones. Few markets have a primary sector coexisting with a secondary sector to such a degree. This secondary market allows property to be used as an investment base, as it guarantees a measure of liquidity. (This role as an investment base is more pronounced in office property than in residential property. The latter has more of a community character, and is often the subject of regulation designed to preserve its social utility. This in turn holds down yields on capital investment.) This closed-circle structure accords particular importance to the role of intermediaries. They exist to help transactions (and ensure market liquidity), performing an essential role in affording investors continuity between primary and secondary sectors. Another consequence of this special configuration is that the various players in the marketplace can either simultaneously or successively adopt opposing roles: buyer and seller, provider and consumer.

Satisfying end-user demands presupposes activity by developers, investors, financial funders and consultants. Each is in competition with the next - both over the character of the product and the means by which it is acquired, i.e. purchase, rental, or leasing. Professional competence in this sector takes a number of forms:

- Local market knowledge; the ability to put a precise value on a site and its possibilities, and to define a product suited to the needs of the end-user. This factor can only be provided by local experts, and has acted as a brake on internationalisation of the sector as a whole.
- Manpower resource deployment: this activity is an integral feature of the sector. It should be pointed out that high levels of productivity are present: consultants achieve rates of ECU 150 million per employee in the larger firms within this sector, a productivity level comparable to that recorded in heavy industry. In terms of sales, volume exceeds ECU 350 billion at the level of 300 employees and above.
- Financial expertise: the professions in the property market are closely linked to the world of finance, which explains the presence of banks in the sector. Financing of the product, besides production and sale, presupposes relevant management expertise.

As in every service activity, communication capacity plays a major role. The profession is able to intervene rapidly, which is a key element for success. This is seen, for example, in the auction process, where investor reaction must be immediate. In such conditions, the larger institutions, with their hierarchical structure and their prudential constraints, are at a disadvantage in the race to obtain business.

**Table 6: Real estate  
Trend in the price of dwellings (1)**

(1985=100)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België (2)	100	106	111	119	133	144	153	163	175
Danmark (3)	100	115	107	110	110	101	102	96	102
España (4)	100	107	132	156	201	217	239	236	251
France (5)	100	104	108	104	118	135	128	134	N/A
Ireland	100	104	104	113	126	142	145	149	153
Italia	100	103	112	126	156	187	207	232	236
Nederland	100	105	110	115	123	125	129	139	152
United Kingdom	100	114	133	167	202	199	196	189	184

(1) National averages. Nominal indices.

(2) Public sales and sales by private contracts.

(3) Average of one family houses and flats.

(4) Second hand dwellings.

(5) Acquisitions by private individuals through a loan.

Source: European Mortgage Federation

## INDUSTRY STRUCTURE

### Companies

Within the EU, property professionals represent a workforce of around 120 000 authorised practitioners. Most agencies are small and operate at a local level. There are two categories within the property profession: developers who construct buildings on land that they already own with a view to their sale or rental, and intermediaries who make markets in the product and counsel those involved. Outside the property profession two other groups play an important role on the market: firms or persons who construct buildings for own use, and the government, often an important owner of land.

There are four types of developers:

- Independent developers who make up only a small part of the sector.
- Subsidiaries of banking or financial groups. Almost all have in-house development divisions, both as a channel for the distribution of credit and as a profitable activity in itself.
- Subsidiaries of public works and construction authorities. The larger ones tend to have development arms.
- Institutional developers. One such developer includes the association of about 15 insurers and bankers in the Société Française d'Investissements Immobiliers.

**Table 7: Real estate  
Outstanding residential mortgage debt as share of gross  
domestic product, 1992**

(%)	
Belgique/België	21
Danmark (1)	92
BR Deutschland	40
Hellas	6
España	15
France	24
Ireland	22
Italia	6
Nederland	66
Portugal	12
United Kingdom	57

(1) Mortgage debt against residential and commercial property  
Source: European Mortgage Federation

At the intermediary level, the approach to the market is characterised by an increasing professionalism at the level of estate agents, an increasing role for consultants and a progressively national/international structure. In this context, three types of intermediaries can be identified. The first type, the estate agent and administrator, is specialised in marketing and renting to end users, as opposed to developers targeting institutional investors. The second type is the consultant; as products become more sophisticated and the sector more international, this type will increase in number and importance. Such consultancies usually assume the form of small, independent practices. Their importance reflects the fact that decisions on development, investment and acquisition are wholly dependent on market conditions. The third type is the market-maker who buys to resell. These are the speculators who exploit market imbalances (notably when causing undervalued purchase prices) to their own advantage. In addition, however, they also act as a buffer, mitigating the impact of major differences between supply and demand. Their ability to play this role depends on their capacity to carry a property over a period.

### Strategies

One current striking characteristic is the emergence of widely divergent strategies on the part of developers. Until recently, developers tended to adopt similar strategies; they were typically small-scale and unambitious, finding it difficult to operate on an international level in such a conservative profession. The current trend, however, is towards integration of upstream and downstream activities: development-proper upstream and commercialisation downstream.

One can also identify a growing tendency to extend the range of products offered in an attempt to reduce dependence on the vagaries of a single market sector. An example of this resides in developers, originally specialised in housing, who reposition to profit from the boom in office property. Two major strategic groups of developers can thus be identified. Some have elected to diversify into complementary development activities such as administration, hotel chain management or even insurance, which do not share the cyclic nature of property development. Others have opted to remain specialised, but have also diversified their product portfolio and attempted to become more international in scope.

For several years now, intermediaries have tended towards the Anglo-Saxon model of consultancy. This strategic transformation, which is accompanied by an increased presence of banks in the marketplace, has facilitated globalisation of the property market. The main consultancy offices assume the role of go-between by opening up their domestic mar-

**Table 8: Real estate**  
**Representative interest rates on new mortgage loans (1)**

(%)	1992	1993	Change
Belgique/België	9.5	8.4	-11.6
Danmark	10.1	7.1	-29.7
BR Deutschland	8.6	7.3	-15.1
Hellas	25.0	24.0	-4.0
España	15.4	11.7	-24.0
France	10.7	8.6	-19.6
Ireland	14.0	7.7	-45.0
Italia	18.0	11.3	-37.2
Luxembourg	8.3	7.0	-15.7
Nederland	8.5	6.7	-21.2
Portugal	19.6	15.5	-20.9
United Kingdom	9.0	7.9	-12.2
EU (2)	13.1	10.3	-21.4

(1) End of year rate

(2) Average

Source: European Mortgage Federation

ketplace to foreign partners. This development also admits a larger volume of transactions, regardless of the size of the market. For instance, while the office markets in London and Paris are almost the same by volume, there may be (depending on the period in question) between ten and twenty times more transactions in London than in Paris.

The present recession in property has induced the inadequate financial resources of estate agents. Developing these resources has emerged as a priority objective, and agents are working more closely with the banks to allow the development of projects for which no immediate client has necessarily been identified.

Despite growing globalisation of the property market and the increasing sophistication of products - both of which aim towards responding increasingly to demand along the lines of the Anglo-Saxon model - consumers tend to remain more attached to traditional national models.

### Impact of the Single Market

In the market for commercial property there has been a (positive) impact of the creation of the Single Market. The market as a whole is easier to identify and easier to reach as the market participants have started to think and act more internationally. This has resulted in the formation of informal groups and the exchange of information. In the market for residential property there has been no impact at all. The mutual recognition of diplomas, the related differences in level of education and the differences in requirement for obtaining licenses are barriers which have to be removed with high priority. The existing directive on the mutual recognition of diplomas seems to be applied only in one or two countries. Another priority concerns the 'timesharing'-directive. In this respect, the policy concerning transborder operations still needs to be clarified.

**Table 9: Real estate**  
**Total annual net lending against mortgage (1)**

(million ECU)	Residential and commercial property		Residential property	
	1992	1993	1992	1993
Belgique/België (2)	3 077	2 767	2 380	2 125
Danmark (3, 4)	384	18 884	N/A	N/A
BR Deutschland (6)	54 398	90 555	37 253	66 807
Hellas (5)	N/A	N/A	325	324
España (7)	9 161	10 092	6 814	7 638
France (5)	N/A	N/A	2 760	4 462
Ireland	1 282	1 303	975	1 019
Italia (3)	8 990	6 197	7 602	4 590
Luxembourg	N/A	N/A	N/A	N/A
Nederland	14 506	25 055	11 429	16 688
Portugal (3)	1 750	1 915	1 209	1 640
United Kingdom	N/A	N/A	24 568	21 414
EU	93 548	156 768	95 315	126 707

(1) Net lending is defined as the difference in outstanding loans from one period to the next

(2) The figures are ABCI estimates

(3) European Mortgage Federation members only

(4) Figures refer to difference in outstanding mortgage bonds from one period to the other

(5) Loans for residential property and loans to promoters

(6) Loans for residential property not secured by mortgage

(7) Lending against mortgage in residential property

Source: European Mortgage Federation

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## REGIONAL DISTRIBUTION

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Most real estate activity is concentrated in northern Europe, in an area that is bounded by Paris, London and Frankfurt and includes the Brussels area, the 'Capitals Centre'. This region has more than 30 % of employment in the EU (excluding the new German Länder) and more than 35 % of gross value added in the EU. London and Paris house the largest volume of office space in Europe, with a total surface area of around 32 million m<sup>2</sup>. Other European capitals typically average around 5 to 6 million m<sup>2</sup>.

As manufacturing activity moves increasingly out of the cities, European urban development is to a considerable extent influenced by the existing infrastructure and knowledge related to market services. These historically "locked-in" advantages create a significant element of rigidity in the economic ranking of European cities. London for instance has retained its prime position for financial services because of first-mover advantages (gained mostly to the early liberalisation of markets), and because of the depth of the supporting financial and business services.

However, the opening up of markets, political and infrastructural changes provide all challenges to established patterns. The cities best positioned to prosper in the more competitive environment are those that have attracted unique international functions and that have a critical mass of activity and infrastructure sufficient to support the presence of specialised services needed locally by other activities.

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## REGULATIONS

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The regulatory provisions that affect the real estate profession vary widely from country to country within the EU. Generally speaking, regulatory provisions apply mainly to estate agents. Certain countries - Denmark, Spain, France and Italy - have erected major barriers to entry into the profession; elsewhere, professionals are subject to the provisions of common law.

The abolition of exchange controls in France, Spain and Italy has facilitated greater intra-EU competition. The second banking coordination directive ensures that the remaining obstacles to cross-border activity are eliminated.

With the exception of Greece, Portugal and Denmark, each EU jurisdiction has a professional charter. However, further harmonisation of regulations on an European level will be an ongoing process.

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## OUTLOOK

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The outlook for the real estate industry is one of modest growth, which means that in the medium term, the current downturn will be reversed into a moderate upturn. In the medium term, growth in the real estate sector will pick up, but will not achieve the high growth rates of the 1980s. This outlook is based mainly on the anticipation of a slow recovery of general economic conditions. Moreover, growth will differ strongly between cities. There will be marked differences between central business districts (CBD) and outlying areas; for the latter, development prospects appear less promising.

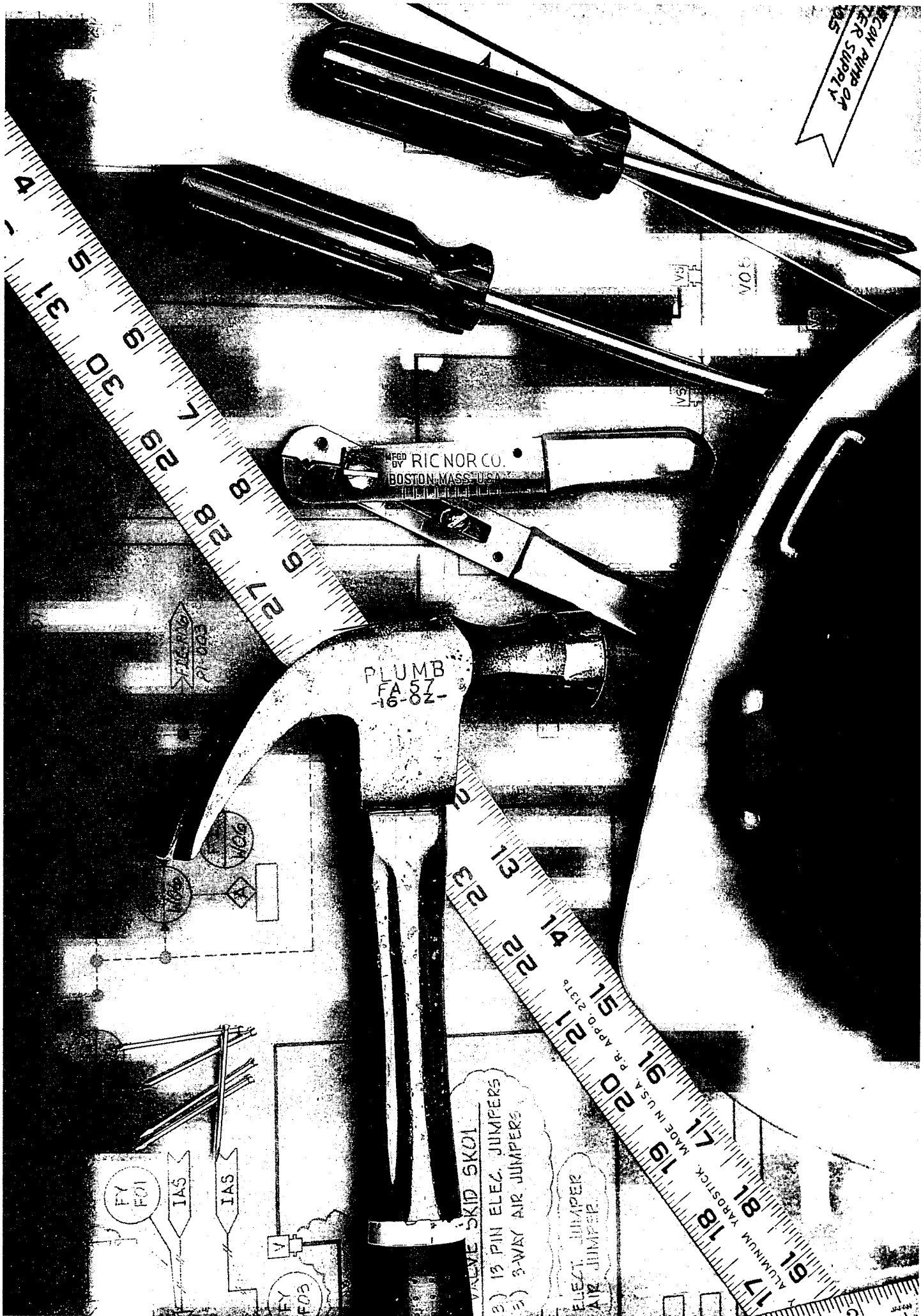
Furthermore, one of the promising investment areas will be retail property, worldwide. In the 1980s, most cross-border investors concentrated on offices, which have been badly hit during the 1990s cool-down. Retail property - especially shopping centres - has shown better defensive qualities and is expected to lead offices and industrial property out of recession.

There can be identified four major longer term trends which offer good performance prospects. First, out-of-town retailing and shopping centres will grow in importance in several countries. Second, Eastern Europe will continue to develop and markets which allow access to the east will benefit. Third, high quality central business district (CBD) offices and shops in prime locations should recover as economies resume growth. And fourth, the relevance of "lifestyle" employment will increasingly influence corporate location decisions and, as working populations decline, will boost areas which can attract employees.

Written by: Netherlands Economic Institute

The industry is represented at the EU level by: European Mortgage Federation (EMF). Address: Avenue de la Joyeuse Entrée 14, Bte 2, B-1040 Brussels; tel: (32 2) 230 2551; fax: (32 2) 230 6411; and Fédération Internationale des Professions Immobilières (FIABCI). Address: 23 avenue Bosquet, F-75007 Paris; tel (33 1) 45 50 45 49; fax: (33 1) 45 50 42 00.

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**Overview**

*Business services experienced considerable growth and development throughout the eighties. The market has been powered by greater awareness of the benefits from increased externalisation of certain activities. The recent slump in economic activity has, however, slowed down growth in a number of business services and even resulted in loss of turnover in some subsectors. In general though, the business services sector appears to be less vulnerable to economic downturns than the services sector as a whole. Prospects for the sector are rosy. As customers progressively recover from the economic downturn, performances are likely to strengthen over the coming years.*

**INDUSTRY PROFILE**

**Description of the sector**

The business services sector comprises a number of heterogeneous activities engineered by specialised companies, aimed at assisting customers in order to increase efficiency, productivity and competitiveness. The sector, classified on the basis of the function performed on account of the client company, includes the following subsectors:

- management and administration services (legal services, accountancy services, management consultancy, etc.);
- production services (architecture, engineering, operational leasing, repair and maintenance, packaging, quality control, etc.);
- research-related services (market research);
- personnel-related services (vocational training, labour recruitment, supply of temporary labour, etc.);
- information and communications services (software and computer services, advanced telecommunications services, data banks, etc.);
- marketing services (advertising, direct marketing and public relations); and
- operational services (industrial cleaning, security services, linguistic services, etc.)

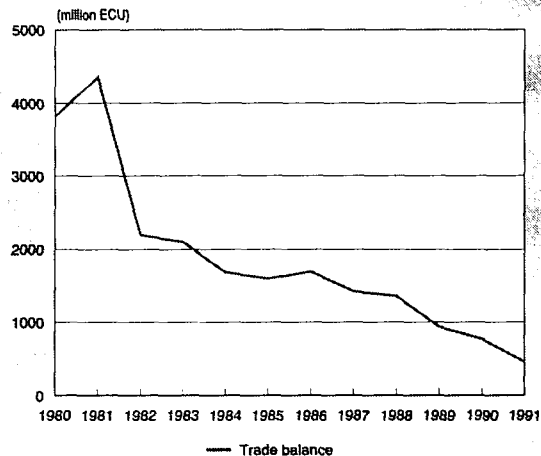
**Recent trends**

The business services sector employs over 7 million persons, which is well above 5 % of total EU employment. The Netherlands has the highest share of persons employed in business services; nearly 7.5 % of total employment.

The business services sector was amongst the fastest growing sectors of the economy throughout the eighties. The economic recession which hit the EU during 1991 to the beginning of 1994 translated, for most subsectors, only into slower growth of business services activity. This was an outstanding performance which illustrates the relative insensitivity of some of the business services sectors to economic downturns. Significant growth was the result of increasing externalisation of these types of activities, coupled with the introduction of important innovations in service management. But, the major factor that generated such growth was the strong demand for these services, sustained by the expansion of economic activity.

Moreover, unfavourable market conditions have led industrial or financial organisations to get rid of in-house services and non-core activities, such as economic services, legal or mar-

**Figure 1: Business services**  
**External trade balance at current prices (1)**

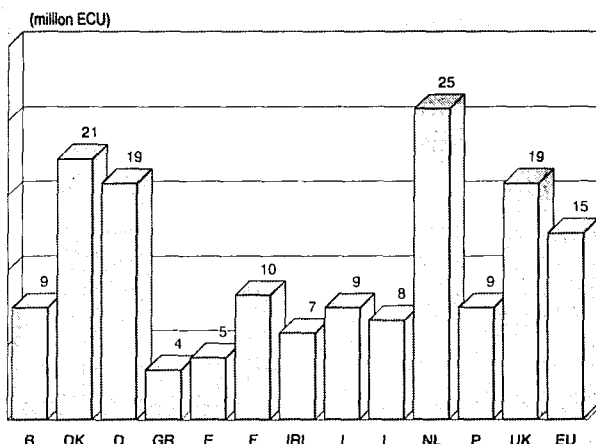


(1) Extra-EU exports less imports. Estimates based on balance of payments.  
Source: Eurostat: International trade in services

keting services, and to use professional consultants instead. This occurred particularly in 1992 and 1993, when companies were in the throes of a financial turmoil. Interestingly, dismissal from industrial or financial companies led some people to either join existing business services firms or to establish their own company. This phenomenon has counted among the factors underlying the increasing externalisation of business services.

A case for concern is the considerable decrease of the trade surplus over the years: from 3.8 million ECU in 1980 to 0.4 million ECU in 1991. The emerging global market, the sector's dynamism and freedom of geographic location, facilitated by advanced information technologies, may well account for this phenomenon.

**Figure 2: Business services**  
**Share of part-time workers in total employment, 1992 (1)**



(1) Including also auxiliary activities to financial services  
Source: Eurostat: Labour force survey



**Table 1: Business services**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	88 178	22 178	(4) 190 790
Danmark	21 621	(2) 10 995	(2) 127 872
BR Deutschland	(2) 308870	(2) 130285	(4) 1 207 295
España (2)	85 086	N/A	458 540
France (3)	251 877	136 334	1 698 988
Ireland (1)	6 440	N/A	38 029
Luxembourg	2 270	N/A	9 445

(1) 1988

(2) 1990

(3) Excluding renting, leasing and hiring of other means of transport without driver

(4) Number of employees

Source: Eurostat; Mercure

## MARKET FORCES

The business services sector has been relatively sheltered from the economic downturn. Despite the poor financial position of the sector's customers, the business services industry reported continued growth of employment, albeit at a slower pace. Outstanding performance can be explained by the need for customer companies to meet such challenges as new technologies, emerging or plummeting markets, or new regulatory environments. Determination to maximise competitiveness under changing and difficult business conditions has obliged firms to increasingly externalise functions requiring new or specialised skills that they either cannot afford or do not want to acquire for their own premises.

Furthermore, the economic downturn has led a significant number of industrial and financial organisations to try and find new forms of production organisation or production processes, in order to get out of the turmoil. This translates into increasing demand for business services aimed at supporting their client's activity.

## INDUSTRY STRUCTURE

The business services sector is characterised by considerable fragmentation and intense competition. The sector is composed of a large network of small companies, a size which gives them the flexibility, quality and specialisation necessary to perform their businesses. However, in activities where economies of scale are important, companies are usually larger. Overall, the sector counts a limited number of large, often multinational, firms. Consulting engineering, accountancy, market research, testing, inspection, quality control and some operational services are subsectors of the business services

industry where larger firms (i.e. companies with more than 50 employees) can be found.

## REGIONAL DISTRIBUTION

As far as marketing or research services are concerned, location of offices does not necessarily depend upon demand. Furthermore, the development of information technologies gives companies, active in these businesses, increased flexibility and freedom in the location of their offices. Consequently, these companies are often found in large urbanised areas; particularly around national capitals.

In contrast, for operational, production, labour-related, management and administration services, it is a real advantage (sometimes even mandatory) to have offices in the places where high demand is expected. For example, vocational training is typically an activity highly correlated with population distribution and economic activity. This service is, consequently, quite evenly spread over the EU; although, a bigger concentration is observed in urbanised and more industrialised areas.

The major European economies are the largest employers in the EU's business services sector. Germany and the United Kingdom lead with approximately 1.7 million persons employed, while France and Italy follow with approximately 1.4 and 0.9 million, respectively. The average share of part-time workers in business services amounts to nearly 15 % in the EU. The largest shares of part-timers are to be found in The Netherlands (24.7 %), Denmark (20.9 %), and Germany and the United Kingdom (both 18.5 %). The share of female workers in business services ranges from 36 % in

**Table 2: Business services**  
**Number of employees**

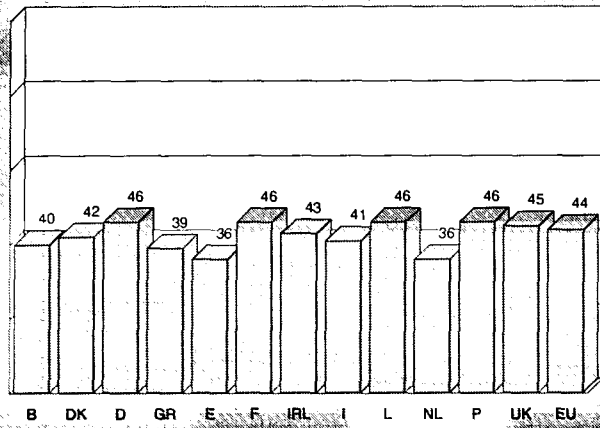
(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	N/A	N/A	117 097	128 872	151 461	171 157	184 305	190 790
BR Deutschland	N/A	792 455	825 109	883 730	935 503	999 093	1 096 042	1 207 295
France (1)	N/A	N/A	894 145	959 668	1 118 539	1 314 815	1 386 796	1 426 996
Ireland	N/A	N/A	N/A	N/A	32 711	N/A	N/A	N/A
Luxembourg	3 138	4 141	4 569	5 116	5 679	6 550	7 385	8 576

(1) Excluding renting, leasing and hiring of other means of transport without driver

Source: Eurostat; Mercure



**Figure 3: Business services**  
**Share of female workers in total employment, 1992 (1)**



(1) Including also auxiliary activities to financial services  
 Source: Eurostat: Labour force survey

Spain to 46.3 % in France, against an average of 43.5 % for all Member States.

Along with differences in the size of the workforce, there are considerable differences in market growth between Member States. Variations mainly reflect the diversity of industrial market organisations that can be observed in the different Member States. In this regard, the EU's southern countries have posted more rapid expansion in the second half of the eighties than the Big Four economies, in line with the process of integration of these economies in to the European Union.

## OUTLOOK

In the future, quality of service will constitute a key asset for companies to increase their market positioning.

For the time being, strategic alliances and mergers and acquisitions involving companies from different Member States are not very numerous. However, an acceleration of this concentration is foreseeable, thanks to the increased integration of the EU's business services practices, and the facilitation of the movement of services through the development of international communication and information networks.

As customers of the business services sector progressively recover from the economic downturn, performance in the sector over the coming years is likely to strengthen, leading to a further increase in employment.

Written by: Bakkenist Management Consultants

# Advertising and direct marketing

NACE 838

*Due to the recent recession in most EU countries, the total expenditure on advertising and direct marketing for 1993 was only marginally higher than in 1992. The turnover of advertising actually showed a decrease, although this was compensated for by a considerable increase in expenditure on direct marketing. Advertising agencies are expanding into direct marketing because it is regarded as a business sector with a greater potential for growth than general advertising. The value of direct marketing has been recognised for longer in the United States than in Europe. Hence, it has reached higher levels of sophistication there. On average, it is estimated that the US is ten years ahead in terms of direct marketing innovation. Thus, a high degree of technological development can be expected in this sector.*

*Due to the positive outlook for the European economies, the expenditure on advertising and direct marketing will increase. Consequently, the agencies will keep their turnover at a high level. Competition between agencies will become tougher and the investment in information technology (IT) will increase the costs of many agencies. Therefore, an increasing degree of specialisation is expected.*

## INDUSTRY PROFILE

### Description of the sector

Advertising and direct marketing is classified under section 838 of NACE, called advertising. The turnover of the sector was approximately 75.5 billion ECU in 1993, making it one of the most important service sectors in Europe. Also in 1993, advertising accounted for 61 % of turnover, direct marketing for 39 %. Both professions have one thing in common: an ability to deliver vital information effectively. The sector is engaged in communications services that promote ideas, goods and services.

### Advertising

Advertising is the main form of mass selling. It tries to communicate with a large number of customers simultaneously. Mass selling is less flexible than personal selling, but when

the target market is large and dispersed, mass selling may be less expensive. Advertising is any paid form of a non-personal presentation of ideas, goods or services by an identified marketer. It involves the use of such media as television, radio, cinema, newspapers, periodicals and outdoor posters and billboards. In 1993, newspapers and magazines took up approximately 56 % of the total advertising expenditure, with television accounting for 33.5 %, and radio/cinema and outdoor advertising making up the remaining 10.5 %.

Europe counted almost 160 television channels in 1993, of which six reached more than ten countries: Eurosport, MTV, TV5, CNN, Euronews and NBC. Compared to 1980 figures, the number of television channels had more than doubled. There are almost 7 000 commercial radio stations, 19 000 cinema screens and 2 000 000 outdoor billboards in Europe. France, Germany and Italy have the highest number of cinema screens and billboards. Along with Spain, Italy has one of the highest numbers of commercial radio stations as well.

Some major pan-European publications (with a circulation of more than 150 000 copies) are: the Financial Times, the International Herald Tribune, The European, The Economist, Newsweek, Time and National Geographic. In-flight magazines are considered an important pan-European medium also. The in-flight magazines with the highest circulation (more than 200 000 copies) are: Bordbuch (Lufthansa), Swissair Gazette (Swissair), Atlas (Air France), Motion (Olympic), High-life (British Airways), Ronda (Iberia) and the Holland Herald (KLM).

### Direct marketing

Direct marketing is a series of different marketing techniques which use a number of different media to allow direct contact between an organisation and an individual consumer or company, in order to achieve the maximum response. Most definitions of direct marketing encompass four areas: direct mail (mail order catalogues, addressed, un-addressed and bulk mail); direct response advertising in the printed press and broadcasting, including teleshopping systems and other mass media (cinema, outdoor and transport); marketing by telecommunications (telephone or fax); and interactive communications, e.g. videotext. One of the main perceived benefits of direct marketing is its accountability, but as it becomes more widely accepted and integrated into the mainstream activities of advertising and marketing, it has to compete on other grounds as well. For example, direct marketing is increasingly being asked to improve brand awareness. Direct marketing has always been a readily quantifiable form of pro-

**Table 1: Advertising and direct marketing**  
Main indicators, 1991

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	8 711	2 862	(4) 9 927
Danmark	2 215	1 229	9 500
BR Deutschland	(2) 30 631	(2) 14 866	(4) 74 219
España (2)	2 818	N/A	20 295
France	16 814	17 030	126 019
Ireland (1)	156	N/A	1 992
Luxembourg	133	(2) 51	536
Nederland	6 715	3 302	23 600
United Kingdom (3)	10 487	N/A	N/A

(1) 1988

(2) 1990

(3) Including market research

(4) Number of employees

Source: Eurostat; Mercure

**Table 2: Advertising and direct marketing  
Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	4 108	5 149	5 766	6 487	8 071	8 584	9 208	9 927
Danmark	N/A	7 088	7 895	8 601	8 834	8 787	8 730	N/A
BR Deutschland	41 790	46 990	49 378	54 096	58 602	62 489	68 290	74 219
France	N/A	64 220	70 395	82 726	91 006	108 127	102 699	109 262
Ireland	N/A	N/A	N/A	N/A	1 947	N/A	N/A	N/A
Luxembourg	200	225	210	231	296	455	386	485
Nederland	N/A	N/A	N/A	N/A	12 600	13 600	16 700	16 700

Source: Eurostat; Mercure

motion. Be it direct mail or telemarketing, response rates can be measured and segmented by age group, socio-economic group, region, etc. But when combined with above-the-line advertising, direct marketing becomes an even more powerful tool. Direct mail accounted for approximately 52 % of the total expenditure on direct marketing in 1993, with direct response advertising for 32 % and telemarketing for 16 %.

### Recent trends

Due to the recent recession in most EU countries, the total expenditure on advertising and direct marketing for 1993 was only marginally higher than 1992 (i.e. less than 1 % higher). The total expenditure on advertising and direct marketing was around 75 billion ECU in both 1992 and 1993. In 1992, advertising accounted for approximately 64 % of the total expenditure, while in 1993 the share of advertising accounted only for 61 % of the total expenditure. The turnover of advertising also showed a decrease of almost 6.5 % (48.7 billion ECU in 1992 down to 45.5 billion ECU in 1993). Despite the recession, the turnover of direct marketing increased almost 12 % in 1993 over 1992 (26.7 billion ECU in 1992 to 30 billion ECU in 1993).

### Advertising

Advertising agencies define turnover or 'billings' in terms of the amount of money they spend with the media on their client's behalf. Normally, the gross earnings are fixed as 15 % of turnover. The mass media with the highest billings by advertising agencies are newspapers and television. Both media together account for more than two-thirds of the total adver-

tising expenditure. In 1993, the printed press accounted for approximately 56 % of the total advertising expenditure, television for 33.5 %, with radio/cinema and outdoor making up the remaining 10.5 %. The average expenditure on advertising in the EU is 131 ECU per capita. Spain, Denmark and Germany have the highest per capita expenditure, at more than 150 ECU.

Television is the only sector to expand its share of total advertising expenditure in all mass media since 1990. Over the last ten years, there has been a massive expansion of choice in television viewing in almost every country in Europe. This expansion was due to the development of communication satellites, and consisted mainly of new commercial stations, financed by advertising. When new channels are launched, viewing often increases, because the new channels frequently broadcast for longer hours. Therefore, competition tends to increase the total audience in underdeveloped markets, but it has very little effect on saturated markets. Further competition in countries such as the UK, France and Italy has led to the fragmentation of existing audiences, rather than an increase in them. Television is generally not competitive with other media for more than a very small proportion of its revenue, as each media serves a different purpose for the advertiser.

Roughly ten to fifteen per cent of the total workforce is self-employed. Usually they are photographers, illustrators, designers, copywriters and translators. Average wages are higher in advertising than in direct marketing because more specialised people work in advertising.

**Table 3: Advertising and direct marketing  
Advertising expenditure at current prices**

(million ECU)	1980	1981	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/ België/Luxembourg	405	400	441	484	538	668	726	806	863	917	1 029	1 105
Danmark	365	428	496	550	610	685	758	782	861	807	779	791
BR Deutschland	4 386	5 334	6 352	7 170	7 772	8 415	9 060	9 876	10 722	12 174	13 518	12 939
Hellas	73	105	119	122	136	156	205	257	330	387	564	642
España	833	974	1 392	1 647	2 039	2 571	3 353	4 403	5 309	6 415	7 777	6 908
France	2 273	2 857	3 469	3 965	4 539	5 160	5 871	6 626	7 331	7 040	7 135	7 498
Ireland	92	137	142	165	203	244	272	323	356	364	405	413
Italia	1 036	1 446	2 411	2 620	3 153	3 789	4 278	4 825	5 273	5 589	5 871	5 107
Nederland	1 232	1 157	1 917	1 927	2 016	2 073	2 072	2 072	2 092	2 171	2 305	2 233
Portugal	38	59	63	76	94	140	195	254	317	412	539	533
United Kingdom	4 269	5 024	6 085	6 665	6 378	7 287	8 997	9 909	9 282	8 988	8 822	7 388
EU	15 002	17 921	22 887	25 391	27 478	31 188	35 787	40 133	42 736	45 264	48 744	45 557
USA	25 494	35 625	66 534	73 493	61 008	55 330	57 708	65 005	57 639	56 696	56 303	65 424
Japan	5 529	8 477	11 833	13 619	15 406	16 506	20 487	22 970	20 716	23 424	22 683	26 601

Source: EAAA



**Table 4: Advertising and direct marketing**  
Final adjusted total expenditure in direct marketing, 1992

(million ECU)	Mailings	Direct advertising	Telemarketing/ others	Total
Belgique/België/Luxembourg	200	190	50	440
Danmark	630	100	80	810
BR Deutschland	5 190	3 170	1 440	9 800
Hellas	10	60	10	80
España	480	1 170	40	1 690
France	3 500	410	1 080	4 990
Ireland	20	40	10	70
Italia	1 320	1 370	190	2 880
Nederland	1 260	310	1 010	2 580
Portugal	10	60	10	80
United Kingdom	1 350	1 850	140	3 340
EU	13 970	8 730	4 060	26 760

Source: EDMA

### Direct marketing

Direct marketing is a large industry, which contributes a significant amount to the total marketing expenditure. Where comparisons can be made with earlier years, the direct marketing business appears to be becoming increasingly important, even in spite of the recession.

Direct marketing is traditionally less expensive than mass media advertising because creative and production costs are lower. The importance of direct marketing also will increase as its customers have access to new electronic media such as E-mail, teletext, Minitel and other telecommunications systems.

About 52 % of the total expenditure is accounted for by traditional direct mail, and 32 % by direct advertising in mass media and specialist media which generate responses through the return of coupons or telephone orders. The average annual growth rate of direct mail since 1981 across Europe is calculated at 7 %. France, the UK, the Netherlands, Belgium, Spain and Denmark all have achieved growth rates in excess of the average. On the other hand, the largest market, Germany, has experienced a below-average growth. Telemarketing, by telephone or by electronic media, accounts for 16 % of the total expenditure but its proportion is growing.

The expenditure on direct marketing in the EU is 87 ECU per capita on average. Denmark, the Netherlands and Germany

have the highest expenditure per capita, above 135 ECU. Expenditure per capita on direct marketing in 1993 was 66 % that of advertising. In 1992 this was 56 %. It should be noted that direct response advertising in the mass media (broadcasting, press, etc.) is counted twice (i.e. calculated for both direct marketing and for general advertising). An increasing volume of direct marketing is included in the marketing sector, where direct marketing is replacing the more expensive form of promotion by salespeople.

### International comparison

Since 1981, the EU narrowed the gap between its advertising investment and that of the United States. In that year, EU advertising was only 50 % of US expenditure for advertising. In 1992, the EU was able to reach 85 % of US expenditure, but EU expenditure in 1993 dropped to 69 % of US expenditure in 1993. The largest medium in the US in 1993 was newspapers, with 40 % share of total expenditure. Television had been the most important medium in 1992.

Japan saw a four-fold increase from 1981 to 1991. After a little dip in 1992, expenditure on advertising increased to almost 17 % in 1993. Japan's most important mass medium is still television, which accounts for about 40 % of the total advertising expenditure.

**Table 5: Advertising and direct marketing**  
Advertising expenditure per capital

(ECU)	1980	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/ België/Luxembourg	36.4	43.2	47.4	52.6	64.5	70.5	78.1	83.4	88.2	97.6	105.6
Danmark	71.8	97.0	107.5	119.2	133.2	147.8	152.4	167.6	156.7	149.6	152.6
BR Deutschland	79.4	103.8	117.5	127.3	133.0	147.4	159.1	169.5	152.2	166.1	159.3
Hellas	6.4	12.0	12.3	13.6	15.4	20.5	25.6	32.6	37.9	54.9	62.0
España	19.7	36.3	42.8	52.8	66.0	86.4	113.2	136.3	164.9	198.0	176.8
France	41.5	63.0	71.7	81.7	90.9	104.6	117.4	129.2	123.4	123.6	130.0
Ireland	37.8	40.2	46.6	57.4	69.6	76.9	91.9	101.7	103.4	113.8	115.9
Italia	17.5	42.6	46.2	55.6	66.8	75.5	85.1	92.9	98.5	103.3	89.5
Nederland	73.7	132.9	133.0	138.4	138.7	140.4	139.5	140.0	144.1	151.2	146.0
Portugal	3.8	6.7	8.1	10.0	14.9	20.7	27.0	33.8	44.1	57.6	57.0
United Kingdom	68.0	107.8	117.7	112.4	126.9	157.7	173.1	161.7	155.9	151.6	127.3
EU	46.2	71.5	79.2	85.5	95.5	110.7	123.7	130.9	131.6	141.0	131.2
USA	102.5	280.7	309.1	252.5	221.4	234.3	261.3	230.6	224.4	220.8	253.8
Japan	47.3	98.6	112.8	126.8	133.6	167.1	186.6	167.7	189.0	182.4	213.4

Source: EAAA



**Table 6: Advertising and direct marketing  
Comparison of expenditure per capita, 1993**

(current prices, ECU)	Advertising	Direct marketing (1)
Belgique/België/Luxembourg	105.6	44
Danmark	152.6	156
BR Deutschland	159.3	123
Hellas	62.0	7
España	176.8	43
France	130.0	88
Ireland	115.9	19
Italia	89.5	50
Nederland	146.0	171
Portugal	57.0	8
United Kingdom	127.3	58
EU	131.2	78
USA	253.8	N/A
Japan	213.4	N/A

(1) 1992

Source: EAAA, EDMA

In relation to GDP, Japan has a smaller advertising expenditure than the United States and Europe. However, in relation to the expenditure per capita, Japan's advertising expenditure is larger than Europe's.

Germany still held the first rank in total advertising expenditure for Europe in 1993, followed by France, the United Kingdom and Spain. Concerning the expenditure per capita, Spain is in first place. It is important to note that the importance of mass media varies enormously across Europe. Newspapers are by far the most important medium in Denmark and Ireland; while television dominates in Spain and Greece. The ranking of direct marketing expenditure per capita is led by the Netherlands and Denmark.

The value of direct marketing has been recognised for longer in the United States than in Europe and hence has reached higher levels of sophistication there. On average, it is estimated that the US is ten years ahead in terms of direct marketing innovation. Direct response television is extensively used in the US and has developed into the so-called infomercial. Infomercials are basically extended advertisements, commonly lasting as long as 30 minutes. They are one of the fastest growing television advertising sectors in the US.

**Table 7: Advertising and direct marketing  
Advertising expenditure as share of GDP (at market prices)**

(%)	1980	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/ België/Luxembourg	0.48	0.28	0.44	0.45	0.53	0.54	0.55	0.55	0.55	0.58	0.60
Danmark	0.95	0.71	0.72	0.73	0.77	0.82	0.82	0.85	0.77	0.71	0.69
BR Deutschland	0.88	0.81	0.88	0.86	0.88	0.90	0.92	0.91	0.89	0.89	0.81
Hellas	0.30	0.28	0.28	0.34	0.39	0.45	0.52	0.63	0.68	0.94	1.02
España	0.63	0.69	0.75	0.87	1.01	1.15	1.27	1.37	1.50	1.74	1.69
France	0.48	0.55	0.57	0.61	0.67	0.72	0.76	0.78	0.73	0.69	0.70
Ireland	0.78	0.60	0.63	0.76	0.90	0.93	1.00	1.01	1.00	1.04	1.05
Italia	0.37	0.46	0.47	0.51	0.58	0.60	0.61	0.61	0.60	0.62	0.60
Nederland	1.01	1.19	1.14	1.11	1.10	1.07	1.00	0.94	0.93	0.93	0.85
Portugal	0.22	0.26	0.28	0.31	0.44	0.55	0.62	0.67	0.74	0.83	0.83
United Kingdom	1.11	1.11	1.10	1.12	1.22	1.27	1.30	1.21	1.10	1.09	0.92
EU	0.73	0.72	0.76	0.77	0.83	0.88	0.91	0.90	0.88	0.92	0.86
USA	1.32	1.39	1.40	1.42	1.42	1.41	1.38	1.34	1.25	1.23	1.23
Japan	0.73	0.74	0.77	0.76	0.79	0.84	0.88	0.90	0.87	0.80	0.73

Source: EAAA

## MARKET FORCES

### Demand

#### Advertising

The major products advertised are consumer products of both the food and non-food sectors. The most important are: alcoholic beverages, food and drink, baby care products, cosmetics, pharmaceuticals, tobacco products, sanitary products, toiletry goods, motor vehicles and car accessories, and financial services.

Very few large international companies run their own advertising department. Instead, most use advertising agencies. Multinational companies prefer working with advertising agencies with offices in all key markets. Advertising also plays an important role in promoting retail outlets. Although small and medium-sized companies often cannot afford organised advertising campaigns, the increase of local television and radio stations should induce more local advertising campaigns by these companies.

#### Direct marketing

Direct marketing helps promote customer loyalty and supports sales activities. Direct marketing is extremely popular for local companies, and allows local retailers, service providers and producers to contact consumers directly by means of addressed, un-addressed and bulk mail, free newspapers, local television, radio and cable systems, or by telephone marketing. Direct marketing is designed by either advertising agencies, specialised direct marketing agencies or is done in-house by the advertiser. Most telephone marketing is done in-house, although the use of telemarketing agencies is increasing, as a number of agencies now offer creative services to companies wishing to launch a telemarketing campaign. This occasionally extends to designing and printing support materials, but more often will include a liaison with an advertising agency and script writer. Telemarketing agencies are also offering inbound as well as outbound telephone systems (i.e. the taking of orders from direct response advertisements), which has increased their appeal.

According to a recent survey, 70 % of all printed press advertising now carries a direct response mechanism, and the proportion of direct response television commercials is increasing. So far, the main users of direct response television advertising have been services, charities and travel agencies, but the next area of growth is predicted to come from FMCG, toiletries and cosmetic companies.

**Table 8: Advertising and direct marketing  
Distribution of total advertising expenditure by media, 1993**

(%)	Printed Newspaper	Press/ Magazines	TV	Radio	Cinema	Outdoor	Total
Belgique/België/Luxembourg	27.7	28.2	27.5	7.5	1.1	8.1	100.0
Danmark	63.2	14.2	18.1	1.6	0.7	2.2	100.0
BR Deutschland	51.2	21.0	19.1	4.0	1.0	3.7	100.0
Hellas	14.2	16.0	61.5	5.3	N/A	3.1	100.0
España	29.7	8.9	51.1	6.2	0.7	3.3	100.0
France	24.3	23.7	32.4	7.1	0.6	11.8	100.0
Ireland	63.6	3.9	21.2	7.0	0.4	3.9	100.0
Italia	27.1	21.3	47.5	1.3	N/A	2.8	100.0
Nederland	45.4	21.1	16.9	3.5	0.4	12.7	100.0
Portugal	18.2	18.7	49.3	6.1	N/A	7.7	100.0
United Kingdom	33.6	20.5	38.5	2.8	0.7	3.9	100.0
EU	36.5	19.4	33.5	4.4	0.7	5.5	100.0
USA	39.7	13.2	34.7	11.2	N/A	1.1	100.0
Japan	30.5	9.2	39.9	5.6	N/A	14.8	100.0

Source: EAAA

### Supply and competition

No regulatory barriers exist to starting an advertising or direct marketing agency in Europe. Newcomers face difficulties entering the market, however, since client loyalty is quite common in this business. Consequently, the market is dominated by large, well-established agencies. International companies mainly choose a single agency which has offices in various countries.

Unlike other mass media, television is still tightly regulated in almost every country, and the ways in which the governments do this affects the amount of advertising carried. As a result, television expenditure is still more closely linked to advertising exposure - defined as the advertising time allowed on each channel multiplied by its audience - than it is to GDP. The potential for pan-European direct marketing is increasingly recognised, at least for major brands. The majority of direct marketing agencies, however, have neither the personnel nor the networks necessary to exploit this potential. Therefore, it is likely that the major agencies will increase their share of direct marketing business if demand for a pan-European service becomes evident. Data protection, sales taxes (VAT), the quality of postal services and other national rules have retarded the use of the single market.

International competition between direct marketers is determined by differences in standards and costs (especially labour costs) between the various countries. However, direct mail can not exploit the benefits of low product costs for high volume printing, or lower postal tariffs offered by some countries due to strict rules on remail imposed by national postal monopolies. This has reduced the potential for freight and courier companies to enter the delivery market for direct mail.

This trend is expected to become more restrictive over the next five years.

### Production process

Direct marketing depends on databases, which are becoming increasingly sophisticated in their ability to target and to create a dialogue with the customer. Direct marketing agencies, including list brokers and telemarketers, can build and update client databases, offer database management services, cleaning, updating and re-formatting. It is expected that direct marketing will become a major source of financing for the information super-highways.

## INDUSTRY STRUCTURE

### Companies

The sector is dominated by large advertising companies, which include direct marketing services. Within Europe, 16 agencies have more than 1 500 employees. All of them are working on an international level.

Advertising agencies are effectively divided into two types:

- large, multinational agencies and agency groups;
- small to medium-sized agencies mainly operating in domestic markets.

Both groups are represented in the European Association of Advertising Agencies (EAAA). The aggregate membership represents about 1 800 agencies, which place about 80 % of all media advertising and a very high percentage of all marketing communications in Europe.

**Table 9: Advertising and direct marketing  
European advertising expenditure by medium**

(million ECU)	1980	1990	1991	1992	1993
Newspapers	6 531	17 588	17 781	17 839	17 019
Magazines	4 020	9 714	9 350	9 167	8 172
TV	2 662	10 875	11 567	13 043	13 987
Radio	690	1 962	1 927	1 989	1 926
Cinema	153	288	285	288	293
Outdoor/Transport	945	2 342	2 403	2 429	2 312

Source: EAAA

**Table 10: Advertising and direct marketing  
Top 20 advertising agencies by billings in the EU, 1993**

Rank	Agency	Billings (million ECU)
1	Euro RSCG	4 102.48
2	Publicis*FCB	3 197.27
3	BBDO	2 555.08
4	McCann - Erickson	2 368.06
5	Ogilvy & Mather	2 339.03
6	DDB Needham	2 220.32
7	Bates Europe	2 134.93
8	Grey International	2 081.13
9	Saatchi & Saatchi Advertising	2 076.00
10	Young & Rubicam	2 053.80
11	J. Walker Thompson	1 979.50
12	Lintas Europe	1 774.55
13	DMB&B	1 534.59
14	The Lowe Group	1 388.56
15	BDDP	953.89
16	Leo Burnett	827.50
17	GGK/GGT	678.91
18	TBWA	634.50
19	Testa International	623.40
20	Conquest Europe	311.70

Source: EAAA, Campaign

Since 1992 there has been a slight change in the ranking of the top five agencies. Young and Rubicam dropped from fourth to sixth place and BBDO (UK) rose to the fourth position, up from twelfth. The top 20 European agencies are still headed by Euro RSCG (F), followed by Publicis FCB (F) and McCann Erickson (UK).

### Strategies

Advertising agencies are increasingly expanding into direct marketing because it is regarded as a business sector with a higher potential for growth than advertising. This notwith-

standing, the spectacular growth which the direct marketing industry has experienced over the past ten years is now predicted to slow down. This is likely to force direct marketing agencies to expand their range of skills and services offered on the one hand, while increasing their degree of specialisation in serving a particular industry on the other. And, with respect to technological development, a high degree of innovation can be expected in the field of direct marketing (e.g. interactive media and automated response).

### REGULATIONS

Regulations have an important effect on advertising and direct marketing, and vary from country to country. As recently as five years ago, there were only four countries in Europe with any kind of competition in television airtime sales; and large parts of northern and eastern Europe had no TV advertising at all. By 1994, this situation had changed considerably. Advertising is now legal everywhere, yet a monopoly is still maintained by only four countries: Ireland, Finland, Austria and Switzerland.

At present, European directives exist on misleading advertising, pharmaceuticals, baby foods and tobacco advertising. There are also rules on various other product sectors, often related to labelling. Other notable EU regulations include credit, public procurement, copyright, broadcasting, product safety, product liability, etc. Meanwhile, directives concerning data protection and distance selling, environmental packaging waste, postal services and database protection will provide a major contribution towards harmonising the legislative environment in which direct marketing takes place.

The Commission is currently preparing a Green Paper on commercial communications (due in June 1995). This Green Paper seeks to examine the whole area of marketing communications in terms of their key role in the Internal Market. It will be the basis for a more co-ordinated Commission policy approach in this field. The Commission ran a survey asking operators to identify the key regulatory barriers that they faced when planning, designing and undertaking transborder campaigns. The result of this survey will form an integral part of the Green Paper.

**Table 11: Advertising and direct marketing  
Europe's top advertising agency networks, 1993**

Rank	Agency (million ECU)	Gross income of employees	Number
1	Euro RSCG	584.12	5275
2	Publicis*FCB	478.22	3 500
3	McCann - Erickson	355.25	3 225
4	BBDO	325.36	2 237
5	DDB Needham	311.70	2 200
6	Young & Rubicam	309.14	2 100
7	Grey International	304.87	3 053
8	Ogilvy & Mather	292.06	2 250
9	Saatchi & Saatchi Advertising	285.23	1 952
10	Bates Europe	281.81	2 250
11	J. Walker Thompson	276.69	1 725
12	Lintas Europe	266.44	2 300
13	DMB&B	208.37	2 055
14	The Lowe Group	203.25	1 330
15	BDDP	172.50	1 600
16	Leo Burnett	N/A	1 500
17	TBWA	90.52	610
18	GGK/GGT	81.13	906
19	Testa International	74.38	700
20	Conquest Europe	34.59	248

Source: EAAA, Campaign



## Impact of the Single Market

The effects of the Single Market have been positive for the advertising industry. It has resulted in the development of new markets and consumer demand for information concerning products and services available in other Member States. However, the industry is experiencing certain difficulties due to a number of economic and regulatory issues, as well as barriers preventing free competition.

The further development of a single currency and harmonisation of the level and manner of taxation of advertising currently form the most important economic priorities. Within the existing regulatory framework, considerable differences exist between Member States regarding advertising for alcohol, tobacco and pharmaceuticals as well as advertising directed at children. Harmonisation is needed in this respect.

Forms of protectionism of national markets through stringent packaging and labelling standards and the overly dominant position of media companies in a number of Member States, most notably Italy, are considered to be the most important obstacles to free competition within the Union. The industry also experiences the cost of telecommunication, provided by amongst others, national monopolies, as being extremely high.

The Direct Marketing industry perceives the objectives of the Single Market as positive. However, the actual benefits have been negligible. This is proven by the fact that only 3% of the turnover in consumer goods is generated by cross border trade. Trade is hampered by the different forms of cross border payments being used (cash or electronic), difficulties related to exchange rates and the level of the bank charges involved in cross border payments.

The most important barrier to further expansion of the European Direct Marketing industry is formed by the national postal services which have generally employed protectionist measures to safeguard their national markets. Furthermore, different levels of indirect taxation (VAT) in Member States as well as a lack of clarity on VAT exemption inhibits cross border activity.

The outlook for the industry is nevertheless positive, amongst other reasons because of the impending break down of telecommunication monopolies throughout the Union as well as the technical developments in communication.

## OUTLOOK

Due to the positive outlook for the European economies, the expenditure on television advertising is expected to grow. This will have a marginal but positive effect on magazine advertising.

On the other hand, while many of the largest markets in Europe are already broadcasting almost 24 hours a day, many channels will be launched in the coming years which are unlikely to increase overall viewing in these markets. So, television audiences will increasingly become a fixed commodity. If the total audience is fixed, then individual television station audiences must fragment as the number of stations increases. The same trend will be applicable to radio stations.

There is no evidence that the multimedia interactive communication superhighway will have more than a marginal effect on television advertising. Nor is there currently a clear demand for personal scheduling of programmes, or ad-free channels. However, the interactive systems will have a profound effect on direct marketing.

Increased expenditure on advertising and direct marketing will enable agencies to keep their turnover at a high level. Competition will become tougher, and investment in information technology will increase the costs of many agencies, because of the degree of specialisation required.

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The industry is represented at the EU level by: European Association of Advertising Agencies (EAAA). Address: rue St-Quentin 3-5, B-1040 Brussels; tel: (32 2) 280 1603; fax: (32 2) 230 0966;

World Federation of Advertisers. Address: rue des Colonies 18-24 bte 6, B-1000 Brussels; tel: (32 2) 502 5740; fax (32 2) 502 5666;

Federation of European Direct Marketing (FEDIM). Address: Place des Chasseurs Ardennais 20, B-1040 Brussels; tel: (32 2) 735 2252; fax: (32 2) 735 4948;

European Advertising Tripartite. Address: avenue de Tervueren 267, B-1150 Brussels; tel: (32 2) 779 2130; fax: (32 2) 779 8980;

European Mail Order Traders Association. Address: Av. E. Lacomblé 17, B-1040 Brussels.



# Public relations

## NACE 838

Today, a growing number of companies, organisations and public institutions are using public relations as a tool to develop communications towards public opinion or to pursue specific targets related to a company, its products and services.

### INDUSTRY PROFILE

#### Description of the sector

Public relations (PR) tools are used to establish and to develop appropriate relationship systems between an organisation, its products and services and the public opinion, according to the company's targets and with the objective of gaining, main-

taining and developing public confidence, acceptance and satisfaction.

Therefore, public relations are the result of a combination of different elements, such as human sciences applied to individuals; all this takes place in a context which uses communication channels, means and techniques that must involve the public's interest and expectations. The publics to which public relations refer may be identified as follows: journalists, consumers, employees, shareholders, public authorities and civil servants, the local community, suppliers, labour unions, competitors and so forth.

Handling systems of relationships with a wide range of publics implies specialisation tools to be applied in different areas, such as media relations, consumer relations, corporate and internal communications, product advertising, environmental issues, crisis management, house publications and audiovisuals, sponsorships, financial relations, public affairs, community relations, institutional advertising, business to business communications and so on.

**Table 1: Public relations  
Main indicators**

	Number of enterprises (units)			Turnover (million ECU) (2)			Number of consultants employed (units)		
	1991	1992	1993	1991	1992	1993	1991	1992	1993
Belgique/België	105	98	105	18.0	12.2	12.7	195	156	169
Danmark	45	76	81	4.9	7.9	8.9	75	102	113
BR Deutschland	1 140	1 103	1 265	119.5	121.9	144.1	1 220	1 173	1 395
Hellas	35	40	42	1.9	2.0	1.2	45	50	54
España	145	245	260	15.7	20.4	20.1	195	309	330
France	420	593	629	31.9	48.2	48.8	500	713	761
Ireland	45	88	89	11.0	26.5	28.8	85	158	159
Italia	545	421	405	53.3	41.6	45.2	635	571	555
Luxembourg	N/A	15	16	N/A	0.9	1.0	N/A	25	26
Nederland	230	451	475	28.4	54.5	59.5	330	653	665
Portugal	50	50	53	N/A	N/A	N/A	70	70	75
United Kingdom	1 970	1 394	1 660	227.9	152.8	190.4	2 110	1 700	1 980
EU (1)	4 730	4 574	5 080	512.6	489.1	560.8	5 460	5 680	6 282

(1) Excluding Luxembourg 1991

(2) Excluding Portugal 1991-1993

Source: CERP

**Table 2: Public relations  
Number of consultants**

(units)	PR agencies: number of consultants employed			PR firms: number of consultants employed			Number of individual consultants			Total number of PR consultants		
	1991	1992	1993	1991	1992	1993	1991	1992	1993	1991	1992	1993
Belgique/België	135	87	96	60	69	73	25	86	93	220	242	262
Danmark	45	39	48	30	63	65	150	140	127	225	242	240
BR Deutschland	120	105	195	1 100	1 068	1 200	1 630	3 663	4 305	2 850	4 836	5 700
Hellas	20	20	24	25	30	30	15	22	42	60	72	96
España	75	96	105	120	213	225	30	263	300	225	572	630
France	120	180	198	380	533	563	2 875	1 320	1 440	3 375	2 033	2 201
Ireland	60	105	105	25	53	54	140	59	27	225	217	186
Italia	135	225	225	500	346	330	1 830	1 817	1 699	2 465	2 388	2 254
Luxembourg	N/A	15	15	N/A	10	11	N/A	5	14	N/A	30	40
Nederland	150	303	285	180	350	380	723	481	955	1 053	1 134	1 620
Portugal	30	30	33	40	40	42	115	113	123	185	183	198
United Kingdom	210	459	480	1 900	1 241	1 500	3 340	5 260	4 545	5 450	6 960	6 525
EU (1)	1 100	1 664	1 809	4 360	4 016	4 473	10 873	13 229	13 670	16 333	18 909	19 952

(1) Excluding Luxembourg 1991

Source: CERP



**Table 3: Public relations**  
**Number of public relations agencies and firms**

(units)	Number of PR agencies			Number of PR firms			Total number of PR agencies and firms		
	1991	1992	1993	1991	1992	1993	1991	1992	1993
Belgique/België	45	29	32	60	69	73	105	98	105
Danmark	15	13	16	30	63	65	45	76	81
BR Deutschland	40	35	65	1 100	1 068	1 200	1 140	1 103	1 265
Hellas	10	10	12	25	30	30	35	40	42
España	25	32	35	120	213	225	145	245	260
France	40	60	66	380	533	563	420	593	629
Ireland	20	35	35	25	53	54	45	88	89
Italia	45	75	75	500	346	330	545	421	405
Luxembourg	N/A	5	5	N/A	10	11	N/A	15	16
Nederland	50	101	95	180	350	380	230	451	475
Portugal	10	10	11	40	40	42	50	50	53
United Kingdom	70	153	160	1 900	1 241	1 500	1 970	1 394	1 660
EU (1)	370	558	607	4 360	4 016	4 473	4 730	4 574	5 080

(1) Excluding Luxembourg 1991  
Source: CERP

**Table 4: Public relations**  
**Consultancy fees turnover**

(million ECU)	1991 (1) (2)	1992 (2)	1993 (2)
PR agencies and firms	512.6	489.1	560.8
Individual consultants	952.9	1 161.5	1 239.5
Total	1 465.5	1 650.6	1 800.3

(1) Excluding Luxembourg  
(2) Excluding Portugal  
Source: CERP

### Recent trends

The European Confederation of Public Relations (CERP) carried out a study among the national PR associations of 19 European countries - the 12 members of the EU plus Austria, Cyprus, Finland, Norway, Slovenia, Sweden, Switzerland, i.e. all full members of CERP in 1993.

The objective of the study was to update the existing data on the PR profession with reference to the researches performed by CERP in 1991 and 1992.

The 1993 survey shows that the PR sector is overcoming the critical period linked to the economic recession, as a result of a general turnover increase, which in each country was above the inflation rate: the total turnover of consultancy fees reached 1.80 billion ECU versus 1.65 billion ECU in the previous year (which represents an increase of 9.1 % in nominal terms).

**Table 5: Public relations**  
**Number of public relation professionals**

(units)	Number of PR consultants			Number of PR officers			Number of PR consultants and officers		
	1991	1992	1993	1991	1992	1993	1991	1992	1993
Belgique/België	220	242	262	480	378	420	700	620	682
Danmark	225	242	240	575	858	960	800	1 100	1 200
BR Deutschland	2 850	4 836	5 700	7 350	7 564	9 300	10 200	12 400	15 000
Hellas	60	72	96	360	578	544	420	650	640
España	225	572	630	1 025	1 628	1 795	1 250	2 200	2 425
France	3 375	2 033	2 201	4 125	3 317	3 685	7 500	5 350	5 886
Ireland	225	217	186	75	133	201	300	350	387
Italia	2 465	2 388	2 254	2 785	2 692	2 646	5 250	5 080	4 900
Luxembourg	N/A	30	40	N/A	120	120	60	150	160
Nederland	1 053	1 134	1 620	2 847	3 066	4 380	3 900	4 200	6 000
Portugal	185	183	198	1 035	1 037	1 152	1 220	1 220	1 350
United Kingdom	5 450	6 960	6 525	7 850	7 540	7 975	13 300	14 500	14 500
EU (1)	16 333	18 909	19 952	28 507	28 911	33 178	44 900	47 820	53 130
Österreich	N/A	413	475	N/A	1 087	1 425	N/A	1 500	1 900
Suomi/Finland	350	306	200	1 600	1 394	1 800	1 950	1 700	2 000
Norge	N/A	N/A	175	N/A	N/A	3 325	N/A	N/A	3 500
Sverige	1 440	1 374	1 005	2 160	1 976	2 345	3 600	3 350	3 350
Schweiz/Suisse	600	574	700	1 400	1 276	1 300	2 000	1 850	2 000

(1) Excluding Luxembourg 1991  
Source: CERP

**Table 6: Public relations****Public relation professionals - Number of men and women**

	Number of men			Number of women		
	1991	1992	1993	1991	1992	1993
Belgique/België	455	341	382	245	279	300
Danmark	464	616	624	336	484	576
BR Deutschland	6 120	6 572	9 000	4 080	5 828	6 000
Hellas	243	299	326	177	351	314
España	875	1 188	1 273	375	1 012	1 152
France	3 525	2 140	2 413	3 975	3 210	3 473
Ireland	114	129	119	186	221	268
Italia	2 783	2 642	2 548	2 467	2 438	2 352
Luxembourg	N/A	45	64	N/A	105	96
Nederland	1 950	2 058	2 940	1 950	2 142	3 060
Portugal	793	793	891	427	427	459
United Kingdom	6 916	6 525	6 525	6 384	7 975	7 975
EU (1)	24 238	23 348	27 105	20 602	24 472	26 025
Österreich	N/A	825	1 140	N/A	675	760
Suomi/Finland	819	680	600	1 131	1 020	1 400
Norge	N/A	N/A	1 820	N/A	N/A	1 680
Sverige	1 800	1 708	1 541	1 800	1 642	1 809
Schweiz/Suisse	1 100	1 055	1 100	900	795	900

*(1) Excluding Luxembourg 1991**Source: CERP*

This situation is mostly due to two contributory factors:

- firstly, in the mix of enterprise communications, investments in advertising are decreasing in many European countries, in favour of other communication means, in particular public relations;
- the other reason is that during economic recessions, companies' communications mainly refer to very specific targets: also in this case, there is a stronger use of PR, due to its selective character.

In 1993 the number of PR agencies and PR firms in the twelve EU Member States was estimated at around 5 080, including 607 PR agencies and 4 473 PR firms, with a total occupation of 6 282 employed consultants, to which 13 670 freelance consultants must be added, reaching a grand total of 19 952 consultants working in the PR sector.

If we consider the annual turnover derived by consultancy fees in the twelve countries of the EU, the highest figures are to be found in the UK (190.4 million ECU), followed by Germany (144.1 million ECU), the Netherlands (59.5 million ECU), France (48.8 million ECU) and Italy (45.2 million ECU).

If we consider the number of consultants, the first place goes again to the UK, where 6 525 people work in the sector, followed by Germany (5 700), Italy (2 254), France (2 201) and the Netherlands (1 620).

## INDUSTRY STRUCTURE

### The current situation

The PR consultancy sector is made up by PR agencies, PR firms, freelance consultants.

A PR agency is usually a registered firm, a company created and managed by some consultants working together and providing full service in PR. On average, a PR agency is composed by a minimum of three to a maximum of ten PR consultants, assisted by executives and secretarial personnel.

A PR firm is a small unit, usually not registered as a company, created by one or two consultants working with a small sec-

retarial support and handling PR services in some specialised areas. Usually, a PR firm does not cover all publics and issues related to global corporate communications.

The freelance consultants mainly provide their professional service in two different ways: some of them operate on an annual contract basis for two to three clients, covering the largest part of the clients' communications needs. Others operate under contracts for specific short term PR projects related to single issues, publics and clients' needs.

### Impact of the Single Market

The impact of the Single Market on the Public Relations sector has been positive. Considering that the same products and services are made available in all Member States, the establishment of a system of relationships between companies and specific targets of people who buy these products and services are all important.

Harmonisation is still needed in a number of fields. Regarding training and education, Public Relations is taught at a number of schools across Europe, however, the programs differ between schools and countries. Secondly, the professional codes of conduct adopted by the National Associations are homogeneous, but due to the different legal situations, the application of these codes varies from country to country. Thirdly, concerning the fee system, only the principles are common, not the procedures and the related applications.

Written by: CERP

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# Legal services

## NACE 835

The advent of the EU has focused attention on a number of large-scale changes which are reflected on a much smaller scale within the legal professions. These trends are characterised firstly by a process of harmonisation, or recognition and simplification of common elements; and secondly, by acknowledging the need to compete in a supra-jurisdictional marketplace. The process of simplification is taking place in both common law and civil law jurisdictions, and not only in the EU. Over the past few years, international legal practice has been growing rapidly. Within the EU, economic integration and growing trade have challenged the traditional jurisdictional restrictions that have characterised legal practice. Multinational partnerships are permitted within the EU and function to varying degrees within a number of Member States. These developments are likely to continue.

### INDUSTRY PROFILE

#### Description of the sector

In this context, the legal services sector covers all professional staff working in the liberal legal professions within the states of the EU. In general, the following professions fall within this definition:

- Advocates, barristers and solicitors (as defined in the EU Directive to facilitate lawyers' effective exercise of freedom to provide services (77/249));
- Public notaries;
- Patent lawyers;
- Legal consultants.

Lawyers undertaking legal work as employees of central or local government, the judiciary, prosecution services or commerce and industry, respectively, are not included.

Since figures relating to the number of firms, employees and turnover in some countries are derived from VAT and social security registers, a large proportion of the firms, as well as employees (e.g. self employed persons), and turnover are not registered. The figures are also difficult to compare because

of the emphasis on in-house lawyers in some jurisdictions, whom are included in some figures (e.g. in Italy and France), and not in others (e.g. Germany). For certain countries, more detailed information is available on some sectors in the legal services.

This monograph mainly covers registered lawyers (advocates etc.) and notaries. However, it is important to note that the boundaries between these professions differ between, and even within, countries. The services provided by the legal professions (i.e. by "lawyers") fall within the following general categories: negotiation on behalf of a client; the preparation of legal documents; legal advice; and representation of clients before Courts, Tribunals and administrative bodies. The principle function of a notary is to prepare deeds and legal documents (e.g. wills and documents for the transfer of real estate).

In total, there are almost 400 000 registered lawyers in the EU, and the number of notaries is estimated at between 30 000 and 40 000. The first figure may include lawyers that are registered but not currently practising as such. The Athens Bar Association estimates that between a quarter and a third of its members are not practising. In Spain, more than 22 000 of the registered advocates fall under the same category. Even if one takes into account the many registered lawyers in these countries that are not in practise, it is apparent that Spain and Greece have the highest number of registered lawyers per 10 000 inhabitants, followed by the UK, whereas France and the Netherlands have the lowest. Meanwhile, Spain and the Netherlands have the lowest number of practising notaries per 10 000 inhabitants, whereas Greece, France and Germany have the highest.

Such differences are in part explained by the differences in the legal systems of these countries. In Denmark, there are no notaries and their functions are carried out by the city courts. In Scotland, every solicitor may become a notary public and 95 % of the solicitors in Scotland do so. Many lawyers in Spain also perform notary functions, although not registered as notaries.

#### Recent trends

A key trend in the legal services is that, in the absence of a distinct limit to their size (numerus clausus), firms have been growing rapidly. It is estimated that between 1989 and 1993, the number of professionals providing legal services has increased on average by over 20 % across the EU, with the

**Table 1: Legal services**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	4 380	129	(5) 10 779
Danmark	1 528	532	11 501
BR Deutschland (3)	30 707	5 942	(5) 358 467
España (3)	19 301	N/A	57 563
France	23 312	7 835	131 636
Ireland (1)	1 559	N/A	9 316
Luxembourg	205	(3) 68	816
Nederland (4)	2 829	1 344	22 857
Portugal (2)	24 681	1 381	N/A
United Kingdom	17 910	13 170	N/A

(1) 1988

(2) 1989

(3) 1990

(4) 1992

(5) Number of employees

Source: Eurostat; Mercure, CBS for the Netherlands

**Table 2: Legal services**  
**Registered lawyers and notaries and penetration level, 1993-1994**

	Total number of registered lawyers	Total number of notaries	Population 1992 (thousands)	Number of lawyers per 10 000 population	Number of notaries per 10 000 population
Belgique/België	10 600	1 221	10 045	11	1.22
Danmark	3 852	(2) N/A	5 170	7	N/A
BR Deutschland	70 438	(3) 10 269	79 984	9	1.28
Hellas	26 500	2 800	10 313	26	2.72
España	84 971	2 020	39 085	22	0.52
France	30 973	7 551	57 374	5	1.32
Ireland	4 678	N/A	3 552	13	N/A
Italia	65 000	4 490	56 859	11	0.79
Luxembourg	470	35	393	12	0.89
Nederland	7 800	1 123	15 184	5	0.74
Portugal	12 000	N/A	9 858	12	N/A
United Kingdom (1)	81 404	N/A	57 999	14	N/A

(1) Estimates from the Research and Policy Planning Unit of the Law Society of England and Wales

(2) Not available as notarial functions are carried out by the City Courts through the country

(3) Notaries 1 609 and lawyers working as notaries 8 660

Source: CAUE, CCBE, Eurostat, Bakkenist Management Consultants

largest individual increases in Luxembourg, Portugal, and Belgium.

The advent of the EU has drawn attention to a chain of large-scale trends reflected on a much smaller scale within the legal professions. These trends are characterised firstly by a process of harmonisation, or recognition and simplification of common elements; and secondly, by acknowledging of the need to compete in a supra-jurisdictional marketplace. These two characteristics dictate a third development: the establishment of international regulations to codify and structure behaviour in the new system.

The process of simplification in the legal professions is taking place in both common law and civil law jurisdictions, not only in Europe. The legal professions in the UK, Germany, France, Greece and Spain have undergone, and will continue to experience, substantial structural and legislative changes.

In Germany, reunification triggered the re-orientation process of the domestic legal services market to shift from a focus on small firms working within court-delimited areas of practice, to trans-local firms with as many as 80 partners, and offices in cities throughout Germany. A number of these new trans-local firms have subsequently set up offices in Brussels and then moved on to enter alliances and networks with other European law firms.

The considerable shifts in policy towards the public funding of legal aid in a number of countries constitute another, possibly important, factor with respect to the provision of legal services. Although many areas of law and legal practice are becoming more European in character, legal aid appears to remain something that primarily is defined by national policy. Given national parameters, no government (with the exception of France the expenditure of which prior to the 1992 reforms was one of the lowest in Europe) is expected to increase expenditure on legal aid. A situation, common to a number of countries, is that the state wishes to control the steady increase in legal aid expenditure, whereas law professionals have indicated that the provision of work that falls under legal aid is becoming increasingly unprofitable for them to carry out. In some jurisdictions, legal-aid work accounts for as much as 12 % of the estimated gross income in the legal services.

### International comparison

Reliable data on the patterns of development in the US and Japanese markets for legal services are also difficult to obtain, as individual states (including the District of Columbia) are considered to be separate jurisdictions, and there is little information available on Japanese lawyers in private practice. In 1986, there were 12 500 licensed lawyers in Japan of which approximately 9 000 were in active practise. This equals roughly one practising lawyer per 14 000 people. Meanwhile, the number of law graduates from Japanese universities is high, between 65 000 and 70 000 per year. Approximately 30 000 to 35 000 per year take the examination to continue their training to become advocates, judges or public prosecutors. However, in 1993 only 712 passed the examination, hence the low number of lawyers in private practice. Most of the large corporations in Japan have in-house legal departments staffed by non-licensed law graduates. A licensed lawyer is used only when a court appearance is necessary.

Japan appears to be opening up its borders for foreign lawyers. The results of the GATT negotiations will have positive effects in this respect. A law has been adopted by the Diet allowing lawyers with at least five years of experience to offer legal services in Japan, together with a Japanese lawyer. Services concerning domestic Japanese law are excluded. It will also be allowed to use the name of the company in the home country.

Long-term outlook is promising in Japan, although Japanese legal services have been hit hard by the problems in the real estate market. Japanese companies are expected to need more lawyers since the cost of handling legal affairs by themselves has proved to be too high.

In the USA, it is estimated that the number of lawyers has tripled over the last 20 years to approximately 800 000 in 1993. Around one third of all lawyers practise law outside the legal sector. There are some 925 000 employees working in the sector, an increase by 1.1 % compared to 1992. Gross income in professional legal services reached an estimated 93 billion US dollars in 1993.

Key trends in the legal services in the USA are: a business approach to providing legal services (the economic downturn in the US in 1990 and 1991, cost conscious clients, technology, litigation reforms and other factors, have reduced the demand for legal services, forcing firms to become more efficient and

**Table 3: Legal services**  
**Number of representations before the European Court of Justice**

	1988	1989	1990	1991	1992	1993	1994 - July
Belgique/België	39	56	30	32	39	23	34
Danmark	4	6	4	2	6	6	39
BR Deutschland	26	41	65	43	56	55	2
Hellas	6	6	19	8	4	3	0
España	2	1	1	12	18	3	6
France	23	37	44	18	34	18	15
Ireland	1	4	8	10	11	3	3
Italia	19	28	12	20	26	36	10
Luxembourg	20	11	1	15	8	3	2
Nederland	9	38	14	23	13	17	17
Portugal	1	1	1	3	6	4	0
United Kingdom	26	43	33	57	55	78	46
EU	176	272	232	243	276	249	174

Source: European Court of Justice

competitive); alternative dispute resolution (ADR, a kind of arbitration with the purpose of avoiding interference with business operations, and preserving confidentiality); development of legal policy by client companies, in order to reduce legal expenses; and internationalisation (US law firms have increased their turnover more rapidly in international operations than in domestic ones, due to the expansion in the international marketplace. The new markets are Eastern Europe, the former Soviet Union and, increasingly, China and Taiwan. In 1991, gross income for the provision of legal services to foreign individuals or organisations was nearly 1.2 billion US dollars. The trade surplus in legal services reached 951 million US dollars.)

The top ten legal service providers in the USA recorded gross revenues of 3.2 billion US dollars in 1992. The largest law firms (by number of lawyers) are Baker & McKenzie (1 604 lawyers) and Jones Day (1 170 lawyers).

#### Foreign trade

Over the past few years, international legal practices have been growing rapidly. However, it is important to note that international legal practice, are only a small part of overall legal services. The key source of work for many international law firms (especially in the UK and the USA) has been in capital markets and tasks related to the large number of pri-

vatisations undertaken during the 1980s in the EU and Eastern Europe.

The Council of the Bars and the Law Societies of the European Community (CCBE) provides support to Eastern European bar associations and actively participates in co-operation programmes with the EU Commission and the Council of Europe. Moreover, delegations from the Czech and Slovak Republics, Hungary and Turkey have joined the CCBE as observers, so as to be provided with information by the CCBE (e.g. on establishing a new legal system, in organising their national bars and safeguarding their independence, and in establishing rules of deontology).

In Europe, economic integration and increasing trade has strongly challenged the traditional jurisdictional restrictions that formerly characterised legal practice.

Multinational partnerships are permitted within the EU and function to varying degrees in most Member States. It is expected that the number of multinational European firms, such as the Dutch-French-Belgian firm Stibbe Simont Monahan Duhot, will increase.

These practises function through numerous mechanisms: they deliver occasional services in another country; lawyers become fully integrated members of another jurisdiction's legal profession or establish themselves in another jurisdiction but re-

**Table 4: Legal services**  
**Number of notary acts, 1994**

	Number of acts per country	Number of acts per 1 000 inhabitant	Number of acts by notary
Belgique/België (1)	650 000	65	532
Danmark	N/A	N/A	N/A
BR Deutschland	N/A	N/A	N/A
Hellas	1 300 000	126	464
España	4 275 823	109	2 117
France (1)	4 058 259	71	537
Ireland (1)	80 000	23	N/A
Italia (2)	5 507 246	97	1 227
Luxembourg	39 000	99	1 114
Nederland	1 307 767	86	1 165
Portugal	N/A	N/A	N/A
United Kingdom	N/A	N/A	N/A

(1) 1993

(2) Without acts of protest of bills and without acts of transfer of vehicles

Source: CAUE

**Table 5: Legal services**  
**Total gross income registered lawyers, 1993-1994**

	Gross income (million ECU)	Average income per registered lawyers
Danmark	325	84 372
BR Deutschland (1)	2 814	39 950
Hellas (2)	125	4 717
Nederland	850	108 974
United Kingdom (3)	8 232	101 125

(1) 1987

(2) 1990

(3) England and Wales 1992-1993

Source: CCBE, Bakkenist Management Consultants

tain their home state qualification; and through association with other firms, groups, networks or through European Economic Interest Groupings (EEIGs). Lawyers in the Netherlands appear to have been the most active in developing international links recently.

One of the sources of international legal work are representations before the European Court of Justice. There is no clear tendency towards more representations since 1989 and the number of cases has remained more or less stable.

## MARKET FORCES

### Demand

As consistent statistics are not collected in all Member States, it is difficult to fully assess the effects of market forces on and within the legal professions throughout the EU.

### Supply and competition

Legal services are not only provided by registered lawyers and notaries. Accounting firms, trade unions, employers associations and banks also provide such services to their clients or members.

The CCBE has issued a statement that co-operation with other professions (notably accountants) is undesirable, as it believes that such partnerships would not be favourable for clients (who do not yet demand such partnerships). According to the CCBE, the quality of services would not be expected to improve, on the contrary, such partnerships would suppress the valuable "cross-control" of advisors. Moreover, insufficient lawyer independence vis-à-vis accountants, and the state of dependence in which the system of "integrated services" puts the client, would jeopardise the latter's interests. Partnerships with notaries are considered less dangerous in this respect.

Paradoxically, lawyers in Europe are trying to learn as much as they can from accounting firms: some law firms in Spain, for example, send junior lawyers to train with accountants to acquire skills perceived as necessary to a new breed of European lawyers.

However, co-operation with other legal professions is increasing in many Member States. In Belgium, the Belgian Order of Advocates announced a "joint declaration of rapprochement" between advocates and notaries, stating that it is advisable to allow lawyers and notaries to work together, provided that clients are informed of such collaboration.

In Germany, partnerships between attorneys performing advocacy work and patent attorneys, tax consultants/auditors, and notaries are allowed in regions in which attorneys are permitted to be notaries. The success of this arrangement is widely attributed to a common code of ethics which protects the interests of the clients.

The legal professions are not the only ones struggling to obtain a place in the European market for professional legal services. Arthur Andersen, one of the "big six" accounting firms, has established a legal arm in many countries of the EU, e.g. in France, Germany, the UK and Denmark, by associating itself with a newly-created law firm.

### Fees, income and prices

The extent to which fees for legal services are regulated varies between different countries. There appears to be a spectrum, with total control of pricing and billing for legal services on the one end (by the profession and/or the state) and complete non-regulation on the other. The one shared element appears to be a high level of control over legal fees for cases in which the State is the indirect client, i.e. for legal aid work.

However, it may be argued that civil law jurisdictions exercise greater control over fees for legal services, and most Member States have adopted and maintain more institutional mechanisms for regulating legal costs.

### Impact of the Single Market

The provision of legal services has a predominantly local character. The number of lawyers and law firms operating internationally is increasing marginally, although they only account for some 1-2% of the total market. The effects of the Single Market Programme have hardly been of influence in this respect.

In general, one can say that many European measures have an indirect influence on the way the (international) legal service sector is operating. The international orientation of lawyers has increased due to the increasing ease of the cross border movement of persons and cross border payments.

Two directives, and a third which is in the draft phase, have a direct influence on the sector. They deal with the mutual recognition of diploma's and the right of residence and operation. The importance of knowledge of European Law and of law of other countries is increasing and is being stimulated by the training and education programmes of the European Union. This will eventually result in further harmonisation of the EU legal services' market.

## INDUSTRY STRUCTURE

### Companies

All in all there are 34 different legal professions in the EU Member States, for historic reasons and different domestic social structures. The structure of the legal professions and the limits it imposes on how lawyers work; e.g. what legal work they can do or where they are entitled to practise also defines (at least in part) the type of legal service which lawyers provide.

In the British jurisdictions, the legal profession's formal specialisation and separation into solicitors and barristers may entail the use of more than one lawyer for a single legal issue.

Other countries have a geographically delimited or local jurisdictional system. One example is that of "localisation" in Germany which prevents individual lawyers from practising outside their court-delimited jurisdiction. Before trans-local firms were legalised, a "system of correspondence" had evolved whereby two or more lawyers worked on a shared case in their respective jurisdictions. Again, such division of legal functions, in this case based on geographical limits as opposed to speciality, may lead to the use of multiple sets of lawyers for a particular case.

There are numerous clauses controlling the number of notaries in operation in the Latin notary countries. Notaries occupy a unique position in most European jurisdictions, as they are both independent practitioners acting solely on behalf of the

**Table 6: Legal services**  
**Number of notaries' offices, law firms and employees, 1993-1994**

	Notaries' offices	Employees (notaries' offices)	Number of registered lawyers' practises, etc	Individual practises (%)	Estimated number of employees (lawyer firms)
Belgique/België	1 209	4 155	6 600	91	9 600
Danmark	N/A	N/A	2 749	38	7 000
BR Deutschland	N/A	N/A	38 077	79	29 000
Hellas	2 800	3 500	20 500	98	22 500
España	2 058	8 528	N/A	N/A	N/A
France (2)	4 735	38 353	N/A	N/A	N/A
Ireland (1)	149	149	N/A	N/A	N/A
Italia	4 000	24 000	N/A	N/A	N/A
Luxembourg	35	175	N/A	N/A	N/A
Nederland	797	7 000	2 233	46	8 900
Portugal	N/A	N/A	11 280	98	6 600
United Kingdom (1)	N/A	N/A	25 061	55	100 000

(1) Common law countries

(2) Figures concerning notaries: 1993

Source: CAUE, CCBE, Bakkenist Management Consultants

client, as well as officials of the state from which the power to serve as a notary is derived.

Most EU law firms are small. In Belgium, Greece and Portugal, more than 90 % of all practises are individual ones. As for notaries, an office in which five notaries co-operate, would be considered large. The large law firm is a phenomenon particular to common law jurisdictions. Of the 40 largest law firms, there are 25 American firms, 10 British, 4 Australian and 1 Canadian. However, there is evidence that a direct challenge to the common law hegemony may be emerging in Europe where 5 of the 30 largest firms are Dutch.

In jurisdictions with relatively low population density and/or smaller economic centres, legal needs may be best met by smaller firms. For example, French notaries are among the most profitable in the legal professions in Europe, yet the number and size of their practices are relatively small. International association, co-operation and EEIGs give the smaller group of practitioners access to the international legal marketplace.

## REGULATIONS

### EU regulations

Two EU Directives define and regulate the activities of legal professionals within the EU. The Council Directive to facilitate the effective exercise by lawyers of freedom to provide services (77/249/EEC), also known as the EU Services Directive, requires each Member State to recognise lawyers from another Member State for the purpose of providing occasional services. It does not address the issue of the rights of establishment or the mutual recognition of diplomas. It does allow the foreign lawyer to practise under his home title, but submits him to the deontology of both his home state and the host state and requires him to be presented and assisted by a local lawyer for in-court services (only if requested by national lawyers or required under national rules). This Directive has been implemented by all the Member States.

Also important is the EU Directive 89/48 on the Mutual Recognition of Qualifications. This, so-called "Diplomas Directive", provides for the full integration of e.g. a lawyer into the legal profession of a host Member State, upon that state's recognition of the home state legal qualifications. Recognition can take one of two forms: the host state may require an aptitude test, or it may subject lawyers to an adaptation period before becoming fully qualified members of the host state

profession. As of January 1994, all Member States had implemented the Directive and, with the exception of Belgium, all had opted for an aptitude test, although the practical organisation of the tests has not yet taken place in all states. The content and the difficulty of the aptitude test, as well as the help provided by the local bodies to the applicants, varies from country to country. The CCBE is monitoring the implementation of the test in the different Member States and has issued an interim report.

The new EU Member States have been changing their laws in anticipation of accession to the EU. In Finland, the Act of Advocates has, from early 1993, allowed lawyers from other EFTA and EU Member States to be admitted to practice in Finland. The Finnish Bar Association plans to develop an aptitude test as a requirement for admission to the Finnish Bar.

At the beginning of 1995, the EU Commission issued a proposal for a Parliament and Council Directive to facilitate practice of the profession of lawyer on a permanent basis in a Member State other than that in which the qualification has been obtained. The Commission was inspired by an earlier draft forwarded by the CCBE, but substantially modified it. The proposal will go through the co-decision procedure of article 189B of the treaty of Rome.

The Commission Programme for the Internal Market promotes the dissemination of Community law amongst lawyers. A first initiative has been taken by DG XV, with which the CCBE collaborated in issuing a questionnaire with the objective of evaluating the knowledge of professionals in this respect.

One of the issues for the development of the Internal Market is effective legal protection for consumers, also when small amounts are involved, but especially for cross-border transactions. In the last respect, the CCBE has stressed the possibility of extending the existing schemes for legal aid to EU residents' "small claims" arising out of cross-border activities, and the need to use the existing European Conventions governing legal aid more intensively. It also highlighted some improvements that could be made to the Brussels and the Hague Conventions to achieve a virtual "free circulation of judgements", and has suggested the exploration of the extension of legal expenses insurance to cross-border cases.

### International regulations

To cope with the issues raised by the numerous changes, a number of supra-jurisdictional organisations have attempted



**Table 7: Legal services  
Largest 15 law firms in Europe, 1992**

Law firms	Rank
Clifford Chance	1
Linklaters & Paines	2
Lovell White Durrant	3
FreshFields	4
Shauthter And May	5
Allen & Overy	6
Herbert Smith	7
Simmons & Simmons	8
Norton Rose	9
Denton Hall Burgin & Warrens	10
Nabarro Nathanson	11
McKenna & Co.	12
Richards Butler	13
Dibb Lupton Broomhead	14
Nauta Dutilh	15

Source: Law Firms in Europe and Legal Business

to lay down common ground rules to regulate the new scope of the professions. The CCBE has been at the forefront of organisations trying to address the issues and has issued an International Code of Conduct for European Community lawyers.

The code reconfirms certain fundamental principles (e.g. independence, confidentiality, pactum de quota litis), recommends approaches to dealing with fees, and makes recommendations on how to deal with lawyers belonging to more than one bar or law society (e.g. in matters of publicity, relation with the Courts and between lawyers).

These provisions have been adopted by most professional bodies in Europe; where the local bar has a regulatory function, the national bar has suggested the adoption or incorporation of similar rules. On a smaller scale, the International Bar Association has been working on an international code of conduct along the lines of the CCBE provisions.

In addition, the legal services were included in the Uruguay Round GATS negotiations. A working group on services will begin to negotiate the implementation of liberalisation measures on a sector basis, beginning with accountants. Legal services will be negotiated at a later stage.

## OUTLOOK

It is most likely that the overall trend of growth in the legal professions throughout Europe and the increasing internationalisation of services will continue.

If the trends of cross-border co-operation, simplification and the creation of pan-European organisations continue, the legal professions in each jurisdiction are likely to grow and cross-border legal activity is likely to increase. Co-operation (and mergers) between the providers of legal services within jurisdictions as well as between jurisdictions is likely to grow rapidly over the next few years, especially within the European market.

In addition to increasing co-operation, another likely result is that of more direct competition on both a national and international basis, as providers of legal services within and across jurisdictions attempt to promote themselves in an increasingly international business context.

Rising competition will force law firms to become more efficient. This will most likely result in a reduction in employment, increased use of computers, including databases and customised legal software.

The experiences from German reunification and from the USA have taught the legal services to regard legal advice as a vital export product. Already, lawyers from Europe and North America are battling to establish their system of law as the primary one to govern commercial contracts in the new markets opening up in Eastern Europe.

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# Accountancy services

## NACE 836

"Accountancy services" is a generic term embracing a number of activities. There is no strict correspondence between accountancy services and the scope of practice of the accountancy profession. Within the EU, the existence of independent professional institutes is perhaps the only common feature to be found in this otherwise diverse sector. Despite efforts at the EU level to eliminate barriers to cross-border practice by professional accountants and accountancy firms, national differences in business and accounting practice still prevent a truly open border situation for this sector.

### INDUSTRY PROFILE

#### Description of the sector

Accounting services long have existed in Europe, but it was not until the mid-19th century that specialists started to organise themselves professionally. These developments took place in the UK, which has since kept its tradition of a self-regulated accountancy profession and services. As a result, the British and Irish markets for accountancy are the most developed in Europe today. Similar developments later took place through continental Europe, where the market has been structured according to local traditions, with a greater use of laws and regulations.

Financial information is at the heart of accountancy services. Accurate, relevant and timely financial information has been a key to businesses' success since the beginning of the market economy. Accountancy services have logically followed the development of the European economy, in terms of volume, variety, sophistication, etc. With the expansion of capital markets, financial information has reached the status of a public utility. Given the many possible methods of accounting for any one economic reality, public authorities have felt it necessary to intervene in order to protect the public interest. As a result, accountancy services and the accountancy profession are heavily regulated in all EU countries, which gives a specific character to the market.

The rules and regulations governing the profession and the services it provides have so far been developed from a national

perspective, in order to respond locally to national problems. It is no surprise that significant differences between the EU Member States have resulted from the process.

The range of services accountants offer is very wide, although again it can vary from country to country. It is, however, fair to say that the core activity of accountants remains centred on financial information and, hence, on accountancy services. These cover primarily accounting and auditing. Accounting involves the production of financial information, which includes the analysis of economic transactions, the selection of a relevant accounting method and some data processing or computing. Auditing consists of the expression of an objective opinion on a given set of financial information, according to a given set of standards, in order to improve the reliability of that information.

The competence developed by accountants to produce, process, analyse or audit financial information can be used for other purposes as well. Hence, the activities of accountants have been expanded far beyond accountancy services, within the realm of each unique national business culture. For example, as it is not possible to produce financial statements without having properly addressed the fiscal liabilities of the enterprise, accountants necessarily have developed an expertise in the tax area, which can be used outside the context of accounting. In the same way, accounting or auditing activities require a sound knowledge of the enterprise, its activities, structures, etc. On that basis, it is easy to develop management consultancy activities, and many accountants do so.

In addition to accounting and auditing, the range of services provided by accountants in most of the EU countries comprises:

- merger audits, which consist of the expression of an objective opinion on a merger in order to guarantee fair treatment of the shareholders of all merging companies;
- contribution audits, which consist of the expression of an objective opinion on the value attributed to non-cash assets (property, inventories, trade marks...) contributed by a shareholder to the capital of a company, in order to guarantee a fair treatment of the other shareholders of the company;
- insolvency services, which entail acting as liquidator, receiver or administrator. These may even involve advising clients on strategy before a critical stage is reached in its financial position;
- expert witnesses, which are accountants acting as experts in accounting matters before most types of courts;

**Table 1: Accountancy services**  
**Main indicators, 1991**

	Number of enterprises (million ECU)	Turnover (excl.VAT) employed	Number of persons
Belgique/België	16 731	1 565	(4) 21 222
Danmark	2 919	1 051	2 014
BR Deutschland (2)	55 974	15 847	N/A
Hellas(2)	(3) 3 364	N/A	6 839
España (2)	12 823	N/A	53 386
France	14 340	6 784	124 251
Ireland (1)	1 323	N/A	7 891
Luxembourg	361	(2) 100	1 898
Nederland	9 600	2 841	61 800
United Kingdom	17 173	8 167	N/A

(1) 1988

(2) 1990

(3) Number of focal units

(4) Number of employees

Source: Eurostat; Mercure

**Table 2: Accountancy services  
Number of employees**

(units)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique/België	12 170	13 346	14 578	15 870	17 966	19 153	20 069	21 222
Danmark	13 125	15 730	16 794	17 964	18 644	18 788	19 147	N/A
Hellas (1)	N/A	N/A	N/A	N/A	6 839	N/A	N/A	N/A
España (1)	12 551	N/A	N/A	N/A	N/A	N/A	53 386	N/A
France	N/A	80 356	82 114	85 400	91 772	99 303	106 548	111 983
Ireland	N/A	N/A	N/A	N/A	7 751	N/A	N/A	N/A
Luxembourg	701	991	1 067	1 155	1 271	1 415	1 599	1 772
Nederland	N/A	N/A	N/A	N/A	41 600	44 500	48 200	49 100

(1) Number of persons employed  
Source: Eurostat; Mercure

- tax advice, which includes tax planning or tax compliance, with the former consisting of advice on the application of taxation law and the latter relating to the preparation and presentation of the various returns and declarations required by law, and assistance to clients in their dealings with the relevant authorities;
- investment services, which include advising clients on potential investments, performing financing studies, or even acting as trustee; and
- management consulting, which includes, inter alia, IT consulting, internal control and procedures review, organisational review, etc.

This large range of services is different for each EU country, according to local rules and regulations. In some countries, accountants may even be prevented by law from offering some of these services. In France, for example, accountants cannot offer insolvency services or tax advice - except in very limited circumstances - as these activities are restricted to other professions. In other EU countries though, accountants are the leading providers of such services. As a consequence, the NACE classification of services does not correspond to the division of the market between the various professions. Therefore, no reliable data are available on the turnover, profits, etc., of the accountancy profession.

### Foreign trade

More than 35 years after the signing of the Treaty of Rome, twelve national markets still exist for accountancy services and the accountancy profession in the EU. Many factors work towards keeping the existing barriers between national markets. These include:

- The dependence of the profession on law. Much of an accountant's work requires an extensive knowledge of law in several areas (accounting, tax, company law, social law, etc.). As most of these laws diverge considerably from one Member State to another, the investment necessary to bridge these differences in order to practice in another EU country remains substantial, although the professional know-how would be almost the same in a large number of cases.
- A number of services provided by accountants are supplied within a limited distance, because of the close relationship which should exist with the client. This is especially true for SME clients, which constitute the bulk of the market. Cross-border competition on these markets is very limited so far.
- The implementation of the general system of Mutual Recognition of Diplomas has not led to large movements of accountants across borders: only eight professionals in 1992 and fifteen in 1993 have benefited from the system. The system indeed is not designed to remove the existing barriers, but to help people establish themselves abroad despite

those barriers. All recent initiatives taken at the EU level have put a strong emphasis on maintaining the current legal status quo. This is why, despite the provisions of the EU Treaty, the cross-border provision of regulated accountancy services and the mutual recognition of professional firms is still not possible.

- International networks of firms of accountants have long developed their own solutions to the problem of barriers. They mainly rely on locally licensed professionals to supply their services and refer the work to their corresponding members in the relevant countries, as soon as any international service is needed.

For these reasons, it is very likely that intra-EU trade in accountancy services remains marginal. Unfortunately, no figures are available to confirm this.

## MARKET FORCES

### Demand

Although individuals may occasionally use the services of accountants, the bulk of the market comes from businesses, whatever their legal form (sole practitioner, partnership, corporate) or ownership (private, public, state, etc.). Therefore, professional accountants could be defined as professional advisors to the business world. The demand is potentially very wide and can be segmented according to many indicators. One is the size of a business, as the needs of sole-traders, SMEs and big companies are definitely not identical. Others could be the economic sector, the legal form of the business (e.g. corporations), quotation on a stock exchange, etc.

As is the case with many other markets, the scope of the demand varies with the size of the client, with big multinationals requiring very sophisticated and diversified services, and SMEs generally having more basic needs. However, it is fair to say that big companies can afford several consultants and have strong enough internal structures to get each service from the best specialist in the area. Conversely, SMEs appreciate that the same consultant, in whom they have "invested", can provide them with a large range of services, in order to limit both the money and time spent. Frequently, for example, the professional accountant is the sole external advisor to the management of small firms.

Legal requirements oblige many companies to have their annual financial statements audited. A properly approved auditor or firm of auditors must state whether the financial statements they have audited give a "true and fair view" of the results of the company's activities and its financial position, and whether accounts comply with the relevant legal provisions.

The purpose of the independent external audit is to lend credibility to financial information, thereby enhancing the effectiveness of economic decisions made on the basis of it. In

addition, many companies, and other entities not subject to the statutory audit requirements, voluntarily request contractual audits, in view of the benefits that accrue from this service. Finally, there is a growing demand for audit-related services, which involve the issuance of special-purpose reports and opinions on the application of certain defined procedures.

In the past, many small companies, self-employed people and small shops were unable to do any of their own accounting and bookkeeping and, therefore, depended on the services of accountants. However, because computer hardware and accountancy software programmes have become so affordable, nearly every business can make the investment required to have their own. Nonetheless, many businesses continue to use accountancy service firms in order to make better use of their own resources and to have access to a specialist's expertise.

Another source of demand can be the public authorities. Courts allocate insolvency work and require expert services; governments require audits and evaluations should they decide to privatise State-owned businesses. With the development of the so-called social economy, a market has recently emerged in the non-profit sector, as its requirements become closer to those of the rest of the economy.

### Supply and competition

In order to offer certain accountancy services, it is often a legal requirement that the provider holds a professional qualification and belongs to a recognised accountancy body. This is especially the case for statutory audits, which can only be performed by a properly qualified and approved professional. For the other activities of the accountancy profession, the requirements vary from country to country, some imposing

conditions similar to those of statutory audits. In any case, all the professional titles of the members of the main professional bodies in the EU are protected in their own countries, but not necessarily abroad.

The process of qualifying as a professional accountant is a lengthy one, requiring both theoretical knowledge and practical experience. It can last from six to seven years, or even up to ten or fifteen years in some countries. Many of those working in lower positions in accountancy firms are doing so to gain the practical experience necessary to qualify as a professional accountant. Most people working in the accountancy services sector are not professional accountants. They include support staff and technical staff as well as trainee accountants.

The accountancy profession is practised mostly through collective entities in almost all EU countries. Only Italy still prevents the use of such entities, and even there professional associations without legal personality are very popular in the sector.

Supply fragmentation almost equals that of demand. Most visible are the big international firms, which attract much public attention, the most famous being the so-called "Big 6," i.e. Arthur Andersen & Co, Coopers & Lybrand, Deloitte Ross Tomatsu, Ernst & Young, KPMG Peat Marwick and Price Waterhouse.

These firms mainly serve the big national and international companies in each EU country, as they do all around the world. One of their major features is the ability to provide the same services with the same quality wherever their client is located. These big firms dominate the market of big quoted companies, banks and insurance companies.

**Table 3: Accountancy services**  
**Main accountancy bodies in the EU, 1994**

Belgique/België	Institut des Réviseurs d'Entreprises (I.R.E.) Institut des Experts-Comptables (I.E.C.)
Danmark	Foreningen of Statsautoriserede Revisorer (F.S.R.) Foreningen of Registrerede Revisorer (F.R.R.)
BR Deutschland	Wirtschaftsprüferkammer (W.P.K.) Steuerberaterkammer (S.B.K.) Institut der Wirtschaftsprüfer in Deutschland (I.D.W)
Hellas	Soma Orkoton Elegkton (S.O.E.) Association of Certified Accountants and Auditors of Greece (S.E.L.E.)
España	Instituto de Contabilidad y Auditoria de Cuentas (I.C.A.C.) Registro de Economistas Auditores (REA) Registro General de Auditores (REGA) Instituto de Auditores-Censores Jurados de Cuentas de España (I.C.J.C.E.)
France	Ordre des Experts-Comptables (O.E.C.) Compagnie Nationale des Commissaires aux Comptes (C.N.C.C.)
Italia	Consiglio Nazionale dei Dottori Commercialisti (C.N.D.C.) Consiglio Nazionale dei Ragionieri e Periti Commerciali (C.N.R.P.C.)
Luxembourg	Institut des Réviseurs d'Entreprises (IRE) Ordre des Experts Comptables Luxembourgeois (OECL)
Nederland	Nederlands Instituut Van Registeraccountants (N.I.V.R.A.) Nederlandse Orde van Accountants-Administratieconsulenten (N.O.v.A.A.)
Portugal	Camara dos Revisores Oficiais de Contas (C.R.O.C.)
United Kingdom & Ireland	Institute of Chartered Accountants in England and Wales (I.C.A.E.W.) Institute of Chartered Accountants of Scotland (I.C.A.S.) Institute of Chartered Accountants in Ireland (I.C.A.I.) Chartered Association of Certified Accountants (A.C.C.A.) Chartered Institute of Management Accountants (C.I.M.A.) Chartered Institute of Public Finance and Accountancy (C.I.P.F.A.) Association of Authorised Public Accountants (A.A.P.A.) Institute of Certified Public Accountants in Ireland (I.C.P.A.I.)

Source: FEE

However well-known these big firms may be, the bulk of the accountancy profession is made up of small and medium-sized firms, which are often better suited to serve the many SMEs of each Member State. Altogether, these smaller firms cover the same range of services, although each firm on its own may, obviously, supply a more limited range of services to its clients.

Unlike the 1980s, the beginning of the 1990s has not witnessed any more mega-mergers at the top end of the sector. Small and medium-sized firms in the EU are currently developing regional networks to gain national or even international exposure. That evolution follows the trend set by a number of enterprises that use the internal market to expand their activities abroad.

The general economic slowdown of the early 1990s affected the accountancy sector as all others. Pressure on fees has been strong, and the growth rate of the profession's turnover which long stood above 10 % in most EU countries, barely shadowed inflation. The recent recovery of the economy in most Member States benefits the accountancy profession as well.

### Production process

Information technology has already been integrated in accountancy services for a long time. However, some further developments can be expected in that respect in the near future. EDIFICAS is the latest initiative of the accountancy profession to tailor EDI (Electronic Data Interchange) to accounting and auditing needs. Although accountancy services are not technology driven, these developments, which should help accounting data circulate more rapidly and accurately, will impact the way the services will be supplied in a few years.

Given that professional standards have long existed in the sector, ISO 9000 has not yet had any real impact on the accountancy services. Developments are taking place, however, and the British profession recently took steps towards its implementation on a voluntary basis. It is too early to state, however, whether this will constitute a precedent for the other Member States.

### INDUSTRY STRUCTURE

The structure of the accountancy profession in the EU is very diversified, and one can find a different national model in almost each country. The existence of independent professional bodies or institutes is actually the only common feature. These bodies have either been established by the profession itself, as in the UK and the Netherlands, created by law, as in France and Belgium, or combine structures of both origin, as in Germany and Spain. Recently, governments have become more and more involved in the regulation of the profession, partly as a result of the implementation of EU directives.

The profession is generally structured with several tiers, corresponding to the segmentation of demand in terms of the level of the sophistication of the services given. The differences between the various tiers is a matter of, *inter alia*:

- level of education, measured in terms of university education, practical experience, etc.
- scope of practice, the less qualified members of the profession having, in principle, more limited rights to practice;
- ethics, the code of conduct of some bodies being looser or less stringent than others;
- international recognition, as some international professional bodies like FEE only have first-tier members, etc.

There are, however, some exceptions to the multiple-tier rule. In France, Greece and, to a lesser extent, Luxembourg, several professional bodies exist, although these all belong to the first tier. Consequently, in these countries it is not possible

**Table 4: Accountancy services  
Membership of FEE Member bodies, 1994**

	Number of members (1)	Share in public practice (%)
Belgique/België	8 665	62
Danmark	2 898	82
BR Deutschland	7 161	100
Hellas	290	100
España	6 075	49
France	24 000	100
Ireland	9 400	43
Italia	64 650	93
Luxembourg	320	100
Nederland	8 750	40
Portugal	973	100
United Kingdom	208 401	22

(1) Including both individuals and legal entities  
Source: FEE

to get a less sophisticated level of service (from less qualified professionals) for the many activities reserved solely to accountants.

In addition to the ordinary functions of any professional body, the accountancy bodies are heavily involved at the national and international levels in the development of accounting standards and reporting standards, of auditing standards and other standards on professional activities and, finally, of ethical codes. They have an important role to play in overseeing the conduct of their members.

The structure of the profession has been rather stable over the years. Any evolution is hence rare and is thus quite significant, given its potential impact on the market (on the supply side at least). The implementation of the 8th and Mutual Recognition Directives (see Regulations section) has had a major influence on the structure of the profession in a number of countries, including Germany, Spain and Italy. Over the last year, two countries, France and Portugal, have seen evolutions in that respect. In France, the law implementing the Mutual Recognition Directive included some other provisions designed to modernise the regulation of the profession as well. The changes are, however, relatively minor and do not affect the substance of the regulations. In Portugal, the law implementing the Eighth Directive did not change dramatically the specifics of the regulation in that country.

In the EU, approximately 300 000 people are members of the professional organisations belonging to the Fédération des Experts Comptables Européens (FEE). About one-third of them work in the accountancy services sector. Most of the remaining 200 000 members of professional bodies represented in FEE are employed as accountants in industry, commerce, education and the public sector. Tables 4 and 5 show how these accountants are spread over the EU. Obviously, the size of the profession in one country does not mirror the size of its economy. This derives from the conception of the profession in countries like the UK, Ireland, the Netherlands, Italy, etc., where all those having the relevant educational profile are permitted to be members of professional bodies, be they in practice, in industry, retired, or whatever. On the other hand, countries like Belgium, France, Germany or Greece restrict the membership of the professional organisations to those in public practice. The membership of the institute is then associated with a given function, and not with a certain educational background.

**Table 5: Accountancy services**  
**Number of members of accounting bodies by type of members, 1993**

	Accountancy bodies	Individuals entities	Legal	Total
Belgique/België	IRE (1)	910	173	1 083
	IEC (1)	6 663	919	7 582
Danmark	FSR (1)	2 498	400	2 898
	FRR	N/A	N/A	3 270
BR Deutschland	IDW (1)	6 461	700	7 161
	WPK - WP	7 601	1 466	9 067
	- VBP	4 216	94	4 310
	BvBP	1 673	6	1 679
Hellas	SOE (1) - OE	290	290	
	- AOE	279	279	
	SELE (1)	200	200	
España	ROAC	15 230	715	15 945
	IACJCE (1)	5 705	370	6 075
	REA	3 150	250	3 400
	REGA	1 200	70	1 270
France	OEC (1)	14 851	8 325	23 176
	CNCC (1)	11 752	1 773	13 525
Ireland	ICAI (1)	8 205	458	8 205
	ICAEW (1)	216	-	216
	ICAS (1)	27	-	27
	ACCA (1)	1 900	-	1 900
	CIMA (1)	1 105	-	1 105
	ICPAI (1)	1 000	-	1 000
	CNDC (1)	33 100	33 100	
Luxembourg	CNRPC (1)	31 544	31 544	
	IRE (1)	251	69	320
Nederland	OECL (1)	81	81	
	NIVRA (1)	8 750	8 750	
Portugal	NOvAA	4 200	4 200	
	CROC (1)	856	117	973
United Kingdom	ICAEW (1)	105 425	9 140	105 425
	ICAS (1)	13 542	-	13 542
	ICAI (1)	760	-	760
	ACCA (1)	42 000	-	42 000
	CIMA (1)	35 815	-	35 815
	CIPFA (1)	11 619	-	11 619
	AAPA	997	-	997
AAT	19 052	-	19 052	

(1) Members of FEE  
 Source: FEE

### Impact of the Single Market

In practical terms, the Single Market as yet does not exist for Accountancy Services. The differences in rules and regulations governing the sector still differ significantly between the Member States, virtually ensuring that the national character is, at least for the moment, kept in place. Very little harmonisation has been reached and considerable effort will have to be invested to reach the Single Market status.

The larger firms operating in all the Member States do this as separate, national legal entities, since there is a complete prohibition on foreign direct investment in firms operating locally. This results in a considerable administrative burden for the international firms. It poses an even bigger problem for the firms classified within the category of small and medium sized enterprises. In order for this group to service their clients, whom may also increasingly operate abroad, significant investment is demanded to develop the international structure needed to service these clients.

The agenda towards achieving greater harmonisation and freedom of operation is considerable. A number of issues which need addressing are, amongst others, the easing of restrictions

on advertising in different Member States, greater freedom in the scope of practice, thereby being allowed to provide services closely related to accounting in the different Member States and measures related to taxation, for example to avoid double taxation of firms operating in more than one country.

Some concern exists as to developments in emerging markets, most notably in Eastern Europe, where individual countries are increasingly moving towards the European model of nationally inspired rules and regulations.

### REGIONAL DISTRIBUTION

As the provision of accountancy services usually requires a degree of geographical proximity to clients, the regional distribution of accountancy services throughout the EU closely mirrors the regional distribution of economic activity in general. However, special concentrations can be noted in the major financial and administrative centres. Another determining factor is the scope of practice permitted to the profession, with a relatively greater concentration of providers in those Member States with a broad-scope profession.

## ENVIRONMENT

There is a clear and definite growth in the importance given to environmental accounting and auditing. The number of companies disclosing environmental information in their annual reports is growing, although the information in most cases is limited to that of a qualitative nature, with no assessment of the financial impact. Companies in a number of countries are moving towards the production of "greener" financial statements; however, the development of an accounting and management reporting framework which specifically deals with environmental issues is some way off. The environmental audit requires knowledge and experience which go beyond that of a financial auditor. The financial auditor does have a role to play in this field, but only as part of a multi-disciplinary team of experts. The accountancy profession, with its considerable experience in carrying out financial audits and in reporting the results of such work, may provide the starting point for the creation of a new function comprising individuals from different professional backgrounds.

## REGULATIONS

Accounting and auditing services are highly regulated in the EU. Regulations are both numerous and complex and vary from one country to another, despite the attempts made at the Community level to bring them closer together. These regulations fall into two main categories: the regulation of the services themselves, including rules governing the manner in which the services should be provided; and the regulation of the accountancy profession and its members.

### Regulation of services

Many of the services provided by the accountancy profession have been regulated for a long time in most European countries, often in different ways. These services include: statutory audit, accounting, public sector audit, contribution audit, insolvency practice, etc. National regulations define the type of work to be carried out, when, under what conditions and by whom.

Statutory audit is the only service provided by the accountancy profession which is regulated in the same way in all EU countries. It is also the only service which has been subject to specific EU directives. As a result, all companies above certain minimum thresholds must now prepare and file financial statements audited by an independent expert. All the other services have, until now, kept their own national specificities. Certain services are regulated in some countries, but not in others; some are reserved to one profession in certain countries but are shared between several professions (or even forbidden to the accountancy profession) in others. Consequently, the range of services provided by the profession varies significantly within the EU, as does the degree of competition which exists in each of these markets between the accountancy profession and other professions.

### Regulation of the profession

In addition to the services it provides, the accountancy profession itself has been regulated for a long time in Europe. Because the economies of the Member States developed in different ways, the regulation of the profession differs from one country to another. The degree of self-regulation has decreased in recent years, mostly as a result of the implementation of EU directives.

In a majority of Member States, the profession has been created and organised by legal or public authorities. Even in those countries where the profession has been privately organised, it enjoys official recognition by the State, which entitles its members to carry out regulated activities. Regulation, be it public or private, applies to a number of areas, such as the definition of professional titles, protection of those titles, membership requirements, minimum levels of education and train-

ing, continuing education, ethical standards or codes of conduct, technical standards, additional licensing requirements for specialised areas of practice, rules for the establishment of professional firms, etc.

In the EU, only limited attempts have been made to harmonise these rules. This has resulted in the Eighth Company Law directive on "The Approval of Persons Responsible for Carrying Out Statutory Audits of Accounting Documents". The directive established minimum education and training requirements for statutory auditors, be they individuals or firms. However, Member States remained free to impose more demanding requirements, and many did.

Another directive applying to the accountancy profession is the First Mutual Recognition directive which, when implemented, allows professionals from any Member State to seek recognition of their qualifications so as to be able to carry out regulated activities in other EU countries without having to re-qualify. In the case of the accountancy profession, Member States can require applicants to pass an aptitude test on local laws and ethical requirements. Although such a regime previously existed in some countries such as Belgium, France, Ireland, Luxembourg and the United Kingdom, it is new for others. This new system should have come into force early in 1991, but its implementation has been delayed in a number of countries. However, it is already obvious that it will not generate significant flows of accountants across EU internal borders. Despite making it easier for professional accountants to establish themselves abroad, differences remain between national laws and regulations with which accountants must be familiar. These differences will continue to restrict the free movement of accountants within the EU.

## OUTLOOK

Growth of the accountancy services market is dependent on the general state of the economy, and the current recovery has benefited the accountancy profession as it has all others. However, the shape of the economy does not seem to be the main challenge accountants face at the moment, as it is very likely that their activities will sooner or later resume with double-digit growth.

The recent wave of financial scandals, and the litigation which followed, has had an effect on the whole profession. Some now question its credibility. Even if one can argue that accountants are easy scapegoats for business failures at a time of economic recession, the challenges ahead for the profession now include, in addition to the increased financial pressure resulting from the huge claims made against its biggest members, the evolution of laws and regulations that may limit its freedom to act, and the strengthening of its public standing. Considerable work on these issues has started already, both inside and outside the profession, and no doubt will lead to a satisfactory response.

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# Market research

## NACE 839.1

The EU accounts for 38 % of the world market for market research. Four of the world's largest ten market research companies have their headquarters in the EU. 50 % of all EU market research is bought by manufacturers, 12 % by the public sector and 15 % by the service sector; 67 % of research is for consumer products and services. The market research sector employs more than 29 000 permanent employees and over 86 600 interviewers, as well as freelance researchers and other self-employed consultants and sub-contractors.

### INDUSTRY PROFILE

#### Description of the sector

Marketing research is covered by NACE category 839.1 and is distinct from management consultancy. Market research analyses the markets for products and services. It provides a flow of information between consumers and suppliers on what people want and why they want it. It is used by decision makers to:

- identify and define opportunities, threats, competition and emerging trends;
- initiate, modify and evaluate marketing activity;
- improve understanding of marketing processes.

Marketing research enhances economic efficiency by enabling companies and other organisations to provide the goods and services that customers want, by investigating their needs, attitudes and behaviour. This helps companies to avoid wasting resources by developing unwanted products and services, or not communicating the benefits of their goods and services adequately enough. Marketing research designs a method of collecting the information required to address these issues;

manages and implements the data collection process; analyses the results and communicates the findings with recommendations for action. In recent years, marketing research has heightened manufacturer and governmental awareness of the increasing public concern about environmental and associated health issues.

The structure of the market research industry is remarkably similar among the Member States. Generally, the market can be divided into three areas:

- **Media market research:** This measures the readership of newspapers and magazines, audiences of television, radio, videos and films; and even viewers of outdoor billboards and posters. This can be done by asking sample households to keep diaries of their media habits, or by day-after interviews, but electronic devices such as "peoplemeters" - which record television viewing habits - are being increasingly employed. Pressures to monitor, justify and optimise expenditures on advertising, sponsorship and promotions have increased with the emergence of a global marketplace and ensuing fragmentation of audiences. More and more, advertisers need to know if they are reaching the right targets to ensure that their commercial communications maximise volume sales and profitability throughout the course of a brand's lifetime.
- **Warehouse and shop auditing:** Electronic scanner information can be gathered through bar code scanning technology to provide detailed sales data on a daily basis. From this information, analyses of consumption can be made. It can be used, for instance, to track the effects on sales of advertising, pricing strategies and special promotions.
- **Specialised market research:** This includes both quantitative and qualitative research to determine consumer behaviour and attitudes. Quantitative research comprises statistical sampling and analysis of the respondents' views obtained through interviews (face-to-face, telephone or mailed questionnaires). Qualitative research includes group discussions and in-depth interviews with individuals.

**Table 1: Market research  
Turnover (1)**

(million ECU)	1990	1991	1992	1993
Belgique/België	71	73	70	74
Danmark	27	30	32	36
BR Deutschland	490	548	637	703
Hellas	14	18	21	25
España	136	146	148	177
France	540	545	571	604
Ireland	14	15	15	15
Italia	254	281	290	261
Luxembourg	1	1	1	1
Nederland	123	136	144	164
Portugal	16	18	22	25
United Kingdom	539	553	565	599
EU	2 225	2 364	2 516	2 684
Other Europe (2)	279	294	309	323
Europe	2 504	2 658	2 825	3 007
USA	1 916	2 171	2 226	2 690
Japan	471	484	499	603
Other (3)	641	673	713	756
World	5 532	5 986	6 263	7 056

(1) Excludes market research conducted "in-house" by marketing departments, advertising agencies, governmental organisations, academic institutions, etc.

(2) Europe excluding EU countries.

(3) No complete data are available for 'other' parts of the world; the assumption has been made that the annual growth rate was 5% for 1990-91, and 6% for 1992-93.

Source: ESOMAR Annual Market Study



**Table 2: Market research  
National shares of EU Member States, 1993**

(%)	Market research expenditure	Advertising expenditure (1)	Gross domestic product	Population
Belgique/België	3	2	3	3
Danmark	1	2	2	2
BR Deutschland	(2) 26	(3) 28	(2) 29	(2) 23
Hellas	1	1	1	3
España	7	16	8	11
France	23	15	20	17
Ireland	1	1	1	1
Italia	10	12	16	17
Luxembourg (4)	0	0	0	0
Nederland	6	5	5	4
Portugal	1	1	1	3
United Kingdom	22	18	15	17
EU	100	100	100	100

(1) Data refer to the 1992 market situation due to the unavailability of the 1993 data.

(2) Including East Germany

(3) Excluding East Germany

(4) Less than 0.5 %

Source: ESOMAR Annual Market Study, Eurostatistics, The European Advertising & Media Forecast

Research can also be categorised by its different characteristics, for instance, that which is continuous (e.g. audits and panels) and that which is ad hoc. Another distinction can be made between single-client studies and omnibus and other syndicated surveys wherein clients can buy space for specific questions they wish to ask.

#### Recent trends

The rapid growth in market research since the 1950s was interrupted by the economic recession triggered by the oil crises of the 1970s. The 1980s saw an annual real growth in excess of 10 % with very strong growth in Southern Europe, albeit from a low base. Growth has slowed since 1989 because of the recession. Nevertheless, the market research industry has outperformed the advertising business since then. In the EU, the industry grew by 6 % both in 1991 and 1992, and by 7 % in 1993.

#### International comparison

The ESOMAR study on the research industry showed a 7 % growth in the size of the market within the EU from 2 516 million ECU in 1992 to 2 684 million ECU in 1993 (see Table 1). This includes work conducted by research institutes but excludes in-house research by companies, advertising agencies, governmental and academic bodies and consultants. The EU accounted for 38 % (2 684 million ECU) of the total world market for market research in 1993. The USA accounted for 38 % (2 690 million ECU) and Japan for 9 % (603 million ECU).

The 1993 EU industry growth rate of 7 % compares to 21 % in both the USA and Japan when quoted in ECU. However, the major realignment of currencies over this period distorts the true picture. When calculating in local currencies and taking inflation into account, real growth rates were 5 % for the EU, 6 % for the USA and there was a shrinkage of 6 % for Japan.

**Table 3: Market research  
External trade by value, 1993**

(%)	Client origin for EU research organizations		Subcontracted by research organizations to foreign research suppliers
	National	Foreign	
Belgique/België	79	21	13
Danmark	86	14	4
BR Deutschland	70	(1) 30	(1) 2
Hellas	68	32	4
España	88	12	(2) 0
France	89	11	6
Ireland	87	13	3
Italia	80	20	8
Luxembourg	87	13	(2) 0
Nederland	88	(1) 12	5
Portugal	89	11	6
United Kingdom	84	16	9
EU	81	19	6

(1) 1991

(2) Less than 0.5 %

Source: ESOMAR Annual Market Study

**Table 4: Market research  
Source of revenue, 1993**

(%)	Manufacturing	Services	Advertising agencies	Public sector	Wholesale/retail	Research organisations	Others
Belgique/België	36	19	10	12	7	13	3
Danmark	48	19	7	6	11	6	3
BR Deutschland	64	6	2	12	4	4	8
Hellas	59	12	9	2	3	10	5
España (1)	25	13	7	24	8	19	3
France (2)	50	19	4	11	6	4	6
Ireland	42	19	4	25	5	5	0
Italia	50	8	16	6	6	10	4
Luxembourg	5	30	5	45	5	10	0
Nederland (3)	40	23	3	15	10	9	0
Portugal	57	9	13	7	4	7	4
United Kingdom (4)	44	21	4	13	9	4	6
EU	50	15	5	12	7	6	6

(1) Estimate based on 1992 data

(2) Estimate based on 1990 data

(3) Estimate based on 1991 data

(4) Apparent changes since 1992 may partly be attributable to modifications in data sources.

Source: ESOMAR Annual Market Study

**Table 5: Market research  
Employment (1)**

(units)	1990	1991	1992	1993
<b>Number of employees (2)</b>				
Belgique/België	700	800	800	820
Danmark	405	400	390	400
BR Deutschland	(7) 5 719	7 500	6 650	6 774
Hellas	548	575	700	664
España	(4) 2 000	(4) 1 800	(4) 1 900	2 313
France	(7) 4 500	(4) 5 600	(4) 6 720	(4) 6 500
Ireland	270	270	280	277
Italia	(7) 2 750	1 200	1 200	(5) 2 000
Luxembourg	(4) 13	(4) 11	(4) 11	(4) 13
Nederland	(7) 2 200	(7) 2 200	2 000	2 697
Portugal	700	670	670	750
United Kingdom	(7) 6 700	(4) 6 500	(4) 5 300	(4) 5 800
EU	(6) 26 505	(6) 27 526	(6) 26 621	(6) 29 008
<b>Number of self-employed (3)</b>				
Belgique/België	N/A	1 300	1 300	2 000
Danmark	N/A	1 300	1 400	1 400
BR Deutschland	N/A	30 000	29 800	31 500
Hellas	N/A	1 567	1 635	1 739
España	N/A	N/A	N/A	6 000
France	N/A	8 000	7 000	10 000
Ireland	N/A	550	600	700
Italia	N/A	5 000	6 000	6 000
Luxembourg	N/A	80	100	100
Nederland	N/A	7 000	7 000	8 372
Portugal	N/A	2 000	2 000	2 000
United Kingdom	N/A	20 000	16 800	16 800
EU	N/A	N/A	N/A	86 611

(1) Most figures are estimates.

(2) Including permanent employees

(3) Covers freelance interviewers

(4) Number excluding full-time research functions within client companies.

(5) Change implied in comparison with 1992 market partly attributable to different basis for estimate.

(6) Total excluding full-time research functions within client companies for some countries.

(7) Estimate based on 1991 data.

Source: ESOMAR Annual Market Study

**Table 6: Market research  
World top 10 market research companies, 1993**

	Turnover (million ECU) (1)	Countries with office (2)	Head office	Ownership
1 A.C. Nielsen	1 075	35	USA	Dun & Bradstreet, USA
2 IMS International	526	47	USA	Dun & Bradstreet, USA
3 IRI	287	26	USA	Public Company, USA
4 GfK	189	(3) 26	D	Public Company, D
5 Arbitron	147	1	USA	Ceridian Corp., USA
6 Sofrès/Cecodis	144	8	F	Finalac-led Group, F
7 Research International	126	45	UK	WPP, UK
8 Video Research	103	1	JPN	Dentsu et al, JPN
9 Walsh International/PMSI	99	14	UK	Private Company, USA
10 Westat	97	1	USA	Private Company, USA

(1) Excluding associates

(2) Including associates

(3) 1992

©SOURCE = Source: ESOMAR Annual Market Study, major research companies, J. Honnichl/Marketing News

As shown in Tables 1 and 2, in 1993 Germany had the largest share of market research turnover in the EU of 703 million ECU (26 %), ahead of France at 604 million ECU (23 %) and the UK at 599 million ECU (22 %). Italy was in fourth place with 261 million ECU (10 %), followed by Spain at 177 million ECU (7 %) and the Netherlands with 164 million ECU (6 %). Germany, France and the UK continue to account for over two-thirds of EU market research turnover.

After taking inflation into account, and calculating in local currencies, Spain and Luxembourg experienced strong real growth rates of 31 % and 29 %, respectively. Other relatively strong growth rates were in Portugal, with 14 %; Greece, with 13 %; and the UK with 11 %. Denmark had a 9 % increase in growth. Finally, growth was at 2 % in Germany, while Belgium, the Netherlands and Ireland all increased just 1 % in terms of their real growth. Meanwhile, turnover in France and Italy was static.

If market research turnover is compared with population, Gross Domestic Product and advertising expenditure (see Table 2), the significance of market research in 1993 in France, the Netherlands and the UK is apparent. At the same time, one notices that its use was more limited in Greece, Italy, Portugal and Spain.

### Foreign trade

As shown by Table 3, 81 % of the market research conducted in the EU was commissioned by domestic clients in 1993. The share of international research has grown steadily, rising from 10 % in 1990, to 14 % in 1991, 16 % in 1992 and 19 % in 1993. Foreign clients are particularly important for Belgium, Germany, Italy, Greece and the UK. Of the total European research expenditure in 1993, 6 % went to multi-country research where an institute in one country coordinates studies and subcontracts fieldwork abroad. UK institutes conducted about 33 % of such work, with French institutes handling 22 % and Italy 13 %.

## MARKET FORCES

### Demand

Manufacturers of consumer packaged goods are the main buyers and users of market research. In fact, 50 % of all research done in the EU is for manufacturers (see Table 4). A broader range of business and non-commercial organisations is now using market research to facilitate their decision-making. Taking 15 % of research spending, service industries are growing

clients, with hospitals, banks and airlines now amongst those who use market research to improve the quality of their services. The public sector is a significant client with 12 %, and research is becoming an important tool through which local and national governments receive feedback about public reaction to their policies. Additional clients are: wholesalers and retailers (7 %), other research organisations (6 %) and advertising agencies (5 %). Other clients (6 %) account for the rest. In the EU, approximately two-thirds of total expenditure stems from research for consumer products and services, while the non-consumer sector (including business-to-business and government research) constitutes the remaining one-third.

There have been major changes in the information needs and priorities of marketing companies. A key factor is the growing number of multinational companies and their branded properties. An increased demand for pan-European information is exacerbated by the proliferation of media. This underscores the need to remove barriers created by different national statistical definitions so that survey findings are more comparable between nations. Clients require research companies to have a wider geographic spread of resources while maintaining a strong local presence and perspective so that national insight is not lost in the global picture.

Another major influence is the growth of profitable and relatively undeveloped new markets in South East Asia. Furthermore, whilst markets in Central and Eastern Europe will grow relatively slowly in the short term, the potential demand is significant in the long term. The growth of demand depends on the productive investment rate as well as variables such as qualification standards, and is strongest in those countries where the labour force is highly qualified. Business opportunities for market research are increasingly visible as public institutions have begun conducting their own studies and a number of cooperation agreements between EU and Central and East European private companies have been made.

Brands are increasingly viewed as a company's key asset. A greater emphasis on building and maintaining strong brands will have a major influence on the types of market research that are in demand, as companies strive to understand brand elasticity and the measurement of brand relationships, positioning and brand equity, particularly in relation to the growing competition coming from own-brands.

Growing areas are research into customer satisfaction, branding and corporate image, as well as for the business-to-business, finance, retail, utility and legal sectors. Studies suggest

that expenditure on most types of market research is likely to increase over the next five years. This will be markedly so in the areas of usership and attitude studies, product testing, advertising and concept development and evaluation, as well as advertising campaign tracking, particularly with the growth of electronic and published media.

### Supply and competition

The trend of many major US corporations to disband or downsize their market research departments during the past few years has become evident in Europe as well. This has allowed research institutes to develop new, and often closer, relationships with clients, through which the client benefits from the switch from fixed to variable costs.

Changes in technology, growth in the information industry, diversification of life-styles and proliferation of media all have made marketing research that monitors changes in the market place that much more valuable. Technological developments have meant a greater detail in and frequency of reporting, which has inspired the opinion widely amongst many users that a sort of data overload exists. This, along with the diversification of sources of marketing data, has meant that it is increasingly necessary for researchers to help marketing management understand the implications of the data so that they can effectively apply it in their marketing strategy. In addition, they must provide added value to their clients by offering diagnostic, interpretative and predictive services and by gaining expertise in the client's business sector. It also implies that clients will demand an on-going strategic counselling relationship rather than one characterised only by a string of separate projects.

This trend is already evident, with a growing number of researchers acting as consultants to companies. ISO 9000 accreditation has been taken up by research institutes in certain countries, notably the Netherlands and the UK, as a means of guaranteeing to clients - who are not professional market researchers themselves - that procedures exist to confirm that quality standards are being upheld.

There is considerable cost and price variation between the EU countries, largely reflecting differences in salaries and social costs. For instance, freelance and part-time interviewers in France and other countries are eligible for benefits. The subsequent costs for employers include: income tax, social security contributions, holiday entitlements, redundancy pay and pension provisions. In other countries, they are employed on a very different basis. This will probably change with greater harmonisation of the benefits that freelance and temporary workers are entitled to in the EU. Other factors affecting pricing include: the degree of competition in the local market, the enhanced efficiency that comes with greater experience in certain types of research, the mix of research and data collection methods and the geographic dispersion of populations.

In an ESOMAR survey designed to discover how research prices vary from one country to another, research institutes were asked to state what price they would quote a client to carry out six different types of surveys. On average, France and Italy emerged as the most expensive countries, with Belgium, Greece and Portugal as the cheapest. In 1991 the rank order in terms of average research costs from the most to the least expensive was France, Italy, Germany, Ireland, UK, Denmark, Spain, The Netherlands, Belgium and Greece, with Portugal being the least expensive. Research prices in Germany and Denmark were relatively much lower than they were three years before. These are relative changes and they should not necessarily be taken to mean that research prices in Germany and Denmark had fallen in absolute terms.

Continuous research has always demanded a higher level of investment than ad hoc research. The advent of scanners, "peplemeters" and single-source data services has added further

**Table 7: Market research**  
**Number of research organisations in EU member countries, 1993 (1)**

	1993	1993/92 (% change)
Belgique/België	35	17
Danmark	13	-13
BR Deutschland	109	4
Hellas	20	11
España	40	5
France	77	0
Ireland	6	20
Italia	74	-1
Luxembourg	3	0
Nederland	46	10
Portugal	11	22
United Kingdom	124	6
EU	558	4

(1) The figures refer to the numbers of research organisations with a full listing in the ESOMAR 1994 Directory which reflects the market situation in the year 1993; comparison has been made with the listings in the 1993 Directory (1992 market situation).  
Source: ESOMAR Directory 1994

to the high technology and investment that characterise this sector. Data collected from these and other sources increasingly form part of database management information systems (decision support systems) - requiring a further substantial investment. Computer-aided interviewing, especially that which is done by telephone (CATI) has involved sizeable investments in facilities with as many as 20 to 100 telephone booths along with the accompanying telecommunication and computing equipment.

Over the past decade, more EU research companies in the ad hoc sector have begun to emulate US research firms in standardising and branding their research products. This too involves investment, although typically more in the time of research technologists and innovators. Significant investment in designing, testing and validating new research techniques, and the subsequent marketing of these techniques to customers, is only possible if the costs can be amortised by applying the same techniques across many countries over time.

These costs, and the protection afforded to research suppliers by time series data, have created entry barriers, which have led to a small number of very large players. Corporate prescriptions for research buyers identifying the preferred research suppliers or techniques world-wide, as well as a demand for increasingly sophisticated international co-ordination of research projects have all led to the concentration of ownership, and the formation of international research chains or networks of national agencies.

Parallel to this has been the emergence of more specialist research companies dedicated to CATI omnibus services, advertising tracking and research in particular business sectors, such as pharmaceuticals and automobiles. Larger research businesses also have been broken down into separate operating divisions or subsidiaries focusing on specific areas of information need or research techniques. Clients can now choose among a wide spread of suppliers ranging from large, full-service research companies to specialist research boutiques and consultants.

Market research always has been highly competitive and subject to intense price pressure. Recession exacerbates this tendency, with a number of research professionals leaving research institutes or client corporations to set up their own



**Table 8: Market research****Top 10 market research companies in the EU, 1993**

	EU market research turnover (1) (million ECU)	EU countries with office	Current ownership/Acquired/ Merged with
1 A.C. Nielsen	(2) 494	11	Dun & Bradstreet, USA (acquired 1984)
2 IMS International	(2) 218	11	Dun & Bradstreet, USA (acquired 1988)
3 GfK	(2) 174	10	Public company, D (ex-public association)
4 Sofrès/Cecodis	144	7	Fimalac-led group, F (ex-Sema; acquired Cecodis 1992)
5 Research International	95	10	WPP, UK (acquired 1989)
6 IPSOS	91	6	Public company, F (acquired Makrotest (Italy) 1990; RSL, GFM-Getas, ECO 1992; Insight, WBA, Explorer, Infométrie 1993)
7 Infratest/Burke	84	9	Public company, D (acquired Burke in Europe 1980)
8 Taylor Nelson AGB	66	4	Public company, UK (acquired MaS 1987, Addison 1990, AGB 1992)
9 MAI	47	2	Public company, UK (acquired MIL, NOP, SRA 1989)
10 Millward Brown	37	5	WPP, UK (acquired 1989)

(1) Excluding associates

(2) The figures reported derive from the extrapolation of the ratio between EU: non-EU turnover for the company in 1992 based on the worldwide turnover figure for 1993.

Source: ESOMAR Annual Market Study, major research companies, J. Honomichl/Marketing News

consulting businesses. An estimated total of 29 000 people are employed on a permanent basis in the EU market research industry with a further 86 600 as freelance interviewers (see Table 5). In 1993, several countries saw a slight rise in the number of permanent employees, evidence that despite the effects of automation and downsizing for greater efficiency, the industry is coming out of recession.

External competition is emerging as management consultants, accounting firms and database marketing organisations also have begun offering marketing and management information. Changes in client requirements and intensifying external competition mean that new skills are required within the market research industry. In addition to having expertise in marketing research techniques, researchers increasingly are required to possess a broader range of marketing and management skills, and at the same time to specialise in a specific sector, in order to best serve their clients. Furthermore, interviewers are requiring more training, particularly those who use portable computers for interviewing instead of paper questionnaires.

### Production process

In 1993, 57 % of research was ad hoc and 43 % was continuous (27 % on panel research, 7 % on omnibus research and 9 % on other continuous research). About 81 % of ad hoc research expenditure in the EU is from quantitative research and 20 % qualitative.

Data collection methods in quantitative research include mail survey, telephone and face-to-face interviews. Despite the higher costs involved, face-to-face studies continue to account for the largest part of quantitative research expenditure in the EU: 27 % of total turnover compared to 13 % telephone and 4 % mail studies. Smaller countries with a highly developed infrastructure tend to make more use of telephone studies (e.g. 35 % of research in Luxembourg) compared to 3 % in Greece, 5 % in Portugal and 9 % in Spain. The proportion of telephone studies is rising because of cheaper costs, higher telephone penetration, faster delivery of data and the problems associated with conducting face-to-face interviews in some inner city areas.

Group discussions account for a larger part of qualitative research expenditure in the EU than do in-depth interviews.

## INDUSTRY STRUCTURE

### Companies

There are well over 1 500 market research companies and consultancies in the EU, including the headquarters of several of the world's largest. Four of the top ten market research companies in the world and two of the world's major research chains (networks of independent companies) have their headquarters in Europe (see Table 6). Although there are a number of major players in the EU, the industry is characterised by considerable fragmentation and intense competition nonetheless. Barriers to entry are low except in the high-tech/high investment areas. Many of the major research organisations are listed in the ESOMAR membership directory (see Table 7).

Historically, pre-tax margins have been modest (averaging around 5 to 6 % of turnover for ad hoc research companies) though they were slightly higher in recent years. Substantially higher margins are earned by companies with multi-client services and a contractual customer base.

### Strategies

Several companies have restructured to survive in the rapidly changing market. A number of mergers and acquisitions have taken place, often as part of the creation of global marketing service corporations. As a result, industry concentration has increased, and eight major research holding companies have been established, as shown in Tables 8 and 9. Two Dun & Bradstreet companies - A.C. Nielsen, the world's largest market research organisation and IMS International, the second largest - were restructured in 1993 to form D & B Marketing Information Services.

Developments in automation and technology, along with the growth of international research chains, have enabled buyers to go to one head office to commission a research project in many countries or several regions. A variation of this is the licensing of particular research techniques or brands in other countries. This is practised most commonly by US research firms which license their techniques in advertising pre-testing, simulated test market, brand position and customer satisfaction/service quality.

The other major structural change is horizontal specialisation. Increasingly, market research organisations in the EU have set up specialist divisions or operating subsidiaries that concentrate on key business sectors (e.g. media, health care, auto-

motive, finance) or research specialisation (e.g. qualitative, advertising, customer care). Also, growth in international research has led some research suppliers to set up multi-country syndicated services on a regional or global basis.

Vertical integration has always been a feature of the European market research industry. All but the smallest companies have combined a client service function with a data handling facility (data collection, preparation, processing and printing). However, it seems that some companies are starting to question the effectiveness of this arrangement, especially where personal interviewing fieldwork is concerned. For instance, the US market typically has been characterised by a separation between the ownership of research companies and fieldwork suppliers.

The client-research company relationship is likely to be affected by growing Total Quality Management (TQM) and Service Quality demands and their associated measurement needs. Many companies are adopting TQM and cultivating service quality. Research organisations should expect to do the same if they wish to continue offering a consistently high level of quality in their services.

### Impact of the Single Market

Market Research on a national level has traditionally been a well developed market. On the contrary, on the European level, the market was relatively immature. The inception of the Single Market has brought about a radical growth in multi-country market research resulting in a doubling of the volume during the last ten years. The growth has been particularly evident in the Mediterranean countries.

The opening and expansion of the market has resulted in increasing competition which is mainly based on price. It has also led to a higher mobility of labour, especially of personnel in higher positions. This in turn has led to a convergence of compensation levels, although different laws on social security and benefits in Member States lead to considerable differences in labour cost.

The priorities for the coming period are the following. Special attention should be paid to the installation of a common currency, or alternatively, a common currency parallel to the current national currencies. Furthermore, harmonisation of in-

direct tax levels is of importance. Regarding the legal framework, harmonisation of data protection and privacy measures needs addressing considering that a forthcoming directive is expected to facilitate the implementation of different rules in individual Member States.

### REGIONAL DISTRIBUTION

When a market reaches a certain level of maturity, an equilibrium is established, of which continuous research makes up about one-third of total expenditure. Other regular services (e.g. advertising tracking, quality of service monitoring) add a further semi-contractual sector, partly substituting for ad hoc studies and partly reflecting overall growth in the information market. Other geographic variations stem from broader economic and marketing influences. In smaller countries, less research on new product development is undertaken as the major R&D activities and corporate headquarters are located elsewhere. This leads to more research involving the concepts, products or communication approaches that have been developed and researched more thoroughly in the larger EU markets.

Market research tends to be used relatively less in countries where the emphasis is on industrial products. There have been different patterns between the post-war evolution of markets and that of marketing. Restrictions on television advertising (and hence, related research) in a number of countries also have contributed to this differential use of market research across Europe as have varying levels of retail trade concentration (broadly, more concentration in the North than in the South). These and other factors mean that compared with the national level of economic activity, the research market is particularly well developed in the UK, France and the Netherlands and somewhat less so in Italy, Greece, Portugal and Spain.

### REGULATIONS

Market research, like many other industries, depends upon self-regulation. The ICC/ESOMAR International Code of Marketing and Social Practice is applied by all ESOMAR members and the national marketing research associations in all EU Member States. This Code guarantees the respondent's ano-

**Table 9: Market research  
Corporate parents of EU market research companies, 1993**

	Market research turnover in EU (1) (million ECU)	Main research companies in EU	EU countries with office (incl. associates)	Home country of corporate parent
1. Dun & Bradstreet	(2) 712	Nielsen, IMS	11	USA
2. GfK	(2) 174	GfK	10	D
3. WPP	165	Research International, Millward Brown, MRB Group	10	UK
4. Sofrès/Cecodis	144	Sofrès, Sobemap, Sofemasa, Abacus, Cecodis	7	F
5. IPSOS	91	IPSOS, Makrotest (Italy), RSL, GFM-Getas, ECO, Insight, WBA, Explorer, Infométrie	6	F
6. Infratest/Burke	84	Infratest, Burke Europe	9	D
7. Taylor Nelson AGB	66	Taylor Nelson, MaS, Addison, AGB	4	UK
8. MAI	47	MIL, NOP, SRA	2	UK

(1) Excluding associates

(2) The figures reported derive from the extrapolation of the ratio between EU: non-EU turnover in 1991 based on the worldwide turnover figure for 1993.

Source: ESOMAR Annual Market Study, major research companies, J. Honomichl

nymity and specifies responsibilities towards respondents, the rights of respondents, relations with the general public, the mutual responsibilities of clients and researchers and reporting standards. The Code is particularly relevant in the light of the EU Directive on privacy of personal data. For the time being, such restrictions vary from one Member State to another. Many countries offer an exemption of some restrictions to marketing research, recognising that it deals with aggregated and anonymised data and not personalised data.

Another Directive which could influence telephone research, is the proposed Directive for the protection of personal data in the context of digital telecommunications networks, particularly the Integrated System Digital Network (ISDN) and digital mobile networks.

The proposed Directive on Temporary Employment is likely to affect most free-lance interviewers and ultimately drive up market research prices in some countries. At the moment, legislation on social security and other benefits varies widely among Member States.

Other restrictions which vary from country-to-country can affect the right to conduct and publish public opinion polls, particularly in the run-up to an election. Although political opinion polling constitutes only about 2 % of the entire market research industry and actual pre-election polling less than 0.3 %, it naturally attracts a lot of media and public attention.

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## OUTLOOK

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The adoption of TQM by many major corporations brings the need for a method to measure its success, both initially and over a period of time. This will involve behavioural measures of business control monitors in efficiency and quality, satisfaction studies amongst internal as well as external customers and the effectiveness of the communication between and studies amongst personnel. Furthermore, research companies increasingly will be working with central and local government institutions in areas including education, health and crime prevention.

Another trend is the enhancement of tracking services with a demand for more multi-country tracking on a comparative basis, with more emphasis on various types of brand equity measurement, and a wider scope for tracking studies. The latter will include business control monitors, advertising effectiveness, business efficiency and environmental and other issues of public concern.

Timeliness is becoming an increasingly important issue as clients need more immediate data to support a range of strategic decisions which go beyond marketing. Downsizing already has been seen in the USA and the UK and will be a continuing trend with many companies undergoing restructuring and process re-engineering in an attempt to cut costs and increase efficiency. This will feed client demand for marketing intelligence and added-value services from marketing research institutes, and not just market data.

A major change will be the move towards pan-European data collection where the region is treated as an entity. One-stop data collection through integrated European data handling companies will move the industry further down the road of international research co-ordination and steps in this direction have been taken already with computer-assisted telephone interviewing.

The outlook for market research is good. The market research industry will need to make certain that it is proactive rather than reactive, and researchers must ensure that they provide not only techniques and data, but timely advice and strategies for decision-makers as well.

Written by: ESOMAR

The industry is represented at the EU level by: The European Society for Opinion and Marketing Research (ESOMAR). Address: J.J. Vlottastraat 29, NL-1071 JP Amsterdam; tel: (31 20) 664.2141; fax: (31 20) 664 2992.

# Management consultancy

NACE 839.1

Management consultancy has shown an impressive growth for over a decade, both in terms of revenue and employment. Since 1992, however, growth has slowed down, forcing some firms to close entirely. The first signs of recovery have become evident only in 1994.

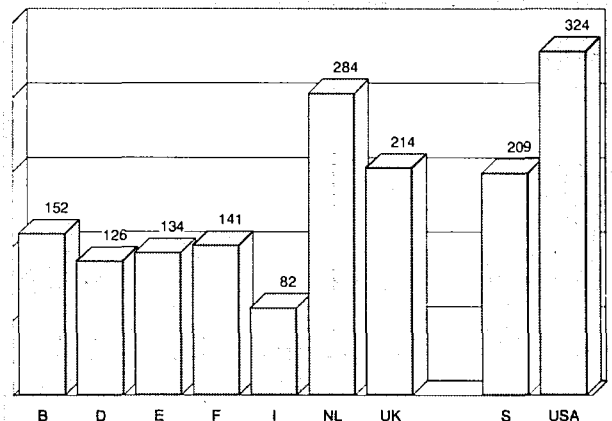
The industry as a whole is maturing and entering an era of further professionalisation and internationalisation. The business provides services to improve performance; therefore, management consultancies' function is to anticipate future growth for their clients.

## INDUSTRY PROFILE

### Description of the sector

Management consulting is an advisory service contracted for and provided to organisations by specially trained and qualified persons who assist the client organisation, in an objective and independent way, to identify management problems, analyse and recommend solutions to them, and help, when required, in the implementation of these solutions. Management consulting comprises advisory services in areas such as information technology (information strategy and architecture, systems development, project management); corporate strategy (planning, finance, communication); operations management (i.e. production management, research and development, total quality management, logistics); marketing and sales; human resources and organisation development; and finance and accounting. In fact, the services offered are very diverse, and

Figure 1: Management consultancy  
Number of management consultants per million inhabitants, 1993



Source: Alpha Publications, London

include, amongst others, environmental impact studies, economic studies and project management.

The clients of management consultancy firms are to be found in all sectors of society, e.g. manufacturing (of consumer goods, industrial products, etc.), private sector services (banking, transportation, communications, entertainment, etc.), public sector services (government, health care, education, etc.) and utilities.

Market penetration of management consultancy differs from country to country. Relative to population, the Netherlands, the United Kingdom and Sweden are the most "consultancy-intensive" Member States. In absolute terms the UK, Germany

Table 1: Management consultancy  
Turnover, number of enterprises and consultants (1)

	Number of enterprises			Number of consultants			Turnover (million ECU)			FEACO share of total market (%)			
	1989	1990	1992	1989	1990	1992	1989	1990	1992	1993	1992		
Belgique/België	24	21	19	20	853	877	848	N/A	112	129	141	N/A	80
Danmark	50	46	46	34	344	386	340	424	42	71	68	57	45
BR Deutschland	270	310	310	472	7 000	7 000	9 000	12 867	1 400	1 550	2 053	2 065	40
Hellas	N/A	N/A	21	24	N/A	N/A	215	250	N/A	N/A	80	95	N/A
España	35	29	29	50	1 300	1 900	N/A	N/A	385	224	N/A	N/A	20
France	40	48	50	60	1 990	2 000	3 175	3 305	323	432	455	415	60
Ireland	15	15	15	15	369	316	N/A	N/A	N/A	47	N/A	N/A	80
Italia	48	55	50	53	2 310	2 400	2 092	2 092	300	320	212	212	50
Nederland	30	27	29	28	1 323	1 450	1 797	1 692	151	172	227	242	70
Portugal	19	19	19	14	733	733	N/A	N/A	N/A	70	N/A	20	N/A
United Kingdom	31	32	32	36	6 760	7 265	6 321	6 706	980	1 170	1 012	1 111	55
EU (2)	562	602	620	806	22 982	24 327	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Österreich	N/A	N/A	N/A	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Suomi/Finland	N/A	N/A	N/A	148	N/A	N/A	N/A	43	N/A	N/A	N/A	4	N/A
Sverige	N/A	N/A	N/A	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Central Europe (3)	N/A	N/A	N/A	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Global market (4)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25 000	N/A

(1) Figures for Europe cover members of FEACO.

(2) Excluding Greece (1989-1990) and Luxembourg

(3) Bulgaria, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Slovenia

(4) Source: Management Consultant Int. (MCI)

Source: FEACO



**Table 2: Management consultancy  
Leading consultancy firms within the EU, 1993 (1)**

BR Deutschland	España	France	Italia	Nederland	United Kingdom
A.T. Kearney (USA) Andersen (USA)	Andersen (USA) Boston Cons. (USA)	Andersen (USA) Bossard (F)	Andersen (USA) Bain Cueno (USA/I)	Andersen (USA) Berenschot (NL)	Andersen (USA) Coopers Lybrand (UK)
Boston Cons. (USA) Ernst & Young (USA)	Control Pres. (E) Coopers Lybrand (UK)	BPI Group (F) CGI/Eurequip (F)	Booz-Allen (USA) Ernst & Young (UK)	BSO/Origin (NL) CMG (NL)	Ernst & Young (USA) Gemini (F)
Gemini (F)	Ernst & Young (USA)	Coopers Lybrand (UK)	Galgano & Ass. (I)	Coopers Lybrand (UK)	ICI (UK)
KPMG (NL)	Gemini (F)	Gemini (F)	KPMG (NL)	Moret, Ernst & Young (USA)	KPMG (NL)
McKinsey (USA) Mummert + P. (D) Roland Berger (D)	I.O.R. (E) ICSA (E) Mc Kinsey (USA)	GSI (F) KPMG (NL) Price Waterhouse (UK)	McKinsey (USA) Praxi (I) SOI Group (I)	GITP (NL) KPMG (NL) McKinsey (USA)	PA (UK) PE (UK) Price Waterhouse (UK)
Siemens Nixdorf (D)	Price Waterhouse (UK)	Sema Group (F)	Telos Consulting (I)	Twijnstra Gudde (NL)	Touche Ross (USA)

(1) In alphabetical order  
Source: Alpha Publications, London

and France are the largest users of management consultancy services (see Figure 1).

### Recent trends

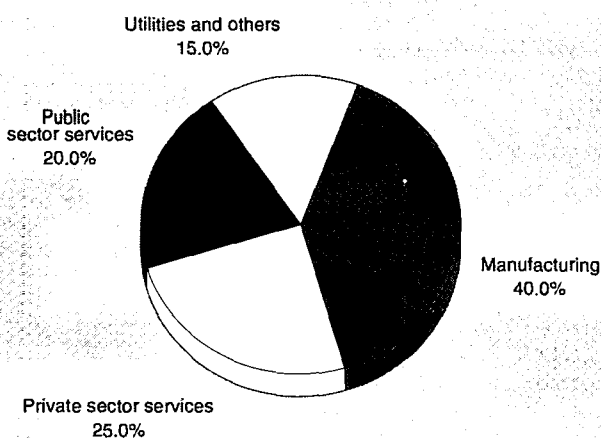
The total EU market for management consultancy services in 1993 is estimated at 9 000 million ECU. This is based on a survey conducted by FEACO (Fédération Européenne des Associations de Conseils en Organisation), whose members account for a significant share of the different markets (see Table 1).

The average revenue growth in the industry amounted to approximately 16 % per annum in the past five years. After a slowdown in 1992 (3 %) and 1993 (5-7 %) (growth was even less in Spain and Italy), a return to double-digit growth in the EU is expected in 1995, and the EU market could equal the US market by the year 2000. The consultancy market in the US is now estimated at 13.7 million ECU (Source: Consultants News).

The turnover per consultant depends on the type of service rendered and varies from 50 000 ECU to 300 000 ECU per annum, with an average of 150 000 ECU per annum. Recent trends in the consultancy industry can be summarised as follows:

- growing client sophistication and demand for value-added service;
- reduction of staff and even a shake-up of consultancies in some Member States;
- increase in the number of mergers, acquisitions and joint ventures;
- proliferation of aggressive solo and small consultancy operations;
- blurring of lines between traditional consultancy services and relatively new services (i.e. further penetration of information technology in practically all strategic and functional areas); and
- overall increase of competition in the industry.

**Figure 2: Management consultancy  
Market breakdown by type of client, 1993**



Source: FEACO

### MARKET FORCES

#### Demand

The demand for management consultancy services is closely linked with macroeconomic factors such as growth of Gross Domestic Product and government expenditure. Variances in the consulting market size are also caused by structural and cultural differences among European national economies. Part of the demand, however, is generated by the consultancy industry itself by introducing and disseminating new management concepts and methodologies, such as business process re-engineering (BPR), benchmarking, time-based competition, etc.

In most market segments, the demand for consultancy services is boosted by rapid changes in the macro-economic environment, technology and customer needs. At the same time, a strong increase in national and/or international competition obviously has an impact on demand as well. Clients are re-designing their strategies, which often entail cost reduction programmes and performance improvement in operations, organisation, information and communication, or even a drastic redesign of the business processes. Privatisation measures in

many Member States and, in particular, Central and Eastern Europe also create opportunities for the consulting industry.

Developing markets exist in Central and Eastern Europe. The number of consultancies in these regions, established by nationals as well as by international consultancy firms, is increasing rapidly. Typical consultancy services needed in these regions are: infrastructure studies, investment and market analyses, legal system assessment and management development programmes. Aid programmes initiated by the European Commission and individual Member States have induced many consultancies to take on assignments and even open up offices in the areas in question, although competition is stiff and fees are under pressure.

Another promising market for international consultancies is the Asia-Pacific region, especially in Hong Kong, Taiwan, Korea, China, Indonesia, Malaysia and Thailand.

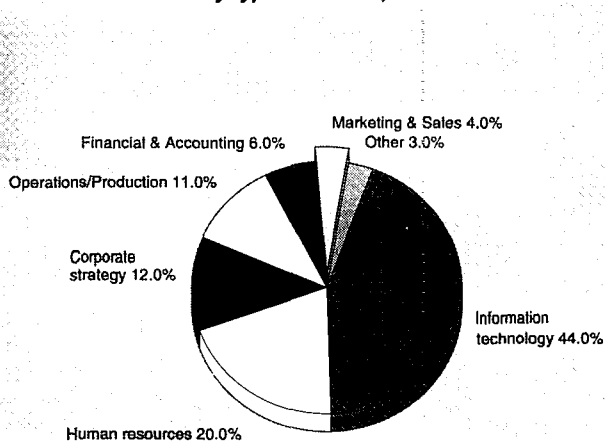
A market breakdown by type of client shows that the manufacturing industry generates 40 % of the revenues of the management consultancy industry, followed by the private and public sector services with 25 % and 20 % respectively. Utilities and other segments account for 15 % of total revenues. These are approximate percentages (see Figure 2).

A breakdown by type of service reveals that information technology (IT) is the most important type of service. This consultancy service accounts for 44 % of the total demand (revenues). Human resources rank second with 20 %, followed by corporate strategy and operations management with 12 % and 11 % respectively. Financial and accounting make up 6 % and marketing and sales 4 %.

### Supply and competition

The consultancy business in the EU is predominantly a local business. As recorded by FEACO, cross-border activities account for a scarce 15 % of total revenues. There is, however, no clear consensus in the industry as to what exactly constitutes cross-border activity. Anyway, more and more clients, especially in manufacturing and in the private sector services, are pursuing a European or even a global growth strategy, and international projects are definitely on the rise. Some consultancies handle international projects by setting up ad hoc teams with members from two or more countries. Others form a team that is based in one office and handles a large share of all international projects.

**Figure 3: Management consultancy Market breakdown by type of service, 1993**



Source: FEACO

The management consultancy industry used to compete with the internal consulting departments of large organisations (amongst others). In the past few years, however, many of these internal consultancy departments have undergone a reduction in staff, were privatised or sold to independent consultancies. Nowadays, management consultancy increasingly faces direct or indirect competition from computer firms, software houses, contract research firms, advertising agencies, accounting firms, banks, temporary work services, interim management firms, outplacement firms, consulting engineering firms and university-based consultancies. Some of these parties enter the traditional consultancy market, as is the case with IT-firms. Others offer services which more or less overlap traditional management consultancy services, as is the case with interim management and contract servicing.

## INDUSTRY STRUCTURE

### Companies

The supply of management consultancy services in the EU is very fragmented. The twenty largest consultancies, with turnovers varying from 80 million ECU to 800 million ECU, account for about 50 to 55 % of the total European market. Their individual share in the European market ranges from 1 % to 10 %. The remainder comprises over 50 000 small consultancies and an unknown number of 'solos'. The latter category has increased considerably, because many experienced executives laid off during the recession have set up their own consultancy business.

There are four broad categories of consultancies within the industry: generalists, strategy consultants, IT-specialists and niche players. Generalists usually offer a wide range of services covering some or all functional areas. Within this category, two sub-groups can be distinguished. The first sub-group comprises large consultancies with over 500 consultants each, most of them with global operations. The 'Big Six' accountancy-based consultancy firms (Andersen Consulting, Coopers & Lybrand, Deloitte Touche Tohmatsu, Ernst & Young Consulting Group, KPMG Management Consulting and Price Waterhouse) can be included in this sub-group. The second sub-group comprises medium-sized generalists, mainly focusing on their national market, but increasingly crossing borders, predominantly through networks or consortia of independent consultancies in different Member States.

Strategy consultants mainly target the top management of large corporations and government with consulting services in the area of strategy, policy and issues. The larger ones are based in the US and operate in the EU and/or worldwide through branch offices.

IT-specialists are active in areas such as information strategy and architecture, systems development and integration, and project management. This supply segment is relatively new compared to traditional consultancy services, but it has an impressive growth record. It comprises a variety of large consultancy divisions of multinational computer, telecommunications and software firms and a great number of predominantly small to medium-sized independent IT-consultancies.

Finally, niche players are highly specialised consultancies. These focus on one or two functional areas (e.g. human resources) and/or market segments (e.g. health care) (see Table 2).

### Strategies

Strategies pursued by consultancies basically reflect developments in the market place such as internationalisation, concentration, professionalisation, rapid developments in telecommunications, growing client sophistication and, last but not least, increased competition in the consultancy industry itself. The industry as a whole, after being hit by the recent

recession and feeling the influx of many newcomers into the market, has become more strategy-conscious.

Associations of management consultancies in various Member States have embarked upon ISO-9001 certification programmes for their members. Programmes are also in place to professionalise management consulting and create demand for and recognition of the profession. Nearly 20 % of all consultancies in Europe has been certified; and over 75 % has a quality management programme in place. With regard to improving professional qualifications, the postgraduate university course for management consultants, launched by the Amsterdam Free University and the Dutch association of management consultancy firms ROA in 1993, is exemplary.

Depending on market position, ambition and objectives, individual consultancies are likely to pursue one (or a combination of) the following strategies: shifting the focus of service portfolios, with concentration on core consultancy services and/or on core market segments, blending cultures within the present operations (e.g. traditional consultancy with IT-consultancy); restructuring practice areas in order to serve new emerging markets; and extending service lines by opening branch offices abroad, through acquisitions, mergers, joint ventures or by building/strengthening international networks.

### Impact of the Single Market

The emergence of the Single Market and, in general, the globalization of business, has positively influenced the demand for and supply of management consulting services. Demand has shifted from a predominantly local orientation to a more European and/or global orientation. Assignments from large scale companies (establishing, concentrating, relocating facilities and re-engineering operations) and from the European Commission have boosted revenues and increased cross border activities of leading consulting firms. The total number of consultancy firms has increased by roughly 30% since 1992 and, at the same time, competition has become fiercer. The top 20 firms now account for some 50-55% of total revenues. The strategies pursued by consultancies to become a European or even global player are primarily based on the size of the companies and the resources at their disposal.

The 'Big Six', accountancy-related, consulting firms currently have local offices in practically all Member States. A number of large national independent consulting firms have also expanded to neighbouring States, but mainly through permanent networks or ad hoc consortia with local companies in order to compete for assignments on a European level. Others are in the process of setting up networks.

Management consulting firms operate in a market which is characterised by little or no external regulation. Self regulation is achieved through the legal and regulatory framework which is formed through a number of national and European associations. These associations endeavour to harmonise professional practices, codes of conduct and certification.

The European Union itself, the possible expansion of the Union and programmes in neighbouring, non-Union states currently form considerable demand for services, although competition is formidable and fees are under pressure.

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## REGULATIONS

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There are no regulations specifically affecting management consultancy or regulating the qualifications of persons engaged in the profession. Similarly, there is no requirement for consultants to be a member of any professional association. In fact, the EU market is currently open to all consultants aspiring to work internationally.

The legal/regulatory framework is one of selfregulation via a number of national industry associations, membership of which is voluntary. Harmonisation of professional practices, codes of conduct/ethics, and standards of certification applied by the different associations is being examined by the FEACO and the International Council of Management Consulting Institutes (ICMCI).

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## OUTLOOK

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With the economy recovering in most Member States, prospects for the management consultancy industry are promising. After a slowdown since mid-1990, the industry expects revenue growth to return to double-digit figures on the order of 10 % or more per annum in the next few years. These prospects, however, will depend largely on the further recovery of EU economies. All market segments are expected to contribute to growth. Information technology, human resources and operations management are the most promising service lines.

Opportunities in Central and East Europe do exist but they depend a great deal on aid programmes initiated by the European Commission and individual Member States.

Competition within the industry will increase as a consequence of client sophistication, the rapid proliferation of new management concepts and methodologies, IT-firms entering the traditional consultancy market and vice versa, large multinational consultancies striving for major multi-national market positions, and the proliferation of aggressive solo and small consulting operations.

Written by: Bakkenist Management Consultants

The industry is represented at the EU level by: Fédération Européenne des Associations de Conseils en Organisation (FEACO). Address: 1-5 Avenue de la Joyeuse Entrée, B1040 Brussels; tel: (32 2) 285 00 25; fax: (32 2) 285 00 24.

# Architects

## NACE 837

*Like most members of the liberal professions, the architect is a provider of intellectual services who cannot be satisfied with an ambiguous position, who is sometimes an economic agent and sometimes a public servant. The architect must always seek a function more deeply rooted in the economic and cultural fabric of society.*

*An architect's role is that of an active mediator between supply and demand, the production and "consumption" of real estate and the legitimate interests of the market and those pertaining to the community's physical heritage and quality of life. To play this difficult role, the architect must be able to apply the "rules of the game," which safeguard his/her independence and integrity and which, along with his/her ability, make him/her credible in the eyes of the public.*

*The strategic position which the architect occupies upstream of the building process confers upon him/her the dual role of a privileged observer of economic movements as well as of a stimulator capable of guiding demand according to the varied needs of society, including the still ill-defined need for a better ecological approach.*

### INDUSTRY PROFILE

#### Description of the sector

The architectural profession is characterised by the great variety of services it offers to meet the requirements of the market while at the same time anticipating future demand. There are two primary types of intellectual services that the architect offers, which complement each other. The first is artistic in nature and requires the creativity, imagination and invention needed to design a structure. The second is economic in nature. It comprises elements of technical know-how, management skills and material factors necessary for the implementation of a project. This part of an architect's job is connected to the fields of real estate and construction.

However, architectural services must not be confused with the act of building itself, even though it is the edifice that represents the architect's creative concept in structural form. Lastly, the complexity of programmes, finance packages, design and construction techniques (as well as overlaps between project planning and project management) is such that the architect is increasingly a member of a team rather than an independent worker. This can make it very difficult to discern what his/her services are, especially when s/he is coordinating design work and contracting construction work.

In short, architecture is an art. The ability to design buildings enables the architect to adapt to a wide array of demands - be they minor or major, private or public - ranging from interior design to town planning layouts.

#### Recent trends

The size of an architect's business is just as varied as the demands made of him/her. Over the years, the very large number of small practices (i.e. employing only two or three persons) has decreased to the benefit of larger firms. There are many reasons for this shift.

First, a substantial increase in the number of new graduates each year, contrasted with the sharp decline of activity in the building industry during the recent recession has deterred architects from going into business on their own. The next factor is the growing dominance of the commercialisation of supply in the building sector, which encourages working as a salaried member of a staff. Finally, the scale and complexity of some

new building projects no longer require the services of small architectural firms.

One of the questions confronting large firms (with staffs of more than 50) is how best to adapt to sharp market fluctuations. Some have responded by offering a wider range of services and diversifying their expertise. Thus, in large firms, there has been a steady increase in the number of departments specialising in a host of peripheral activities such as programming, marketing and project management, building management, engineering, equipment and design, etc.

The recession was particularly felt in the architectural services sector of the United Kingdom, Spain and France. In fact, in only a very few countries (e.g. Germany and Luxembourg) was this sombre period for EU architects not as gloomy.

It is the medium-sized architectural firms which appear to be coping best with the adverse business situation. This is probably due to their flexibility and ability to deal satisfactorily with conversions, renovations, restorations, etc. Business is still relatively brisk for the smaller firms as well. One activity in which they specialise is that of giving expert advice on technical matters and real estate, either for legal purposes or at the request of private individuals.

#### International comparison

Statistics suggest that the industrialisation of the building sector in the US and Japan is much more advanced than it is in Europe. This is attributed in part to the highly sophisticated prefabrication of residential buildings which exists there. It is still generally accepted that a real demand for "products" of this type does not yet exist in Western Europe. However, if the economic slump were to persist, offering a well-prepared supply of such products could succeed in resolving the problem of dwindling resources and time available and increasing needs to some extent.

EU architects are no more open than producers or consumers to taking such a step, which would call into question the specific architectural features which characterise most of the Member States. Nevertheless, even if the single internal market were to remain insensitive to the search for effective ways of responding quickly to a housing demand that requires a minimum degree of comfort and also affordability (such needs are still immense: 1.5 million new dwellings in ten years are planned for Germany alone), designers and building firms would still be able to offer their services and products to many other regions of the world where housing needs are even more acute (e.g. Eastern Europe).

**Table 1: Architects**  
**Number of architects and students, 1994**

	Students	Architects (1)
Belgique/België	N/A	N/A
Danmark	N/A	N/A
BR Deutschland	46 000	92 400
Hellas	1 899	13 590
España	21 275	23 616
France	17 138	26 490
Ireland	510	1 390
Italia	N/A	N/A
Luxembourg	115	334
Nederland	N/A	N/A
Portugal	N/A	N/A
United Kingdom	9 700	30 600
Austria	N/A	N/A
Finland	1 044	2 237
Sweden	900	4 000

(1) Number of registered architects (according to Directive 85/384/EEC)  
Source: Architects' Council of Europe

## MARKET FORCES

### Demand

One of the most pronounced tendencies in the demand circuit for construction is that the course of this demand is increasingly going directly "from the consumer to the producer," with "designers" being passed by. In other words, to start a project customers tend to consult less with an architect and instead turn to a general contractor who can provide them with all the services leading up to the construction of a building.

Therefore, the self-employed architect is increasingly induced to offer services which will make him/her better able to meet cost requirements and time schedules, whatever the size of the commission involved. The "project manager" aspect is taking precedence over the demand for unique, personalised designs. This trend of customer demand has forced the architect to equip himself with computerised means of tracking price fluctuations, planning the design work and even executing it.

This increased technological capacity has been supplemented by an extraordinary improvement in computer-aided design facilities. These techniques are becoming common in medium-sized firms and even more so in big ones. The high performance of such technology opens up prospects which were previously unimaginable.

However, methods still need to be perfected for transmitting data between the demand from clients and the architect's design and then between the latter and the demand for implementation. These integrated systems would not only lead to gains as regards performance and cost, but also would enable the reliability of such communication itself to be improved.

Such prospects shed a positive light on the architect's strategic position in the economic process of construction by preserving his/her creative role as designer and his/her active role as coordinator. This necessarily presupposes a sufficiently independent position to safeguard the architect's credibility in the eyes of those who seek his services.

### Supply and competition

One of the major markets for architectural services is public orders, although these are shrinking markedly in most countries as a result of the recession and the endemic shortages of public funds. A common method of gaining access to public orders is to participate in architectural competitions. It may be said that France is in a remarkable position in this respect (over 2 000 such competitions are held there each year). This is due to a legal obligation to hold competitions for the allocation of public architectural orders involving fees in excess of 900 000 FF, including taxes. French architects complain, however, that the return from these competitions is too low, because most of them do not offer sufficient compensation to unsuccessful competitors.

This tradition of architectural competitions differs from country to country in Europe. In Belgium, for instance, public competitions for the award of public contracts for architectural work are rare. There might be a decisive change in this situation in the very near future, as a result of the transposition of EU Directive 92/50/EEC on "Public Contracts for Services" into national law (see Regulations).

## INDUSTRY STRUCTURE

The following analysis is based on the results of far-reaching surveys for France, the United Kingdom and Belgium. Unfortunately, at the time of writing, figures were not available for the rest of the EU, and, therefore, no statistical analysis was done for the other countries.

### Companies

According to l'Observatoire de l'Economie de l'Architecture, the number of architects employed in France has more or less stabilised since 1991. In 1993, 26 280 architects worked in France (around 87 % of them are men), and more than one-third worked in the Paris region. Since 1983, over 70 % of all French architects were self-employed, although the level had dropped by 6.4 % by 1993 (to 71.9 %). Salaries also seem pretty steady in the sector, although between 1990 and 1992 the average annual income for all French architects actually increased slightly, rising from 25 869 to 26 347 ECU per architect (an increase of around 1 % per annum).

The number of architects in the UK is about that of France (24 000 and 26 280 respectively), although in proportion to the overall population it is a bit less. Of those, over 80 % were employed full-time; 76 % in the private sector and 24 % in the public sector. As in France, about one-third of the architects work in or around the capital city: 26 % of all British architects work in the greater London area. On the other hand, whereas salaries increased by 1 % in France between 1992 and 1993, they decreased by that amount between 1993 and 1994 in the UK. Regionally, incomes in the London area averaged 24 000 pounds in 1994, falling 9 % since 1993. Similarly, they fell 8 % in 1994 in the Midlands and East England, where they average 20 700 pounds. Conversely, in the south-west and Wales, salaries rose 7 % in 1994, to 23 000 pounds (Source: RIBA survey, April 1994).

Structurally, the majority of private practices are small firms employing one or two people (there are twice the number of such companies than those with six to ten employees). Only 8 % of all British private architectural firms have a staff of more than 50 people.

It is interesting to note that while the number of architects in Belgium is only about one-third that of the other two countries (8 685 including trainees), even without the trainees the percentage of architects relative to the entire population is somewhat higher. 73 % of them are self-employed (18 % are self-employed but in a partnership), and 57 % of all Belgian architectural firms are single-person operations. The average annual net income of self-employed architects in all of Belgium is 17 777 ECU. It is slightly higher in the Brussels area (21 000 ECU) (Source: 1992-93 survey by the Conseil National de l'Ordre).

### Impact of the Single Market

Directive 85/384/CEE, in effect in all Member States, gave architects the right to set up business and offer their services anywhere in the Union with a minimum of constraint. These rights are linked principally to the legal and regulatory contexts of each of the Member States. However, the widespread hope that there would be more active participation and exchange of architectural services was somewhat frustrated by the economic recession.

It must also be said that Europe and its Member States have introduced regrettably few instruments for the promotion of cross-border architectural exchange. In practice, the G.E.I.E. represents the only legal framework with satisfactory prevalence in cross-border architectural activities. This framework does not, however, entirely meet partners' needs for the integration of their activities.

Real cross-border movements for architects will rather be brought about by the implementation of specific directives, such as directive 92/50/CEE on the Public Service Market, whose translation into national legislation has so far proved to be a rather slow, but which should allow a more systematic development of procedures in architectural collaboration.

The Council of European Architects is working actively at all levels to promote the harmonisation of working methods



and to encourage policies of free movement in the exchange of goods and services within the European Union.

## ENVIRONMENT

Architects and their representatives have taken very bold stands on ecological issues. These statements recurred regularly between 1992 and 1994, particularly at the Rio Conference in June 1992, the Congress of the International Union of Architects in Chicago in June 1993 and the Münster Congress in September 1993. Furthermore, the Architects' Council of Europe (ACE) was co-opted to a European strategic seminar at the end of November 1994 by DG XI, in connection with the White Paper on "Growth, Competitiveness and Employment," which included a workshop on the urban environment.

Within the architectural services industry, the idea of environment is not solely a matter of nature (e.g. water, air, land, etc.). In addition, it comprises the constructed physical environment (i.e. urban spaces, architectural heritage, eco-architecture, etc.).

Architects are now making more stringent demands for credible information on the real ecological balances of materials, products and implementation techniques. But few scientific and technical research institutions give enough weight to this field in their programmes. As a result, designers remain ignorant of the consequences of their architectural choices.

The only reference field is that of energy savings: most architects have changed their design practices, and now use both passive energy techniques, insulating materials and air-renewal methods.

But ecological problems transcend national frontiers and therefore have to be tackled at all levels and on all scales. Harmonisation is thus a typical Community problem, one which represents a real challenge to all EU industries.

## REGULATIONS

The idea of free competition embodied in the Treaty of Rome puts some pressure on professional activities governed by rules which influence prices. In several EU countries, the architectural profession is regulated by the recognition of a degree in architecture and the registration of the holders of that degree.

EU Directive 85/384 EEC stipulates that, "... considering that architectural creation, the quality of the structures designed, their harmonious insertion in the surrounding environment, respect for natural and urban landscapes and for the collective and private heritage are a matter of public interest:... reciprocal recognition of diplomas, certificates and other evidence of formal qualifications must be based on qualitative and quantitative criteria which ensure that the holders of recognised diplomas, certificates and other evidence of formal qualifications shall be able to understand and translate the needs of individuals, social groups and communities with regard to spatial arrangement, the design, organisation and execution of building projects, the conservation and enhancement of the heritage in the form of buildings and protection of the natural equilibrium...."

In the UK an attempt to abolish the registration in 1993 failed. In Spain there has been some pressure to reduce the prerogatives of the professional boards, which were seen as being either too protectionist or too corporatist. Ireland has attempted to introduce registration that would extend the right to exercise the profession to insufficiently qualified persons. The debate remains open, however, as some countries, (e.g. Denmark) favour greater regulation of the profession. In France, recent legislation assigned more extensive and compulsory checks on the execution of public works. Thus, the situation varies greatly from country to country.

Be that as it may, the public importance of architecture is constantly recognised and was confirmed by this directive. There is little probability of the emergence of a consensus in favour of a drastic deregulation of the EU architectural profession in the near future, because most of the ethical rules by which it is guided are in line with the interests of the "consumers" as individuals or as a community.

Two directives evoked strong reactions from European architects. The first concerned the liability of providers of services. This horizontal directive has been withdrawn, but the European political authorities have instructed architects to coordinate, within the GAIPEC, the views of all the partners in the construction sector on the possible harmonisation of liability, guarantees and insurance. This step might lead to a new vertical directive or a sectoral recommendation. The second directive, approved by the European Parliament (EP) in 1992, concerns safety and health at mobile work sites. Directive 92/57/EEC has been transposed into national legislation partially in France and completely in the Netherlands. Everywhere else it has encountered strong opposition, and in Germany the Bundestag actually rejected it. In short, architects are opposed to this directive insofar as it implicates them in liabilities which were hitherto assigned to the builder alone.

Another important directive is Directive 92/50/EEC, which lays down rules for public contracts for services, including architectural services, involving fees in excess of 200 000 ECU. Although this directive does not make competitions compulsory, it does open the sector up to cross-border competition by harmonising basic Community rules for their announcement and transparency. It is to be hoped that the organisers will use the regulations which guarantee the credibility of demand. This directive will make a positive contribution to healthy competition between architectural firms and will encourage the development of an order culture, which is necessary not only for the harmonisation of procedures, but also for true openness in the quality of architectural demand. It could also curb the abuse of procedures for invitations to offer general "design and build" contracts, in which the work to be tendered also includes the architectural design. Several countries, including France and Germany, have taken steps in this direction after seeing the adverse effects of these procedures on both architectural quality and the cost of implementation.

Cooperation by architects with the Commission and the EP is steadily improving. The ACE has made proposals concerning the environment and the organisation of a European competition for executed urban architectural projects. In 1995 the ACE will publish the "White Paper on Architecture in Europe," which should make a useful contribution towards a better profile of the general or specialised professional architects within this wide field.

Written by: ACE

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# Construction economists

## NACE 837

*The construction economist, traditionally known in various countries as the quantity or building surveyor, the metreur-verificateur, and the geometra, is a professionally qualified expert who assists the client/owner/building promoter in contractual, financial, managerial and economic matters, to optimise the value of a construction project over its lifetime.*

### INDUSTRY PROFILE

#### Description of the sector

Construction economics encompass:

- project development - new and rehabilitation;
- project and quality management;
- feasibility studies - including environmental issues;
- risk analyses related to construction;
- cost information and time scales;
- bills of quantity;
- advice on design and construction procurement;
- management of design and project documentation;
- tender procurement;
- planning of site and security measures on site;
- logistics to and on site;
- planning of building maintenance and operation;
- facilities management;
- valuation of property;
- services related to building pathology; and
- arbitration and related services.

In France, construction economists are educated as construction economists, while in Ireland and the United Kingdom, construction economists are educated as quantity surveyors and building surveyors. Traditionally, quantity surveyors deal with new construction, while building surveyors are specialised in facilities management, building pathology, and refurbishment. In Germany, construction economics are performed by architects or engineers. In Spain and Portugal construction economists are trained as technical architects: Aparejadores y Arquitectos tecnicos. In the Netherlands and Finland they are architects and engineers who have specialised in construction economics. Construction economists in Belgium are predominantly engineers and in Denmark they are architects, construction technologists and engineers who have specialised in construction economics and participated in a post graduate training programme.

As professional training and the role of the construction economist varies between Member States, two interlinked Pan European Associations have been founded: AEEBC and CEEC. The general objectives of AEEBC and CEEC are to:

- establish guidelines for the definition, contents, practice, and supervision of construction economics;
- coordinate working methods;
- facilitate the exchange of information and experience;
- promote basic and continuing education of construction economists; and

**Table 1: Construction economists**  
**Number of construction economists, 1994**

Belgique/België	25
Danmark	100
España	17 500
Finland	80
France	8 100
Ireland	460
Italia	27 691
Nederland	270
Portugal	540
United Kingdom	35 575
Total	90 341

Source: AEEBC and CEEC

- promote the use of qualified construction economists.

So far, CEEC has organised a system for the exchange of information and experience; especially on costs, time scales and tender actions.

The principle of cooperation and exchange of information is a common definition of construction economics. The next phase of Pan European cooperation will be the development of guidelines and tools for the execution and management of construction.

#### Recent trends

In 1994, close to 90 500 construction economists were registered in national, professional associations covered by AEEBC and CEEC in the EU, excluding Germany, where presently no figures are available. Apart from the United Kingdom though, there is no data available on turnover and value added. Turnover in the United Kingdom by quantity and building surveyors in 1994 was about 4.0 billion ECU.

Activity of construction economists mainly follows general economic developments, but performs slightly better than the construction sector in general. This is due to the EU industry focusing on re-engineering and value for money.

### MARKET FORCES

#### Supply and demand

Capacity of the EU construction industry exceeds demand for construction. This will be the case for years to come, except in eastern Europe. Demand here refers to effective demand reflected by the resources actually allocated to construction, not to the obvious need for improvement of older dwellings with poor sanitary installations, inadequate heating systems and in poor repair. Only a substantial increase in productivity, consumer orientation and a large-scale, determined EU effort to obtain a substantial reduction of CO<sub>2</sub> and CFC pollution within a short span of time might be able to redress the balance between supply and demand in the building industry. The resulting demand for the modernisation of existing buildings could lift construction demand to full capacity levels.

The number of construction economists in EU countries reflects the degree of competition and the stage of professionalism in the particular property market. Until now, the decision to start a construction project has been motivated, almost everywhere, by a direct need for production infrastructure, or for dwellings for growing city populations, and not by considerations on the internal interest rate of the project. The exception is the United Kingdom where professional developers of construction projects emerged, as early as the second half of the last century. Furthermore, until recently, a substantial part of income from investment in property originated from increases in value. Consequently, the incentive for im-

provement of productivity in construction has been small. However, over-capacity in the industry and high vacancy rates in existing buildings have depressed the value of real estate substantially. However, unoccupied space is not only a result of economic recession, but a consequence of increasing cost competition in many economic sectors. In addition, increases in productivity are often accompanied by a decline in the need for labour and space.

Response to increased competition in the construction sector has been an increase in productivity, achieved by an increasing specialisation of various construction activities. This creates a need for the services of the rapidly growing number of construction economists. Their function, in the construction process, is to optimise the contractual and financial interests of the client.

The need for construction economics is amplified by the EU Directive on Procurement of Services. Public procurement contracts with architects, consulting engineers or design teams exceeding 200 000 ECU can be awarded only after an open or limited tender. Criteria for awarding contracts are either lowest price or the economically most favourable bid. The EU directive on services only deals with public procurement but, in reality, the principle of tendering is expected to be applied to almost all procurement of services. For these reasons, there is a growing demand for the skills of construction economists even though demand for construction is declining. Their skills are needed by purchasers of construction services in planning the procurement of services, evaluating the bids, as well as, formulating competitive proposals.

### Production process

The nature of the services provided by construction economists evolves over time. The following elements are becoming increasingly important:

- optimising the financial interests of the client;
- assistance with bidding for construction services;
- quality management; and
- care for the environment.

Financial interests of the client are optimised by evaluating the expected payback of the project over 20-30 years (before the project is started), and by efficient management of the design and construction process. As future income from property will only be derived from the difference between income/rent obtained and the costs of running and maintenance, calculation of the payback must focus on life cycle costs, location, indoor climate, design and various 'green' issues, in that order.

The salient characteristic of tender and bidding for immaterial services is the difficulty of specifying the exact nature and quality of services wanted. The present classification of services in the construction industry, often drawn up as part of fee scales, is rather general and, consequently, not very suitable for tender or bidding. In response to these problems the CEEC has started to formulate a Code of Practice. The Code is a model for project management based on a functional data and process model independent of procurement methods and the roles of various professions and kinds of firms. Initially, it will merely serve as a structure for decision making. Gradually, however, it will prescribe general contractual conditions, definition of services, logistics etc.

Quality management, according to EN 29 001, is expected to be included in all contracts. The primary aim of quality management standards is not to improve basic services but to reduce: time spent on negotiation of contracts; time wasted on misunderstandings; inter-professional friction; and, judicial disputes. For the client, the main advantage will be the reduction of indirect costs. Safeguarding the interests of the consumer, in the case of design and construction defects, may be provided by an EU directive on liability.

A thorough and intelligent use of information technology and exchange of data offer possibilities for substantial cuts in production costs. Furthermore, as a service to the client, a database can be constructed with all data relevant to facilities management, structured in a functional way. When such a database is handed over to the operator of a completed building, costs for organising facilities management can be cut substantially.

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## INDUSTRY STRUCTURE

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### Companies

Construction economists are engaged as employees by governmental institutions, local authorities, architects, contractors, and in consulting companies owned by construction economists. The total number of construction economist companies operating on a business service basis is about 10 000 in the EU. In most Member States, the majority of construction economists are employed in private consulting companies. However, in some countries, notably the Netherlands and Spain, a substantial majority work as employees within contracting organisations. In all countries a smaller number of construction economists work for the public sector.

The total number of private companies within the EU varies from 10 in Belgium to 3 000 in Spain. The average number of qualified staff in such firms is less than 10, except in the United Kingdom, where the average is 20. However, there are a small number of firms, particularly in the United Kingdom, with a total world-wide staff in excess of 100, and, in some instances, in excess of 500. In Denmark, only 5 private companies work exclusively with construction economics. The others are predominantly architectural firms owned by or employing construction economists.

### Impact of the Single Market

Although the effects of the Single Market Programme are positive, the sector is very prone to new legislation on a European level as well as on the national level. National laws and legislation differ significantly between Member States, thereby constraining cross border activity. Competition on the one hand has increased due to, for instance, public procurement but on the other has been inhibited by protective measures installed by individual Member States.

A lack of standardisation exists within the sector. This is especially applicable to training- and qualification levels. Some Member States offer under- and post graduate courses in construction economics. Other Member States do not offer specialised courses. In these instances, the sector is formed by, for instance, architects and engineers who specialise in this field. This discrepancy inhibits the ease of working in different countries.

Although the outlook for the sector is very much dependent on the economic cycle, it can be described as positive. The increasing relevance of environmental measures and the social dimension, i.e. worker safety and productivity, lead to a higher demand for services. In addition, due to an increasing consciousness of life cycle costing and return on investment, the role of the Construction Economist is becoming increasingly important.

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## ENVIRONMENT

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About half of the CO<sub>2</sub> emissions in Western Europe results from the use of energy in buildings for heating, lighting and air conditioning. Air conditioning also accounts for about half of the CFC emissions. Consequently, major changes have to take place in the design of new buildings, as well as in existing buildings. Along with other environmental concerns, this presents an enormous challenge to building owners and a need for services rendered by construction economists in order to safeguard their financial interests.



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## REGULATIONS

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No formal regulations exist for construction economists, but professional education is based on the directive on Mutual Recognition of Diplomas.

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## OUTLOOK

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In general, the outlook for the construction industry is depressing. In contrast, due to increased competition among building owners, the directive on Procurement of Services, and the need for a variety of measures to protect the environment, the outlook for construction economists is quite good. The sector will experience growing demand for its services in construction, as well as civil and heavy engineering. In addition, the need for new construction and extensive rehabilitation in Eastern Europe and an absence of know-how concerning project management and other kinds of construction economics will increase demand for construction economists.

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# Engineering consultancy services

## NACE 837

In 1993, engineering consultancy and related services affiliated with EFCA included 24 national associations from 17 European countries (12 EU and 5 EFTA countries) representing over 8 400 firms active in the field of engineering consultancy and employing about 200 000 people. EFCA represents 40 % of all engineering consultancy in Europe; wherein the total sector comprises 21 000 firms employing 500 000 staff. Due to the generally poor economic situation in recent years, the sectoral turnover decreased with the provision of services far outweighing the demand. The increase in private demand could not compensate for the feeble level of public demand. For 1994, another minor downswing was expected, but in the medium term, a slight upswing, caused by new market opportunities like environmental and facility management, could be forecasted.

### INDUSTRY PROFILE

#### Description of the sector

Engineering consultancy services are defined as the intellectual services which aim to optimise investment projects in industry, construction and infrastructure, at all stages of a project: from its conception through to its final execution. These services are provided either by engineering consultancy firms, consulting engineers, engineers employed by construction firms, design firms or public agencies which employ engineers and design consultants, or by individual engineers and consultants. All of these are armed with highly specialised technical knowledge and provide comprehensive multi-disciplinary neutral services, independent of any supply or manufacturing interest.

They seek to optimise investment projects by proposing the lowest cost, highest investment productivity engineering solutions, consistent with the particularities of the specific markets. The broad range of their services includes: pre-feasibility studies, preliminary designs, cost-benefit analyses, working drawings, efficiency investigations, building management/supervision of construction, technical management/advisory services, as well as overall management, planning, project supervision and logistics.

Engineering services include engineering design and construction. An engineering consultant can be responsible for only a part of a project (e.g. the construction itself) or for an entire project (i.e. through to the final inspection). The latter projects are known as turn-key projects. Engineering services apply to residential and non-residential buildings, civil engineering (e.g. transmission lines, power plants, transportation facilities, public work facilities, environment, telecommunication and industrial plants) and to other technical services (e.g. geology, hydrology, shipbuilding and marine engineering).

Consulting engineering services has close ties to other service sectors, such as architecture, quantity surveillance and land surveillance, as well as to all sectors of the building trade industry. For the housing, construction and civil engineering sector, consulting engineering services are of the utmost importance, since obviously no construction could be made without design, planning and project management. Though engineering consultancy services represent only about 8 % of the construction industry, their economic significance is far more important, because the sector causes a large turnover in the production of equipment and material. The total amount of private and public investments involving engineering consultancy within the EU are estimated at 670 billion ECU. The engineering consultancy requirements amount to 55 billion ECU.

Traditionally, a great portion of consulting engineering services has been provided in the UK, where they were offered for the first time in the 18th century by the British construction

**Table 1: Engineering consultancy services**  
Main indicators, 1993 (1)

	Number of firms	Turnover (million ECU)	Number of persons employed	Exports (million ECU)	Export intra-EU	Export extra-EU	Exports as share of turnover %	Average no. of employees per firm	Turnover per employee
Belgique/België	110	275	3 500	25	3	22	9	32	78 570
Danmark	290	510	7 940	130	N/A	N/A	25	27	64 230
BR Deutschland	3 007	4 000	49 000	800	30	120	20	16	81 630
Hellas	176	110	2 800	4	0	4	4	16	39 290
España	98	390	5 190	48	0	3	12	53	75 150
France	902	2 830	23 100	690	N/A	N/A	24	26	122 510
Ireland	165	30	800	N/A	N/A	N/A	N/A	5	37 500
Italia	193	1 020	18 000	496	55	441	49	93	56 670
Luxembourg	51	45	830	3	N/A	N/A	7	16	54 220
Nederland	205	900	10 750	247	N/A	N/A	27	52	83 720
Portugal	67	108	1 900	6	1	5	6	28	56 840
United Kingdom	740	2 529	43 760	857	72	715	34	59	57 790
EU	6 004	12 747	167 570	3 306	N/A	N/A	N/A	28	76 070
Österreich	1 325	N/A	4 850	N/A	N/A	N/A	N/A	4	N/A
Suomi/Finland	198	310	5 500	75	N/A	N/A	24	28	56 360
Norge	360	300	4 110	60	7	53	20	11	72 990
Sverige	191	410	6 420	45	5	40	11	34	63 860
Schweiz/Suisse	359	650	5 700	112	N/A	N/A	17	16	114 040
EFTA	2 433	N/A	26 580	N/A	N/A	N/A	N/A	11	N/A

(1) Only EFCA figures  
Source: EFCA

**Table 2: Engineering consultancy services  
EU trade balance**

(million ECU)	1991	1992	1993
Domestic market	9 800	11 000	9 450
Intra-EU trade	400	400	400
Exports	3 600	3 500	3 300
Total turnover	13 400	14 500	12 750

Source: EFCA

industry. After the Second World War, Denmark, Germany, France and Italy became more important within the European market.

Engineering consultancy services are not separately accounted for and therefore are not reported in official statistics. They are, to a large extent, part of the building trade industries. Data are only available for the EFCA and its national member associations, representing 40 % of the sector in Europe.

### Recent trends

The period since the end of the Second World War shows different trends in the development of consulting engineering services. In the production sector, UK companies faced more and more competition with US companies. Since the mid-seventies, German, French and Japanese firms also have become of greater importance in the international market, and gradually the US and the UK have lost their leading positions in the sector.

On the demand side, international aid programmes were responsible for a growing export market in the sixties and early seventies. Foreign direct investment and large public expenditures for the development of infrastructure in the former Third World Countries launched this trend. The oil price shock in 1973 caused decreasing income especially in the Middle East, where aid money was spent on the improvement of the national infrastructures. At the beginning of the eighties a worldwide recession, accompanied by strong inflation and high interest rates, influenced the market. Consequently, planned projects were sometimes cancelled or diminished. During the second half of the eighties, utilisation of consulting engineering services started to rise. But the structure of demand had changed, with mainly East European countries spending money on the development of their infrastructures.

During the nineties the consulting engineering services within the EU have been mainly offered by British and German companies. Although they lost their leading positions, US firms also played an important role in the international market. Consumption is mostly coming from the Visegrad and former GUS states and from the states which were involved in the Gulf War.

Also significant for the nineties has been the diametrically opposed development of the number of firms on the one hand and the number of employees on the other. While the number of firms has increased gradually since 1990, the number of employees has, after a visible rise from 1990 to 1991, steadily decreased since 1991. In particular, the number of draftsmen, secretaries and accounting personnel was reduced. The average number of employees per firm in 1993 was again smaller than the year before. And, the average turnover per employee in 1993 was significantly lower than that in 1992, because the total EU turnover was reduced by around 12 %. So, after a slight yearly increase between 1990 and 1992, the turnover of the registered firms in the EU shows a loss of 2.5 % from 1992 to 1993.

### International comparison

The traditional pattern of the output of consulting engineering services is becoming more and more blurred. Although the market is still dominated by companies with headquarters in the United Kingdom and the USA, it is necessary for the large companies to have representations all over the world. This is especially the case for American and Japanese companies, as their countries are too far away from those countries with the most active body of customers.

During the first two-thirds of the eighties, a great part of the consumption had its origin in less-developed countries. Today, foreign trade is still of significant importance for the engineering consultancy service sectors, dominated by a flow from developed to less-developed countries. In this context it is interesting to notice that some EU countries mainly serve specific regions of the world. For example, Denmark's consultants often work in Africa. The majority of companies exporting their engineering consultancy services are registered with international organisations which play an important role in the awarding of contracts to consulting firms. The most well-known are the World Bank, The Asian, Inter-American and African Development Banks, the EU, and some organisations of the United Nations like the EBRD, FAO, WHO and UNDP.

Since 1987, domestic markets, especially in the EU countries, have become more important. Intra-EU trade is also increasing, as the internal market has brought about a tendency for companies to focus their business on to other EU countries. In general, there is a decrease of exports to less-developed countries which is compensated for by an increase of demand in the developed states. In the East Asian markets (ASEAN states and the little tigers) - the main markets for US and Japanese companies - demand for engineering consulting services is still high, as these economies continue to grow very quickly.

EU exports of consulting services in 1993 decreased from that of previous years. On the other hand, some national markets are still very export-oriented, namely Denmark, France, Italy and the United Kingdom. Italy is the only EU country to have raised its turnover from 1992 to 1993.

## MARKET FORCES

### Demand

Demand for engineering consultancy services is closely related to the general economic situation and activity level of individual countries. After a recession in all EU countries, most of the national economies are beginning to recover. Three main factors are important for the sector's growth: public and private investment, technological progress and the availability of finance. The average engineering consultancy services in the EU derive about 75 % of their annual turnover domestically (except Italy). In the export market, the most significant demand comes from international working organisations. Contracts are still being offered for consultancy in the Third World and less-developed countries. Additionally, some large European projects (e.g. the channel-tunnel) kept the intra-EC demand for engineering consultancy services high during the last decade.

### Supply and competition

Domestically-generated turnover from public demand decreased again between 1992 and 1993, as private demand dominated in almost all EU countries. The reason for this was the lack of funding for infrastructural investment in most EU countries. Housing construction replaced public investment as the market's driving force in most EU countries. But a new range of clients - the so-called developer-funders - is coming in, and some EU countries already are using private funds to finance public infrastructure work.

The recession seems to have made price the most frequently used criterion, creating concern among engineering consultants. The scope of work in a commission of engineering consultancy is often ill-defined and must itself be developed by the engineering consultant together with the client. When it is known that a commission is to be awarded at the lowest price, there is inevitable pressure on those submitting offers to calculate their proposals on the use of less experienced (and therefore less costly) staff. This tends to minimise the scope of the work offered, limiting it to no more than what the client specifies. Furthermore, an apparent savings in the initial stages rarely guarantees that the final project will be the best value for the money.

Most of the leading international agencies, however, select engineering consultants by using the combined criteria of quality and price. Meanwhile, the national associations try to set up systems which involve a greater amount of selection criteria. The main criteria for the placing of orders should be the firm's technical quality (including the quality of previous jobs fulfilled), price, workload capacity and competence for the particular job.

On public projects, private engineering consultancy firms are often in great competition with in-house engineering consultants. This is another competitive disadvantage for private consulting engineering companies, leading them to sometimes cut their profit margins in their bids simply to survive. The externalisation of in-house services could prove to be a decisive factor for the development of the EU engineering consultancy service sector.

Today, small enterprises, which cover only a part of the services required by the clients, face strong competition from large enterprises, which have their own planning offices and thus can offer the complete management and coordination of projects. This means that smaller firms or independents must specialise in fields where the larger enterprises do not operate, or cooperate more with larger enterprises, as has been the tendency in the past. The Single European Market should facilitate such cooperation.

In cases where foreign enterprises are commissioned with work abroad they will need local experts who know the ins and outs of the national markets and their regulations. 1993 already showed a tendency towards externalisation as well as a reduction of staff in favour of more freelance consultants who are hired by large companies. This means that large en-

terprises are working as main contractors, hiring some small specialised firms as sub-contractors for lower fees.

Price competition seems to exist primarily between smaller firms. And, whereas large firms receive the main profits, smaller firms are often facing bankruptcy. Labour cost advantages have had a minimal influence on the competition on the international market, however, with the exception of some firms from India and Brazil, which have succeeded because of their lower labour costs.

## INDUSTRY STRUCTURE

### Companies

There is a very high concentration of large companies in the sector, especially in Italy, the United Kingdom, Spain and the Netherlands. Going by the number of companies, Germany was in first place within the EU in 1993. But Germany's service structure is dominated by SME's, many of which are one-man firms. Other firms with a very small number of employees are located in Ireland. It is interesting to note that the greatest average size per enterprise within the EU is in Italy.

The largest engineering firms in the world (again, calculated according to number of employees) have their headquarters in Canada, the US and Finland. Of the Top 30 companies in the world in 1991, thirteen were from the US, with seven being British. There were two companies from Canada, the Netherlands and Sweden, and one from Finland, Germany, Japan and Egypt. Within the EU and EFTA countries the largest companies have their headquarters in The Netherlands, the United Kingdom, Finland and Sweden. Swedish and Finnish companies are of great importance to the European market.

### Strategies

For a few years now, even large companies have had to cut back their staff because of the recession, which is what has led to the proliferation of small enterprises. And, for cross-border projects or projects in countries where the contracting companies are not represented, large firms often cooperate with domestic, one-man firms specialising in design and construction, which have a thorough knowledge of the domestic market.

Three countries - Germany, France and the United Kingdom - held more than two-thirds of the turnover of all EU companies in 1993. Considering exports as a share of the total turnover,

**Table 3: Engineering consultancy services  
Development of employment (1)**

	1992	1993	1994	1995	1996	1997
Belgique/België	3 500	3 550	3 670	3 760	3 870	3 950
Danmark	7 940	8 380	8 560	8 890	9 150	9 250
BR Deutschland	49 000	49 490	50 230	50 860	51 560	52 080
Hellas	2 800	2 170	2 610	2 650	2 700	2 740
España	5 190	5 240	5 320	5 390	5 460	5 510
France	23 100	22 800	23 280	23 670	24 120	24 480
Ireland	800	840	870	890	900	900
Italia	18 000	17 640	17 820	18 090	18 450	18 720
Luxembourg	830	840	870	890	920	930
Nederland	10 750	10 750	10 960	11 070	11 240	11 410
Portugal	1 900	1 920	2 040	2 110	2 220	2 270
United Kingdom	43 760	43 980	44 550	44 950	45 440	45 670
Total	167 570	167 600	170 780	173 220	176 030	177 910

(1) 1992 and 1993 are EFCA estimations; 1994 to 1997 are estimations of Volker Stabernak Consulting  
Source: EFCA

the United Kingdom is on top. Italy lost its second position in 1992 to Germany and France. Turnover per employee is the highest in France.

In the sixties, engineering design services were closely related to trade in engineering equipment. Due to the externalisation process, engineering design companies now operate more independently. However, engineering consultancy still brings about the export of material and equipment.

Mergers and acquisitions are undergone by companies which hope to gain market positions abroad. In the last few years, only a few of the larger companies merged. Since 1990, the list of the most important companies within the EU has not changed much. If companies expanded, it was mainly by acquisitions and not by organic growth, but the trend to create international alliances continues.

### Impact of the Single Market

The internal market for this sector is characterised by the relatively low level of cross border activity. Only some 3-4% of services are exported between Member States. In comparison, some 30% of services are exported to countries outside the Union. A reason for this is that the national markets are relatively saturated with consulting firms which makes penetration into these markets difficult.

There is still an inherent reluctance to open up domestic markets to foreign companies. Companies wishing to offer their services in a particular country need to adhere to numerous rules and regulations, for example, the requirement to be registered as a Engineering Consultant locally. This has resulted in numerous mergers, acquisitions and joint-ventures, as companies feel the need to be represented in the different Member States.

In general, the creation of the Single Market has had a positive effect. The size of the market has increased considerably and so has the level of competition. Competition is mainly based on price, which is causing some concern as to the quality of services rendered.

Issues which need addressing are the continuing payment of subsidies by certain Member States as well as the existence of 'in house' services. These are not open to public procurement but do, however, constitute some 45% of the total market.

### REGULATIONS

EU regulations have an important influence on engineering consultancy services, albeit one which varies from country to country. Some of the EU regulations influencing the sector are: The Directive on Services, the Directive on the Award of Public Service Contracts (Public Procurement) and the Directive on minimum safety and health requirements for construction sites.

The Directive on Services obliges all public contracting authorities in all EU countries to publish calls for tenders for public service contracts, the estimated value of which is not less than ECU 200 000. The aim is to open the services market for transborder services and thus increase competition. But the Directive is not yet adopted in all EU countries (e.g. France). Regulations for fees are not included in this Directive, even though the national regulations are still valid. Consultants working in foreign countries have yet to consider the national remuneration systems (e.g. the so called HOAI in Germany). Beyond that, some national associations developed a number of criteria which should be considered for the awarding of contracts in the national market.

The EU Directive 92/50 for Public Procurement relates to the coordination of the procedure for the award of public service contracts. Studies with fees exceeding 200 000 ECU fall within this Directive. They are to tender on the EU level. This Directive already has been incorporated into national law in Denmark, Luxembourg, The Netherlands and the United Kingdom.

The Directive about the minimum safety and health requirements is still being discussed in most EU countries. So far, it has been adopted in Luxembourg only, and is supported now by the ISO regulations 29000 - 29004 about quality management and quality assurance. The main subject of this Directive is a liability of 20 years for construction, which would result in an increase in costs. Discussions now involve the amount of the risks which should and/or could be covered by insurance.

### OUTLOOK

The improvement of the general economic situation in all EU countries which was expected in 1994 began in the second half of that year. Continuing small increases for most of the EU economies are forecasted for the years 1995 to 1997. But the most important clients for consulting engineering services, i.e. the public authorities and the states, are still in a bad financial situation, with ever increasing deficits. This situation is of great significance for the short- and medium-term perspectives of the engineering consultancy services sector. Presently, the demand for engineering consultancy services by public administration is at a standstill in some EU countries.

But the new tendency to finance infrastructure projects by private funds will cause new demand for consulting engineering services. The employment situation will be influenced accordingly, gradually increasing through 1997.

Other factors that will probably improve the situation of the engineering consultancy services in the near future include the harmonisation of environmental regulations, stricter environmental control and technological progress in Europe and the USA, and the reconstruction of the infrastructure in the former planned economies in Central and East Europe. Moreover, large projects planned in Asia (e.g. a huge dam at the Jangtse river in China), Africa and Latin America, and the construction and completion of a European transport network also should cause additional demand for engineering consultancy services.

Other new tasks can be found within the field of facility management as a cost saving instrument in the administration of buildings. An integrated and computer-based information system on buildings would supply the data for a more comprehensive controlling, which takes advantage of synergies, organises work more effectively and economises the operation of buildings.

As the above paragraphs imply, there is a substantial need for many of the engineering consulting services in Europe, which should have the effect of improving the market for them during the rest of this decade. Meanwhile, the Single Market is expected to encourage competition between domestic services and foreign services.

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# Geodetic surveying

## NACE 837

Due to wide-spread market saturation, the industry will show no growth in the near future, even though the economy is showing an upturn in many Member States. The long-term prospects are promising, however. The number of people employed in the industry will remain stable, as qualitative demands rise. There are over 65 000 professionals working in the industry, of which more than one-half are in France and Germany. About half of these are working in the public sector. There is a trend towards larger companies offering a more diverse range of services, while small companies specialise.

### INDUSTRY PROFILE

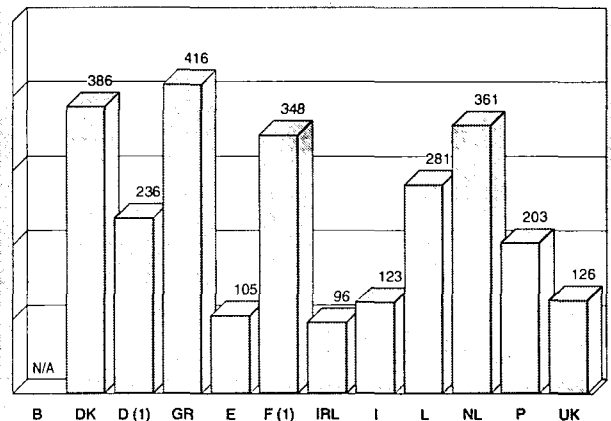
#### Description of the sector

Geodetic surveyors measure the size, position and three-dimensional shape of the earth's surface and the objects upon or in it. The following areas of expertise fall within this broad description: cartography (national and international, small or large-scale maps, navigation charts, etc.), measured building surveys; tunnelling and mining surveys; measurement and location of underground structures and services; cadastral and boundary surveys; industrial and engineering surveys; preparation for construction; monitoring and deformation surveys; land and geographic information systems; ocean bed, coastal and river surveys; measurement of marine resources; and other surveying services.

In many Member States, urban and regional planning, land and building valuation, soil testing, land management, and management of development also come within the scope of the geodetic surveyor, although not necessarily as part of the traditional definition of his or her activities.

Measurement systems can be land, sea, air or space borne. Examples of these systems are remote sensing (land, air or space), Global Positioning Systems (space), hydrography (sea)

**Figure 1: Geodetic surveying**  
Number of geodetic professionals per million inhabitants, 1993



(1) Estimate

Source: CLGEE, Bakkenist Management Consultants

and tachymetry (land). Much of the geodetic surveyors' work, however, is in the management, analysis and structuring of the acquired data, in order to create maps, plans, etc. from this data.

#### Recent trends

In many Member States, the geodetic surveyor traditionally has been a public servant (e.g. the Netherlands, Germany, France). In others, access to the profession is legally protected (e.g. Belgium, Germany). Only in some Member States (e.g. the United Kingdom, Ireland) has the profession been open to competition. This has changed in some Member States (e.g. the Netherlands) in the last decade.

The number of people employed in the private and the public sector combined is given in Table 1. In total, over 65 000 persons are employed in the EU. If this figure is recalculated according to the number of inhabitants in each country, the level of penetration is highest in Denmark, Greece and the

**Table 1: Geodetic surveying**  
Estimated number of geodetic surveyors, 1993

	Surveyors	Technicians	Others	Total
Belgique/België (1)	2 200	N/A	N/A	2 200
Danmark	750	550	700	2 000
BR Deutschland (2)	N/A	N/A	1 000	19 000
Hellas (3)	N/A	N/A	N/A	4 300
España	2 200	600	1 300	4 100
France (4)	2 000	10 000	N/A	12 000
Ireland (3)	40	300	N/A	340
Italia (3)	5 000	2 000	N/A	7 000
Luxembourg (3)	34	77	N/A	111
Nederland	625	4 175	700	5 500
Portugal (3)	1 800	200	N/A	2 000
United Kingdom	1 810	3 210	2 300	7 320
Österreich (4)	309	N/A	N/A	N/A
Norge	1 200	1 800	N/A	3 000
Sverige (1)	700	N/A	N/A	N/A
Schweiz/Suisse	600	1 800	1 200	3 600

(1) Geodetic surveyors only

(2) Statistisches Bundesamt 1991

(3) Figures for 1991 and/or 1992

(4) Private sector only

Sources: CLGEE, Bakkenist Management Consultants, Amsterdam



**Table 2: Geodetic surveying**  
**Percentage of geodetic surveyors, technicians and others**  
**working in the private and public sector**

	Private	Public
Belgique/België (1)	32	68
Danmark (2)	45	55
BR Deutschland (3)	32	68
Hellas (3)	45	55
España	66	34
France (4)	60	40
Italia (3)	14	86
Luxembourg (4)	31	69
Nederland	31	69
Portugal (3)	42	58
United Kingdom (2)	42	58
Norge	33	67
Sverige (1)	7	93
Schweiz/Suisse	83	17

(1) Geodetic surveyors only. For Belgium: including surveyors that only occasionally perform geodetic activities.

(2) The number of geodetic surveyors is higher in the private sector but the number of technicians and support staff is higher in the public sector.

(3) Estimate based on 1991 data

(4) Estimate based on 1992 data

Sources: CLGEE, Bakkenist Management Consultants, Amsterdam

Netherlands and lowest in Spain and the United Kingdom (see Figure 1).

The high level of penetration in Denmark and the Netherlands can be explained by the legal situation in these countries and the demand for high accuracy. In Greece, the penetration level is high because of the many other activities in which the geodetic surveyors are involved. Penetration in the United Kingdom and Ireland is low because of the numerous types of surveyors (not included in the figures) and the fact that the land registration system in these countries is essentially descriptive.

The sectors employing geodetic engineers vary among the European countries, as Table 2 clearly shows. Over 80 % are employed in the public sector in Italy and Sweden, while there are 66 % or more private employees in Spain and Switzerland. No major changes are expected which could significantly alter this in the near future.

In Belgium the figure is somewhat uncertain because no registration is available. The figure shows all geodetic engineers, whether they are currently involved in geodetic activities or not. Discussions are taking place in Belgium to make registration mandatory to work in the geodetic field.

The turnover in the private sector in each Member State is given in Table 3. About three-quarters of the estimated total turnover in the private sector is generated in just two countries: France and Germany. There is widespread market saturation within the EU. After the serious fall in turnover in 1992 and 1993, most countries expect the turnover will remain stable in 1994.

## MARKET FORCES

### Demand

Geodetic surveyors serve developers, builders, contractors, architects, planners, lawyers, engineers, geophysicists, oil companies and governmental bodies. This list is growing as more people start to benefit from the services and skills of the profession (e.g. in the earth sciences). Satellite positioning systems have opened new markets where conventional techniques would not have been considered previously because of cost. However, the apparent ease of operating such systems means that for low-precision work the geodesist often is involved more in the capacity of a consultant.

Market differences exist between Member States in the amount of work received from the private and public sectors. Belgium, Denmark, France, Greece and the United Kingdom have a larger proportion in the former and Italy, Luxembourg, Germany, the Netherlands, Portugal and Spain a larger part in the latter. In the long term, cadastral surveys and other public sector work will show a fall in demand balanced by an increase in engineering and industrial surveys and large-scale mapping. For the short term (1994/1995) an increase in the work derived from local and/or regional governments is expected in many countries.

### Supply and competition

Within each country, profit margins have been reduced considerably due to the economic downturn, which has an effect on government spending and the construction industry. Due to the effects of competition, these margins probably will not increase significantly. Cost-based operating for non-specialised work will, therefore, remain significant. In certain sectors of the industry, especially in the areas of land and geographic

**Table 3: Geodetic surveying**  
**Estimated turnover**

(million ECU)	1991	1992	1993	trend 1994
Belgique/België	35.5	N/A	36	=
Danmark	59.2	54	54	=
BR Deutschland	650	N/A	N/A	N/A
Hellas	14.2	N/A	15	N/A
España	N/A	N/A	N/A	=
France	500	522	429	=
Ireland	3.9	N/A	4	N/A
Luxembourg	3	3	N/A	N/A
Nederland	129	107	108	=
United Kingdom (1)	N/A	62	76	=
Norge	N/A	65	70	+
Schweiz/Suisse	N/A	302	302	=

(1) Turnover of companies with more than five employees, geodetic activities only; total turnover is estimated at million ECU 110.

Source: CLGEE, Bakkenist Management Consultants, Amsterdam



**Table 4: Geodetic surveying**  
**Estimated number of geodetic companies in the private sector**

(units)	1991	1992	1993	Trend 1994	Employees 1993 (%)
Belgique/België	1 000	N/A	N/A	N/A	N/A
Danmark	162	142	136	-	74
BR Deutschland	1 400	N/A	N/A	N/A	N/A
Hellas	1 230	N/A	N/A	N/A	N/A
España	60	150	200	=	63
France	1 848	1 773	1 733	-	85
Ireland	15	N/A	N/A	N/A	N/A
Italia	75	N/A	N/A	N/A	N/A
Luxembourg	4	5	N/A	N/A	N/A
Nederland	57	50	60	-	50
Portugal	10	N/A	N/A	N/A	N/A
United Kingdom (1)	N/A	120	130	+	51
Österreich	N/A	305	314	309	N/A
Norge	N/A	19	19	20	63
Schweiz/Suisse	N/A	300	300	300	N/A

(1) Established hard-core geodetic survey firms only  
 Source: CLGEE, Bakkenist Management Consultants, Amsterdam

information systems, computer software companies are competing for work.

Geodetic surveying is primarily a national business, and there is hardly any international competition. Generally, over 95 % of the turnover is generated in the home country. Only companies in Spain and, to a lesser extent, Luxembourg and Portugal, meet serious competition in their home market. The main disadvantages for outside competitors are the regulations necessitating membership in professional bodies and certain educational requirements.

The focus of some specialised areas, notably aerial photogrammetry and hydrography is almost by nature international. The largest photogrammetry companies have their headquarters in Germany, France, Belgium and the Netherlands, and the major hydrographic companies are located in the United Kingdom and the Netherlands.

The distribution of geodesists is highly related to population distribution. Also, the services provided are strongly tied to the land itself; hence, the industry polarises where land or real estate is being exchanged, monitored or developed.

## INDUSTRY STRUCTURE

### Companies

The number of private companies in each Member State is given in Table 4. In total the number of companies is around 6 000. Most companies are small (less than 10 persons employed). Belgium, Germany, Denmark, Greece and Ireland all have a high proportion of very small companies, and in Belgium self-employed status is the typical situation. The United Kingdom and the Netherlands have a more equitable spread of company size.

Most larger companies are either technically specialised, for example in aerial photogrammetry and remote sensing (Hansa Luftbild (D), Eurosens (B) and KLM Aerocarto (NL)), or are part of a bigger field such as civil engineering, offering geodetic surveying within their operation (Racal (UK), Oranjewoud (NL), Heidemij Advies (NL)). Some larger companies do offer a range of services purely within geodetic surveying (Engineering Survey (UK), Fugro-McClelland (UK/NL), Fjellanger Wideroe (N)).

Because many of the larger companies form a part of a company with activities in other fields, it is hard to rank the largest

companies operating in this sector with any certainty. However, the following companies are amongst the largest operating in the EU (in order of the estimated size by number of employees): Fugro-McClelland (UK), BRS Grontmij/Geogroep (NL), Oranjewoud (NL), Hansa Luftbild (D), Starkstrom Anlage Gesellschaft (D), BKS Surveys (UK), Geonex UK (UK), Egle Vermessungsbüro (D) and Eurosens (B). Elsewhere in Europe, large companies can be found in Norway, e.g. Fjellanger Wideroe and Blom.

### Strategies

The most general strategies, especially for the larger companies, lean towards diversification of services offered and collaboration with associated professionals, particularly in the field of information technology and aerial photogrammetry. Some smaller companies tend to specialise themselves, offering niche marketing solutions to specific problems (e.g. monument measuring).

Most companies try to keep abreast of the latest technological developments, since many professional customers use these technologies themselves. The result is that the educational level of the people employed is increasing (e.g. in the Netherlands and the United Kingdom).

Other trends include efforts to achieve quality accreditation, and a change in personnel structure. In general, one can see a reduction in staff among the larger companies aiming to operate more efficiently.

### Impact of the Single Market

Geodetic surveying (with the exception of aerial photogrammetry and hydrography) is closely connected to the 'field' and dependent on national legislation. It is estimated that some 95% of the business is local, meaning that measures on the European level have had little influence on the industry.

This will, however, change during the next five to ten years. The Comité de Liaison des Géomètres-Experts Européens is currently preparing a European Profile (i.e. a definition) of the profession to be published in the course of this year. Furthermore, European quality standards for measurements are being discussed and expected within two years. Should these initiatives find support within the Commission and acceptance by the Member Countries, they will most likely have an effect on how companies will operate in future and also on their price structure.



The most important remaining internal barrier is formed by the regulation concerning the description of land and the organisational and regulatory aspects concerning the measurement of property (kadastral). Regulations differ between Member States and therefore make cross border activities problematic. Measures are being taken in some countries to accept foreign geodetic surveyors (recognition of diplomas).

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## REGULATIONS

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The most important regulations are those concerning cadastre. Most countries recognise boundaries based on survey measurements. These measurements are carried out by a specialist organisation (e.g. l'Administration du Cadastre et de la Topographie in Luxembourg), by public servants (cadastral surveyors in most countries) or by (licensed) geodetic surveyors (e.g. Öffentlich Besteller Vermessungs Ingenieur (ÖbVI) in Germany and Austria). In the last case, this work often forms a substantial part of a geodesist's activities. Ireland and the United Kingdom have an essentially descriptive system of land registration. The geodesist's involvement in cadastral work in these two countries is, therefore, minor.

The differences in cadastral law between countries (and also between regions within one country, e.g. Germany) mean that this sector of the market sees little competition across borders. EU regulations concerning recognition of qualifications for migrant workers - especially the one on mutual recognition of diplomas at a higher level (BAC +3) - and the responsibility for services, are being addressed by the Comité de Liaison des Géomètres-Experts Européens (CLGEE). A detailed report of education for geodetic surveyors within the EU was published in 1988. A second update to this report is being prepared. The CLGEE is striving to harmonise qualification standards and mutual recognition of diplomas. Some cross-border activities have already resulted from these initiatives. EU directives concerning public service contracts have had no significant effect to date.

In Denmark, Germany, France and Italy, the profession is afforded legal protection. In the Netherlands, Ireland and the United Kingdom, however, no such legislation exists. The remaining EU countries have situations which fall somewhere between the two.

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## OUTLOOK

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The outlook in the short and medium term is strongly linked to the economic situation in the countries of the EU. It largely depends on the activities of the construction industry, public utilities, off-shore industry and cadastre. Since the construction industry in most countries shows an increasing level of activity, the turnover of the geodetic surveyors in this sector generally will remain stable and/or increase to some extent. The off-shore activities in the North Sea and the Continental Shelf are limited, thus effecting the hydrographic activities in a negative way. This is partially offset by the increase in activities in the Far East.

In most Member States, government or semi-government bodies are facing budget constraints and/or are reorganising to become more efficient. This too will have an effect on the activities of geodetic surveyors. In some countries (notably Denmark and the Netherlands) government bodies become competitors for the geodetic engineering companies in the private sector. In the Netherlands, a public-private partnership has come into existence for the production of the great-scale basic map.

In Germany, the near future looks brighter, especially for the ÖbVI's. All five new Länder (former East Germany) have accepted the ÖbVI's. The market in these five Länder is growing with the regulation of land property.

The long-term outlook for geodetic surveyors is good and will rest largely on their ability to adapt to change. Many of the traditional skills in data acquisition are becoming less relevant with the advance of automated systems. However, the processing, structuring and manipulation of these data within land and geographic information systems (GIS) for resource management, planning, route guidance systems and other projects is increasingly important.

Collaboration with information technologists will be essential to provide such services. Currently, the European Normalisation Commission is developing a European format for the transfer of GIS information. This would enable GIS information to be internationally exchangeable.

In many countries (Denmark, France, the Netherlands, the United Kingdom), there is a tendency towards fewer and larger companies offering more diversified service. There is also a place for small companies which offer simple, low-tech services with low overhead, or which invest in and can offer state-of-the-art products. It is estimated that the number of people employed in the industry will remain stable or decrease only slightly.

Industrial metrology is an area where the surveyor's measurement skills are competing with long-established methods. It is anticipated that some surveyors will choose to specialise and increase their market share here.

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# Landscaping

*The landscaping, gardening and sports ground construction industry is finding increased demand with the growing urban population and a concern with a green environment. The sector is dominated by a large number of small to medium sized firms who operate labour intensively. Thanks to the expected economic recovery, landscaping companies anticipate increased activity for the future in renovation and maintenance of existing parks and gardens along with more complete biological and ecological environmental projects.*

## INDUSTRY PROFILE

### Description of the sector

This sector includes the installation, renovation and maintenance of gardens, landscaping and sports ground construction in private and public gardens, parks and leisure centres. Specific activities like tree maintenance or transplantation, landscaping of public works, installations for noise prevention, creation and construction of ways and places within parks also fall within this sector.

Traditional landscaping work such as construction, laying out and maintaining gardens and parks is the core sector. However, as a consequence of the recent economic recession, landscaping companies have seen the construction of new gardens, parks and sports grounds facilities decline. In response, firms have been seeking out new fields of work such as: gardens in the backyard, on the roof or facade and even indoor gardens. Thanks to the increased concentration of urban population, municipal and state projects have been areas of growing interest, for example: landscaping in traffic-restricted zones, natural landscaping of roads and highways, city redevelopment, new private and public parks, play-grounds, and leisure centres. Renovation of pre-existing sites and ongoing maintenance is also a significant field of work for landscape contractors.

The importance of less traditional activities such as biological engineering and natural landscaping is growing. The former is landscaping which uses living plants and inanimate materials like wood, stone, and geotextiles; natural landscaping is the creation of "almost" natural spaces or ecological niches not typically intended for public use.

### Recent trends

In 1993, the annual survey on the landscaping sector has been taken among national associations members of ELCA, the European Landscape Contractors Association. However, the survey does not cover all EU Member States.

Data indicate that in 1993, employment in member companies of national associations in gardening, landscaping and sports ground construction for nine Member States totalled about 192 000 individuals. Overall employment figures have greatly increased from the previous survey in 1991 because of two main reasons: first, the addition of Spain, with its 5 000 firms and 50 000 employees; second, the large increase of employment in Germany (80 100 persons), which is the result of the inclusion of figures for the Eastern Länder and of young people employed under training schemes (about 5 % of total workforce).

Germany has clearly the largest turnover per enterprise, with France and the United Kingdom following far behind. The vast majority of garden, landscape and sports ground construction companies is composed of small and medium sized firms.

### Foreign trade

As the vast majority of companies are SMEs, they mainly depend on small regional markets. Intra-EU projects take place when the landscaping firms are located close to national borders, or decide to join efforts for a specific contract, or if the firm is highly specialised and is able to fill special requirements such as transplantation of larger trees, roof planting, etc.

## MARKET FORCES

### Demand

Demand for landscaping services is strictly linked to the business cycles in the construction sector, both in building and civil engineering projects. On the other hand, developments in the construction sector itself are influenced by changes in the economy as a whole. Thus, the recent general economic recession which swept Europe has weakened demand for landscaping services.

On the other hand, recent years have seen stronger demand for a healthy environment for the public, fuelled by increasing pollution in modern society. As a result, the requirements for the construction of gardens, landscapes and sports grounds have not only increased, but are also undergoing a big change.

The available data, presented in Table 2, show that the demand for landscaping services is divided between private clients and public or semi-public clients. This division is not consistent throughout all Member States, for example, only 30 % of Denmark's demand comes from private clients, while private clients account for 80 % of demand in Belgium. In Italy and the United Kingdom, public demand represents the highest portion of sales (respectively 60 % and 48 %).

Landscaping often deals with various projects of re-cultivation and re-naturalisation. In general, these projects are a result of a legal condition. An example would be the re-naturalisation of gravel pits or quarries, greening of mounds or slag heaps, re-cultivation of industry fallows or areas under recent construction, and the restoration of damp areas.

### Supply and competition

Public authorities are among the sector's best clients, while at the same time they are the fiercest competitor for landscape contractors in the EU. Government initiatives such as employment programs, social rehabilitation, and agricultural programs compete with private landscaping firms in most European countries. State-financed employment and social programs employ untrained persons to maintain parks and

**Table 1: Landscaping**  
**Main indicators, 1993**

	Number of enterprises	Number of persons employed
Belgique/België	2 000	4 700
Danmark	400	(1) 1 450
BR Deutschland	8 100	80 100
España	5 000	50 000
France	7 000	31 000
Ireland (2)	120	(1) 450
Italia	3 000	(1) 1 400
Nederland	2 500	10 000
United Kingdom (2)	3 000	13 000
Total EU 9	31 120	192 100

(1) Member firms only  
(2) 1991  
Source: ELCA

**Table 2: Landscaping**  
**Turnover by type of customer, 1993 (1)**

(%)	Private	Public	Semi-public
Belgique/België	80	20	0
Danmark	30	40	30
BR Deutschland	32	36	32
France	60	35	5
Italia	40	60	0
Nederland	60	40	0
United Kingdom (1)	52	48	0

(1) Covers member companies of national associations in the EU (excl. GR, E, IRL, L and P).

(2) Figures from 1991

Source: ELCA

public places. These programs are widespread in Europe, and particularly in Denmark, Germany and the Netherlands.

Competition is growing from farmers as government agricultural programs are reducing the amount of cultivated acreage by paying farmers to leave their fields untilled. Another objective is to maintain and beautify the land. Although farmers are not landscaping the countryside or building parks, some of the activity of maintaining uncultivated ground competes with landscaping companies.

### Production process

Landscaping is a typically labour intensive activity. The average salary per employee per hour varies between approximately 6 and 11 ECU with an average estimated work week of 39 hours. Within the EU, traditional construction machines i.e. wheel loader, excavator and tracked vehicle make up, on average, 45 % of equipment used. Transport vehicles are the

second largest capital expense followed by machinery and equipment for speciality use e.g., compressors for building paths and squares.

The use of special machines varies among the individual Member States. By way of example, winter equipment represents a large share of apparatus used in North European countries, while its importance falls considerably in the Mediterranean area.

Professional qualifications are treated differently by public authorities throughout Europe. In the Netherlands, Austria and Norway, a professional certification is required in order to manage a landscaping company, whereas, in other countries no certification is necessary to open a landscaping company although professional certificates do exist and membership in national associations require an adequate qualification.

## INDUSTRY STRUCTURE

### Companies

The landscaping industry is very fragmented. Available data indicates that 90 % of garden, landscaping and sports ground construction companies operate with less than 50 employees. In fact, in Belgium, Spain, France and the Netherlands, the majority of firms have five or less employees. The largest garden, landscape and sports ground companies with more than 50 staff are to be found in Germany, France, the United Kingdom. Firms frequently collaborate across national boundaries to expand capacity and expertise in larger projects.

### Impact of the Single Market

The overall impact of the Single Market programme on the EU landscaping sector has been small but positive. A few firms now compete on foreign markets, but landscaping essentially remains a business centred on local markets.

**Table 3: Landscaping**  
**Main competitors of landscaping companies, 1993 (1)**

	B	DK	D	E	F	I	NL
Agricultural companies			X	X		X	
Civil engineering & road construction companies			X	X		X	X
Social institutions		X			X	X	X
Employment programmes	X	X	X	X		X	X
State companies		X	X				
Garden centers & tree nurseries	X		X		X		X

(1) Covers member companies of national associations in the EU (excl. GR, IRL, L, P and UK).

Source: ELCA

**Table 4: Landscaping**  
**Number of enterprises by employment size classes, 1993 (1)**

(%)	1 - 5	6 - 10	11 - 25	26 - 50	51 +
Belgique/België	75	15	6	2	1
Danmark	20	50	20	10	0
BR Deutschland	6	11.5	28	27.5	27
España	65	20	10	2	3
France	51	25	15	6	3
Italia	0	6	45	25	24
Nederland	50	25	15	7	3
United Kingdom (2)	0	13	35	20	32

(1) Covers member companies of national associations in the EU (excl. GR, IRL, L and P).

(2) 1991

Source: ELCA



**Table 5: Landscaping  
Future perspectives, 1994**

	B	DK	D	E	F	NL
Biological/ecological works		X				X
Environmental works		X	X			X
Facade gardens					X	X
Natural parks						
Maintenance works		X				X
Recultivation				X	X	
New private gardens	X		X			X
City redevelopment Parks		X				

(1) Covers member companies of national associations in the EU (excl. GR, IRL, I, L, P and UK).  
Source: ELCA

There is one remaining obstacle to be abated to fully achieve Single European Market for landscaping services. The access to public procurement markets indeed remains difficult, as bidding rules are often too complicated for small firms. Most of difficulties on foreign markets originate from the need to offer customer-tailored services: in this case, different languages and cultures often prove to be an insurmountable obstacle to internationalisation. Hence, the sector welcomes the initiatives and programs sponsored by the Commission to increase language awareness and to promote exchanges of experience and workers among firms.

#### ENVIRONMENT

The push for environmental quality in and around urban centres continues to benefit the industry. As land gets more expensive, gardens and green spaces become smaller. This encourages creative and intensive use of gardens. Reurbanisation projects such as Parc André Citroën in Paris are another example of the urban need for green space.

#### REGULATIONS

An important area for currently developing EU regulation is the standardisation of quality and safety norms. Lawn quality and maintenance for sports grounds alone is subject to several different norms depending on the use and need for safety of the different facilities. Another important area is the contract bidding process. Public works projects now must be offered for tender on the EU level, instead of a national or local level as before. Other areas of public policy like social legislation, industrial law and the safety and security directives for workplace and machines have an impact on the industry.

#### OUTLOOK

As mentioned above, landscaping is a sector linked to general economic development, above all the construction of houses, business facilities and public projects.

Landscapers in Europe are confident for their future, thanks to the general economic recovery whose effects are becoming more and more evident. Demand for re-cultivation and re-naturalisation, leisure centres, natural parks and maintenance work is set to start growing again. Biological/ecological and other more comprehensive environmental works will also grow in many Member States.

Landscape contractors in several EU countries anticipate in the near future a reduction of work carried out for public authorities, as a consequence of tightening state budgets. Hence, the importance of private clients will increase further.

Written by: DRI Europe

The industry is represented at the EU level by: European Landscape Contractors Association (ELCA). Address: Alexander-von-Humboldt-Str. 4, D-53604 Bad Honnef; tel: (49 2224) 77 07 20; fax: (49 2224) 77 07 77.

# Linguistic services

NACE 839.3, 935

The sector includes translation services, interpreting services and language education. The number of professionals working in these three branches is growing steadily, although a large part of these services, e.g. translation, is provided by people other than professionals. Competition is keen in the most common languages, but there are good job possibilities for those who specialise in East European and Asian languages. The trend towards more international cooperation in politics and economics will spawn increasing demand for linguistic services in the near future. Specialised knowledge and technical progress are also becoming increasingly necessary for translators, interpreters and language teachers.

## INDUSTRY PROFILE

### Description of the sector

Translation and interpretation services as well as language teaching belong to the linguistic services sector. Translators and interpreters are included in NACE 839.3. Language teachers are under NACE 935, included in private tutorial. Close relations exist between linguistic services and other sectors covered by the Panorama, mainly those operating at the international level (especially the printing and publishing industry).

Translation covers an extremely diversified market. Today, translation is required in a wide variety of human endeavours, ranging from commercial and industrial affairs to scientific research, legislation, communication and literature. The translator's job is to translate texts from one language to another, one of which is normally his native language. There are two basic types of translators: the literary translator, who translates literary texts, and the so-called techno-scientific translator, who is responsible for all the other forms of translation. For the technical translator, it is necessary to be up-to-date on innovative specialised terminology, as new developments in technology lead to new technical terms. To create new words, a technical background is often required as a supplement to fluency in the languages involved. Literary translation encompasses fiction and non-fiction, including plays, essays and poetry. It often demands subjective involvement with the original author.

Interpreting covers a wide range of subjects. Interpreters translate directly from one language into another, using various

methods. Most important is simultaneous interpretation, used mainly during international conferences with the help of modern communication technologies. Similar to this form of interpretation is whispered interpretation. This means that the interpreter translates what has been said and whispers it into the client's ear. This form of interpretation is normally used if somebody is making a speech which must be translated for a single person. A third form is consecutive interpreting. In this case, the speaker stops talking after a few sentences, allowing the interpreter to translate. Then the speaker continues, and the interpreter translates again after a few more sentences. This continues until the end of the conversation, which is usually only between two people. A fascinating form of interpretation is the signing interpretation. Generally, interpreters do not have the texts being translated in advance. Only simultaneous and consecutive interpreters sometimes get to see the text before the speech is given.

In addition to the above-mentioned services, translators and interpreters are qualified to perform other jobs. Of these, the lexicographer, terminologist, publisher's reader and computer linguist are the most well-known. Additional qualifications are necessary for each of these professions.

Language instruction involves teaching language courses offered by public institutions, private enterprises or individual teachers. Besides the normal public school language education, language teaching is given as advanced vocational training in private language schools or public high schools, or provided in-house by large companies. Professional teachers in these areas work either as independents or for the public sector. Only a few are employed by private enterprises, such as publishing houses or television and broadcasting corporations.

The economic weight of linguistic services is difficult to measure because the services are usually included in the turnover of large enterprises and institutions and are not separately reported. Actually, their weight is more qualitative in nature. Linguistic services are the basis for international relations for large and small companies alike and cannot be avoided in enterprises that work with new technologies and technical equipment.

In general, linguistic services are concentrated in regions with high demand, i.e. areas with large population and extensive foreign contacts. In 1993, most of the EU's linguistic services were produced in Germany, the United Kingdom and the Netherlands. Germany and Spain had the highest number of literary translations during the 1980s.

### Recent trends

The importance of linguistic services is linked to the growing internationalisation of political and economic relations.

Table 1: Linguistic services  
Number of translators and interpreters (1)

	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België	N/A	N/A	249	243	243	281	281	330
BR Deutschland (2)	(4) 135	(4) 3 386	(4) 3 525	4 067	4 146	4 300	(3) 5 200	5 400
España	N/A	N/A	N/A	N/A	N/A	(2) 800	N/A	945
France	N/A	(5) 300	(5) 350	(5) 400	(5) 450	(2) 1 400	N/A	1 630
Italia	N/A	N/A	600	700	950	1 300	1 400	1 450
Nederland	N/A	N/A	N/A	N/A	N/A	(2) 1 440	(4) 1 150	(4) 1 300
United Kingdom	(4) 510	(4) 889	(4) 998	1 260	1 397	2 019	2 242	4 130

(1) Registered members of professional associations, including interpreters and literary translators.

(2) Excluding interpreters.

(3) Including the former German Democratic Republic.

(4) Excluding literary translators.

(5) Only literary translators

Source: National professional associations, F.I.T.



Throughout the period of economic recovery following the end of World War II, translation helped significantly to promote peaceful relations and understanding between nations, and international economic relations steadily expanded during the following decade thereafter. Relations between individual European nations, and their relationships with other countries became closer and more constant. In particular, Germany regained its economic importance and moved towards once again playing a meaningful role on European and overseas markets.

At the same time, exports became more and more important for national economies, particularly in the manufacturing sector. New affiliations were created between industrialised nations, and the foundation of international organisations like the European Community for Iron and Steel in 1951 sparked cross-border joint ventures and cooperation.

With the shift away from manufacturing and towards a service-oriented society, international contacts increased again, entailing more consumption of linguistic services. Especially, translations into or from English and French were in demand. The meaningful role that East Asian markets have played during the past decade, combined with the recent opening of Central Europe and the former Soviet Union, has opened up new market opportunities for the sector. There is a growing demand for translations into East Asian and East European languages.

The number of translators and interpreters registered in the national professional associations within the EU totalled approximately 15 000 in 1993. A significantly higher yearly increase from 1991 to 1992 was due to the new membership of the 'Institute of Linguists'. However, all other reporting countries showed only small increases from 1992 to 1993. A large part of linguistic services is still produced by women. Most professionals work as free-lance translators and interpreters, e.g. almost 100 % in France, about 90 % in the United Kingdom and about 85 % in Belgium. Larger groups of employed translators and interpreters are found only in Germany with around 50 % and in Italy with around 40 % of all registered association members. In many countries, the national professional associations estimate that their registered members cover only about 30 % of all persons working as translators or interpreters. The situation is different in Scandinavia, where 50-85 % of translators and interpreters are organised in associations. Especially short and easy translations (e.g. business correspondences) are done by part-time, non-registered translators or by persons with dual native languages, who have other jobs.

The situation is different for language teachers. A large proportion of them work as employees of private language schools or large companies which train their staff in-house.

### International comparison

Translation and interpretation are more important within the EU than in Japan or the US, because the countries which work together in the EU have eleven different official languages. Since English and French are the working languages of the EU, English- and French-speaking countries have no problem keeping informed about EU policy and regulations. At the same time, a majority of Europeans learn English at school, and English is a dominant language all over the world. Even many Japanese people are able to read English. But Japan has close trade relations with the EU and as even cultural relations are now becoming closer, so that the need for literary and technical translation between a European language and Japanese is rising substantially.

Foreign trade is not important for linguistic services, because texts to be translated are usually translated at the place where they are needed. For example, a company working in London will get a text translated into English by a translator based in the United Kingdom.

## MARKET FORCES

### Demand

In general, the demand for linguistic services has grown proportionate to the increasing interdependence of countries in business and government, and the ensuing proliferation of international organisations like the EU, OECD, United Nations agencies and others. However, decreasing budgets for translation, particularly in such international organisations, result in a curtailed demand for linguistic services. The expansion of the EU since 1 January 1995, on the other hand, will cause new demand, as in-house staff for the Nordic languages will be needed.

At the moment more than 50 % of the demand for translation comes from the commercial and industrial sectors; about 20 % comprises scientific translation and less than 30 % is made up of legislative and other translation, including press, audio-visual and literary translations. Demand for literary translation was decreasing or stagnant for a long time, but has been increasing in a few EU Member States during the past years.

**Table 2: Linguistic services**  
**Translations by country of publication**

	1980	1981	1982	1983	1984	1985	1986	1987
Belgique/België	1 149	1 071	798	854	639	680	550	680
Danmark	1 913	1 120	1 387	1 503	1 639	1 610	1 771	1 892
BR Deutschland (1)	6 752	4 904	9 009	8 509	7 542	6 305	8 936	11 793
Hellas	N/A	482	N/A	N/A	N/A	181	283	83
España	5 366	6 361	7 381	7 447	7 741	7 944	9 649	7 337
France	5 691	2 794	1 894	3 436	3 821	4 679	1 710	2 213
Ireland	N/A	N/A	N/A	N/A	5	8	8	40
Italia	2 055	1 871	2 034	2 939	289	93	961	1 958
Luxembourg	0	2	N/A	5	N/A	N/A	N/A	2
Nederland	3	0	N/A	N/A	N/A	4 286	3 945	3 974
Portugal	939	449	949	794	738	729	872	342
United Kingdom	1 348	1 035	1 070	1 143	1 153	1 121	914	1 560
Japan	1 968	2 754	2 479	2 498	2 698	2 892	2 875	3 183
USA	1 380	1 086	1 319	969	828	21	N/A	N/A

(1) Including former East Germany  
Source: UNESCO Yearbooks



The demand for translation into and out of German has been the main source of the growing demand for linguistic services in Western Europe since 1990. Within the EU itself, the most important languages to be translated are English and French. As to the languages into which translations are made, there is almost a statistical balance among all EU languages.

Small enterprises are broadening their international connections and need more and more linguistic support. The demand from large companies is also increasing. The most important industrial sectors that require translations are the mechanical engineering and the metal, computer, chemical, plastic, cosmetic and car industries. For work in non-western languages, even large companies tend to hire free-lance translators.

Technological progress has been increasing in recent years. The computer is a prerequisite for every translator. Obtaining the hardware and software now used for translation involves high financial expenditures for the translator who seeks to maximise his or her potential for employment, as well-equipped translators have a better chance of receiving work. A new area of demand is for translation that involves desktop-publishing and/or machine-assisted translations.

Most of the registered translators and interpreters in the EU either work as free-lance, or are employed by private enterprises and translation offices or by the public administration. Interpretation is mainly needed for international conferences and is used both in the public sector and by private enterprises. In this context, privately organised meetings are gaining importance. Normally, conferences are not regularly scheduled and take place in various venues. This requires a great deal of flexibility on the part of the interpreters and is the reason why most institutions and enterprises do not have an in-house staff of interpreters. Hence, most interpreters are independent. Non-independent interpreters primarily work for international organisations such as the EU, the United Nations and the OECD.

The demand for language teaching services differs from that for translation and interpreting services. Large business enterprises and national and international institutions need language teachers for the vocational training of their staff. Usually, they have their own teachers for in-house tutoring. Smaller companies tend to use private language schools. The demand for independent language teachers comes from private individuals who need to learn a foreign language rather quickly. An interesting new market for language teachers has sprung up in recent years as the combination of travel and language courses has become an important part of the market. In this context, language instruction is mostly given by private schools.

In general, the demand for linguistic services is not dependent on the general economic development of a country. However, it is interesting to note that enterprises tend to reduce their in-house staff if their economic situation is bad. The upshot is that there are more possibilities for independent translators and interpreters to obtain free-lance work.

### Supply and competition

To meet the various needs of the private and public sectors, translators, interpreters and language teachers can either be free-lance or salaried. Traditionally, free-lance translators are members of a professional association. They work from their own premises and deal with the client either directly or through the intermediary of translation agencies. These agencies sometimes have no in-house translators, and subcontract free-lancers. The input costs of free-lance translators are reasonable, their most important overhead being an office and a PC. Technical translators are normally paid per word, line, page or hour. If they work directly for the client, they earn more money than working through an agency. Literary translators are either paid per line, per number of pages, in a lump sum, or they receive a fixed percentage of the royalties.

In recent years, government agencies and international organisations have increasingly awarded translation contracts to free-lance translators, because they have so much work that requires detailed knowledge and specialised skills. For free-lance translators as well as for staff translators, a combination of translating and commercial skills is an advantage in securing jobs and contracts. Many free-lance translators work part-time.

Nevertheless, in most of the EU countries many translators are registered as unemployed, and the number is increasing. For example, almost 1 800 translators were registered as unemployed in Germany in 1993. In 1993 the number of unemployed translators increased in almost all EU countries for the first time since 1988.

Although the unemployment rate among translators is quite high, competition between free-lance translators with specialised knowledge is not, except in the case of the high-salaried positions offered by international organisations. Large volumes of translation which require multilingual knowledge are usually done by translation enterprises employing translators with a variety of native languages. Free-lances sometimes tend to specialise in more exotic languages, and handle smaller projects. Compared with in-house translation, free-lance translators are cheaper in most EU countries, giving them a slight advantage. The strongest competition between single independent translators and interpreters is mainly concentrated close to national borders between countries in which the official languages are the same, e.g. Belgium's border with France and the Netherlands.

Normally there are enough free-lance interpreters within the EU. Though interpretation of English, French and German is required more than other languages, the competition is keener, because most of the interpreters will have at least one of the three languages as their mother tongue. Thus, specialisation in certain sectors (especially in the technical field) and the knowledge of exotic languages, will enable the free-lance to avoid competition, although there is always competition with the in-house interpreting staff of bodies like the EU and the OECD.

Language teaching services are offered by individual professors, private schools of all sizes and free-lance teachers. Other competitors are enterprises which offer telephone tutorials or training programmes such as books, videos, records, tapes and compact discs. The latter are cheaper and offer more flexibility than scheduled courses.

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## INDUSTRY STRUCTURE

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### Companies

The company structure is characterised by three types of firms: "one-person" firms, large private companies, or public employers. Free-lance interpreters, translators and language teachers comprise the first type. They offer their services directly to public or private clients or obtain work through an agency. Employed professionals are mainly employed by large companies or public bodies that have their own in-house translation, interpreting and language teaching services.

The European Commission is the most important public employer of translators and interpreters. Other private translation, interpreting and language teaching enterprises are often large. They sometimes have more than one-hundred full-time translators or interpreters and award contracts to independent free-lance professionals, if their in-house services are overloaded. The largest European companies in the translation sector are located in the United Kingdom. These are: Interlingua T.T.I. Ltd., Randall-Woolcott Services Ltd. and the Longman Group UK Ltd. The German company Brähler International Congress Service dominates the EU interpreting market. Brähler also provides all the technical equipment and experienced techni-

cians necessary for interpreting services. In the language teaching sector, Linguarama Ltd. (London) and Elsevier Languages from the Netherlands are the largest European enterprises. However, two other language schools are important within the EU: Berlitz, headquartered in Princeton, New Jersey (in the US) and E.F. with their headquarters in Lund, Sweden. Berlitz used to belong to the Maxwell trust. After the collapse of this trust, more than two-thirds of its shares were taken over by the Japanese publisher Fukutake Publishing Co. But they are still operating as Berlitz, and run around 300 schools all over the world.

SME's do not play an important role in the linguistic services market. For them it is too difficult to compete with large enterprises and free-lance workers because their fixed costs are relatively high and their degree of specialisation is too low.

### Strategies

Stronger competition will be the greatest challenge to free-lances and the enterprises working in this business, as shorter deadlines, more need for translations into East European languages and technical languages, as well as for translations using specific software and translations done by persons without certification, e.g. with dual mother tongues, penetrate the market. There is a trend among smaller firms to offer comprehensive services from translation to the printout of a manual. Also, a new branch is emerging, the so-called 'post-editor' who is needed as machine translations based on different systems such as Systran (used by the EU Commission), CAT and LOGOS are gaining ground. The post-editor's duty is to proof and structure machine-translated texts.

Overall, the technical ability of translators must increase, as computer-assisted translation becomes more popular. While the use of translation machines makes the work of the translators faster and more efficient, the construction of such a modern infrastructure is expensive. Only large institutions and enterprises are able to implement such translation-assisting tools. But computer-assisted translation is only acceptable when less emphasis is placed on quality. There is a chance for free-lance translators to excel by continuing to provide top-quality work in those subjects which require a fundamental knowledge of software and computers. As more specialists are required, firms with modern equipment offer free-lance translators contracts for certain periods and projects. In such cases, the contracted translators work with the machines of the clients, on their premises.

### Impact of the Single Market

The inception of the Single Market has provided new opportunities to this sector. The demand for all services has increased due to the presence and enlargement of international organisations like the United Nations and the European Commission. In addition, demand is created by increasing cross border business but also by the media, for example television and radio as well as the courts.

The structure of the sector is changing as individuals and companies form alliances and networks within the Union in order to strengthen their respective competitive positions. However, in terms of regulation, very little has changed. The sector can be described as generally unregulated but is moving increasingly towards a model of self-regulation. An example of self-regulation is the initiative employed to achieve quality assurance through the requirement of minimum qualifications and diplomas.

An important barrier which needs addressing is the ease with which cross border payments can be made. Considering that this is a very mobile sector with members of this sector working in many different countries, the level of bank charges related to cross border payments is considerable.

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## REGIONAL DISTRIBUTION

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Professionals working in the linguistic service sector are concentrated in the regions where large enterprises or international organisations are located. Inside the EU, the OECD and the Commission have the largest staffs of translators and interpreters. This means that a large part of all employed translators and interpreters work in Paris, Brussels, Luxembourg and Strasbourg. Since the EU and the OECD cannot translate everything in-house, a lot of free-lance translators and interpreters have their premises close to these institutions. The traditional structure of regional distribution will be supplemented by the need for translators, interpreters and language teachers in the countries which entered the EU in 1995, and in those where new EU offices will be installed.

Concerning private industry, translators and interpreters are concentrated in areas where international, export-oriented companies are located. This is the case in most capitals of the EU Member States and fast-growing regions of international importance.

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## REGULATIONS

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The titles of 'translator', 'interpreter' and 'language teacher' are regulated by the "International Standard of Classification for Professions" fixed by the International Labour Office in Geneva. According to this classification, translation, interpretation and language teaching the professions all require a university degree. But the titles are not legally fixed and protected in all EU countries. Worldwide, the legal status of these professions varies. Only in Denmark, Finland, Norway and Canada are rules for translators and interpreters stipulated by the state. There, translators and interpreters are authorised by the state if they comply with certain conditions, one of them being that they must have passed a special exam.

The role of translators and interpreters on international markets is only manifested in two documents:

- The relevant provisions and recommendations regarding translators and translations set forth in the Final Act of the Conference on Security and Cooperation in Europe (CSCE), passed in Helsinki in 1975;
- The UNESCO recommendation on the protection and improvement of the legal and social status of translations and translators, adopted in Nairobi in 1976.

Both of these documents recognise translating and interpreting as professions which play an important role in the interest of international understanding, the promotion of culture and the furtherance of science, technology and economic progress. However, they do not include any regulations for the professions, nor do they propose any educational requirements.

In addition to these documents UNESCO has installed two agencies that operate worldwide, the World Intellectual Property Organisation (WIPO) and the Committee for International Copyright Funds (COFIDA). WIPO aims at achieving copyrights in Third World countries. COFIDA is installed for the financial support of multilingual regions and countries to overcome their linguistic barriers.

For the EU countries, a draft of the Directive for liability on services is currently being discussed between the Commission and the professional associations. This draft was refused by the federations, because they do not agree with its content. In most EU countries, there is either absolutely no or only unsatisfactory regulations concerning translators' and interpreters' legal status. Often, they are not even offered copyright on their translations. Only a few EU countries have laws regulating admission to these professions. Otherwise, there is no professional job profile, no professional training is required, and there are no examinations or qualification criteria to protect the title "translator" and "interpreter", codify their



rights and duties, or provide for regulations regarding their practise. This opens the market to anyone who speaks foreign languages, allowing them to offer his or her services as a translator, interpreter or language teacher.

In most EU countries, civil law is decisive in such matters as negligence, libel and performance of contract. Some countries, such as Germany, have actually enacted legislative measures to regulate interpreting and translation in legal and administrative proceedings. But in general the public has no guarantee that every person offering and discharging services or performing as independent interpreter and/or translator in fact possesses the requisite ability. Only the interpreters and translators registered in national professional associations of some countries must have a university degree. It is becoming increasingly common for EU countries to offer academic degrees in translation which result in a legally protected title.

The EU Directive on the acknowledgement of academic education is the only regulation which applies to the professions of interpretation and translation. However, this has not yet been adopted as national law in all EU countries.

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## OUTLOOK

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The demand for the so-called "traditional languages" is almost satisfied within the EU. But the opening of Eastern Europe, the expansion of the EU in 1995 and closer world economic relations offer new possibilities for the profession.

By the year 2000, the number of translated pages is expected to triple within Europe. This fact will not triple the number of professionals because many translations will be done by machine, but an increase of 50 % in the number of registered members of professional associations, especially of translators, seems to be realistic up through 1997. Not only should the quantity increase, but the quality of the translation and interpretation needs to improve, too. In the future a good knowledge of Scandinavian, East European languages and other exotic languages will be necessary. More professionalism, specialisation and comprehensive services will be required by clients. The use of artificial intelligence will also be necessary, as machine translation will increase. Thus, free-lance translators and interpreters will face stronger competition from translation companies which are well-equipped with computers and various in-house specialists. But the market is large enough for free-lance translators and interpreters who are able to speak at least one exotic language and have special knowledge in certain branches.

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The industry is represented at the EU level by: International Federation of Translators (F.I.T.). Address: Dr. Heinrich Maierstrasse 9, A-1180 Wien tel: (43 1) 44 36 07; fax: (43 1) 44 37 56; and

Association Internationale des Traducteurs de Conférence (A.I.T.C.).

Address: Route des Morillons 15, CH-1218 Le Grand-Saconnex;

tel: (41 22) 791 0666; fax: (41 22) 788 5644; and

Association Internationale des Interprètes de Conférence (A.I.I.C.). Address:

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# Publishing services

## NACE 839

*The publishing services sector is growing very rapidly, as technological advances and sharply falling prices bring high quality publishing within the reach of an ever widening customer base. This base ranges from small concerns such as hobby clubs to major international commercial enterprises. The sector overlaps other service sectors including computer consultancy, below the line advertising consultancy, and secretarial support services. The estimated turnover of the "publishing for profit" segment of the publishing services industry (i.e. excluding in-house operations) was roughly 5 billion ECU in 1993, employing about 50 000 people.*

### INDUSTRY PROFILE

#### Description of the sector

Publishing services are services which help people prepare documents for publication in print or, increasingly, in electronic form. This help can take various forms from consultancy to the actual preparation of documents ready for publishing. Companies and individuals providing publishing services include Desktop Publishing (DTP) consultants, DTP shops, pre-press companies and printing companies. These "publishing for profit" companies face increasing competition from in-house DTP departments which are believed to be taking a growing share of the market. Because of its diversity, no reliable statistics are available on the publishing services industry.

#### Recent trends

In recent years, the publishing services industry has been revolutionised by the introduction of computerised methods, and in particular by the growth of DTP. DTP equipment has replaced phototypesetting equipment in many printing companies. DTP shops have been established throughout Europe. It is thought that there are now up to 10 000 such shops in the EU, employing around 30 000 people. Finally many companies in all fields and of all sizes have found it worthwhile to establish their own in-house DTP facilities. A few years ago, working drawings and slides were the input for the graphic reproduction process, now in the Netherlands, for example, it is estimated that 60 % of the input of printers and pre-press shops is in the form of floppy disks.

Most DTP software is of American origin, notably PageMaker, of which 2.5 million copies have been sold worldwide, and Ventura. As a result, it was first available in English, which gave the UK a lead in the use of DTP in Europe. Nowadays, the major programmes are available in all European and many other languages, and the UK's lead in this field has been much reduced. However, English language versions of the software tend to be about 10 % cheaper.

#### International comparison

It is difficult to estimate the size of non-EU markets for publishing services owing to a lack of statistics. The USA has a sophisticated publishing service market and most of the major suppliers of DTP hardware and software are American. The EU lags behind the USA in desktop publishing and design services. Japan, despite being a developer of very hi-tech equipment such as scanners, is trailing a long way behind the EU in the development of DTP companies.

#### Foreign trade

There is very little trade in publishing services. The service companies involved sometimes have production carried out

in a country with lower costs, such as Singapore or Thailand, especially for regular large production volume publications. Extra EU imports and exports are very small. Taking data for the whole printing sector, these are less than 2 % of the internal market turnover. Cross border business within the EU is also minor, amounting to less than 5 % of the turnover of the sector.

### MARKET FORCES

#### Demand

Most printing businesses have now computerised their production processes. More efficient computerised systems at ever lower prices have helped them make the decision to convert. There is a polarisation in the demand for final finish of documents. For some customers, printing on a laser printer (300 dots per inch) gives an acceptable quality. Often this demand comes from persons and companies not using this type of promotion or communication tool before.

Those professional customers converting from the older technology often require the best possible finish and have 2 540 dots per inch bromide films made before printing. Professionals also enhance pictures in documents, often to give them a crisper look, using specialised desktop publishing program extensions.

Customers often require the flexibility of the electronic publishing system which allows documents made at the pre-printing stage in several formats so that they can choose the one they think is best. The latest computers such as the Power Macintosh allow very fast use of graphics packages and consequently the ability to produce a large number of alternatives. The text for a document, nearly always generated by word processor, is transferred to DTP software to enhance the way it looks. Style sheets, automatically set, present information in a given style. Very few key strokes are necessary to change style sheets. In fine tuning a document font types and character sizes can change to achieve the most suitable result.

The introduction of "in-house" DTP facilities in many companies reduces the potential demand for outside publishing services, especially if the company thinks it can handle the whole job itself, perhaps with the help of a colour photocopier. However, really high standard work still usually requires, sooner or later, the help of a professional pre-press or printing company. Moreover lack of graphic knowledge can cause trouble and extra cost at the next production stage.

#### Supply and competition

The traditional pre-press and printing companies are in competition with DTP shops and in-house DTP departments. Printing is a highly skilled profession, and in most countries the industry is a well organised, high wage industry often with strong trade unions. In competition with the new DTP shops, traditional companies must compensate their higher labour costs with higher productivity resulting from their skilled workforces and more sophisticated equipment. Nevertheless employment in the printing industry is declining.

There are no major pan-European DTP service companies. Most companies in this market sector only serve a limited locality in their own country. The level of investment required does not create a significant barrier to entry and economies of scale are limited.

Companies offering a full professional service are fewer than those offering processing and production at 300 DPI. Increasingly the latter subcontract pre-printing to printing companies, if they have to produce a high quality document.

Prices of publishing services offered by both pre-press and printing companies, and DTP shops have been falling, partly due to increased competition in the present economic climate, and partly because of falling hardware and software prices.

## Production process

Most of the companies in the sector are new. Many only started business in the mid-1980s. Leading DTP software companies such as Aldus and Adobe were also founded at this time. Some business service companies with longer histories have altered business plans to get into the flourishing DTP services market. Many computer consultants have become more involved in DTP than in other activities.

Other professionals attracted to DTP include those that were previously involved in translating, printing, typing, word-processing, copy-writing, and proof-reading. Publishing production professionals, photo composers, page layout specialists and photo engravers, have had to move with the times by making investments in electronic printing. Most have now converted from manual to computerised page layouts. These include PC picture publishing, PC art, computer aided design (CAD), and DTP.

Most DTP companies are very small enterprises. Their main work is to layout documents from manuscript or electronic text using professional DTP packages, and subcontract the production. Many use only four main tools: an Apple Macintosh, IBM compatible or other PC, a scanner, computer software including DTP programmes, and a laser printer.

Some have made investments in higher or additional cost pre-printing equipment. This includes film making and bromide, and Cromalin proofing equipment. Often DTP involves incorporating pictures, graphs and tables into a document, and this sometimes needs special scanning or filming equipment and software to create files in tagged image film format (TIFF).

PageMaker has offered colour picture DTP software for several years. This has meant that Apple Macintosh has been the computer system chosen by many printing companies for DTP. In 1991, Xerox's subsidiary, Ventura, now owned by Corel, launched some very professional colour printing products for its IBM compatible PC customer base.

Specialised computer programmes are available for making multi-coloured pictures. These programmes allow PC users to make colour separations and retouch images. Examples are Ventura Separator, Ventura Photo Touch and Ventura ColorPro.

Prices of scanners have fallen dramatically. It is now possible to buy a 600 DPI scanner for as little as 1 250 ECU compared to over 5 000 ECU a few years ago. However, very sophisticated scanners can cost up to 100 000 ECU. Suppliers to the printing industry such as Scitex, Hell, Crosfield and Dainippon, are now supplying scanners for DTP.

Although scanning photographs or drawing has been the main method of making electronics pictures, programs now exist to make picture films from video films. "Multimedia" computer programmes provide pictures by the latter method. An editor can also buy picture files. Many electronic picture libraries and software companies sell electronic pictures. Ventura has recently published a series of CD-ROM's at a very modest price containing photographs classified by theme and which are free of copyright. Documents containing line drawings, data tables and graphs must merge files or parts of files from other PC programmes.

Professional printing companies generally produce the final documents because they have the equipment for high resolution film or bromide production and large print-run capacity. Higher resolution desktop laser printers have recently become available. These will enable DTP shops to compete more effectively with printing companies.

Photocopy machine technology has developed to the extent that the newest generation of professional photocopiers integrate printing and binding of documents. This process involves a computer terminal linked to the photocopy machine.

There are many DTP programmes. They range from programmes designed to make single page layouts to those for long documents. Printing professionals often use PageMaker which costs about 1 000 ECU.

Companies not requiring so much sophistication or text adjustment can use other programmes such as Microsoft Publisher, which cost as little as 60 ECU, and which are very user friendly for novices. Most programmes are available for use in the DOS, Windows and Macintosh operating systems. Some are also available on UNIX and OS/2.

IBM compatible computers have become the standard for the PC computer industry and users are changing from the DOS operating system to Windows, but Apple Macintosh is still the major computer system for DTP and is protecting its position with the launch of the Power Macintosh.

PC art and picture publishing packages to create layouts are newer products for desktop publishers to work with. Some of them have existed for several years. PC art computer programmes such as Illustrator, FreeHand and Corel-DRAW, several in fifth generation versions, are relatively inexpensive (about 800 ECU per single user software). These programmes help operators, lacking flair for drawing, to produce very professional drawings.

The DTP market is growing organically as trade associations, clubs and various companies begin producing magazines, newsletters and other printed material for their members. A particularly important area is the financial sector with the rapid production of overnight reports for investors.

## Impact of the Single Market

Publishing has a domestic character, partly the result of the lingual and cultural bond to a particular geographical area. Only the large multi-national corporations operate across Europe, although this applies mainly to the holding companies, not the subsidiaries. The impact of the Single Market has been positive, starting with the recognition of culture in the Treaty of Maastricht (Article 128). Harmonisation in a number of fields is slowly being reached.

Two important issues currently have priority. Firstly, harmonisation is needed concerning copyright. There are currently two concepts in place, an Anglo-Saxon - and a Continental version. The former essentially benefits the producer, the latter the author. In certain instances this results in problems. A modest degree of harmonisation has been reached, at least in principle. The ultimate goal is to develop a European copyright law.

Secondly, the emergence of multi-media has resulted in the formulation of a number of priorities, amongst others, copyright law to protect publishers against piracy, training of personnel and users and the need for further liberalisation of telecommunications services to facilitate further development.

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## REGULATIONS

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There are no EU regulations governing this sector. National regulations which concern the computer and printing industries apply to publishing services. Companies involved in DTP must observe copyright and trademark laws.

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## OUTLOOK

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As the cost of DTP hardware and software continues to fall more and more, "non-professionals" will be able to afford the equipment necessary to prepare their own documents for publication, and to ever higher standards. Professionals such as DTP shops and pre-press houses will find their market increasingly restricted to, on the one hand, clients who do not have in-house DTP facilities, and on the other hand, to

the final preparation of high resolution documents, already in electronic form, for printing.

As costs fall, the overall volume of work undertaken both in-house and by independent professionals, will increase. More newsletters and publicity material will be produced and catalogues will be updated more frequently. Output will be increasingly in electronic form such as CD ROM or on-line, rather than ink on page.

The input for documents will also be increasingly electronic deriving from electronic databases and computer networks both private and public such as Internet.

There will be increased demand for ancillary services such as electronic picture libraries, although the cost of these is likely to fall.

It is generally expected that the pre-press market, which is rather sensitive to the economic climate (advertising and promotion are major clients), will grow by at least 10 % a year in the medium term.

Written by: Databank - MIA

# Temporary work services

## NACE 839.3

Over the past four decades, temporary work services have progressively changed into a sophisticated, professional service industry providing instruments for labour management. The industry has become not only the main tool for helping businesses fill temporary shortages in their workforce, but also - since temporary workers often find permanent employment through their temporary assignment - an important branch of personnel recruitment advisors. Temporary work businesses (TWBs) are now widely accepted in most countries. After a period of recession, which ended in most EU countries in 1993, TWBs showed double-digit growth figures in many of them for the year 1994.

### INDUSTRY PROFILE

#### Description of the sector

Temporary work businesses hire temporary workers and put them at the disposal of a third party. Key to this triangular relationship is the fact that workers receive their salary from the temporary work business but their work orders from the third party. Client firms call upon the services of temporary work businesses when they have temporary shortages of labour. The hourly cost of temporary labour may at times be higher than that of permanent workers, but since temporary labour is usually resorted to for short, well-defined periods or for specific tasks, the cost is borne only for effectively supplied hours of labour. The alternatives, overtime or a permanent reserve of extra manpower, would be more expensive. Temporary work businesses bear the costs of recruitment, selection, payroll, statutory social security insurance, etc.

For temporary workers, temporary work businesses satisfy particular individual needs and preferences. However, a growing number of jobless workers also resort to temporary work

businesses with the hope of finding permanent positions at a later stage. It is estimated that on average well over one-third of temporary workers find permanent jobs as a result of temporary contracts. The actual proportion varies widely between different EU countries.

The ageing of the European workforce and the increase of the female constituent also have an effect on the temporary work services sector. These developments have been associated with a greater desire for more flexible and temporary working arrangements.

#### Recent trends

The importance of temporary work can be shown by the number of people who are active in the sector each working day. In Table 1 it can be seen that France, Germany, the Netherlands and the United Kingdom are the largest employers of temporary workers in the EU. In the EU as a whole, it is estimated that well over one million people a day worked through temporary work businesses in 1993. In the United States, a country with a comparable workforce, this figure was lower for many years. But the past few years have shown a quickly increasing market penetration (also because of new services), so that employment per day is now higher than in the EU. For a correct comparison, however, it should be noted that the temporary work services sector is non-existent in Italy and Greece, and still not very developed in Portugal, Luxembourg and Ireland.

Most of the turnover in this sector is generated in Belgium, France, Germany, the Netherlands and the United Kingdom, as can be seen in Table 2. Overall, the sector showed double-digit growth in the years prior to 1991, in countries where temping was already more or less established, as well as in countries where it was still developing. The onset of the current recessionary period in many countries, however, resulted in a zero or even negative growth in 1991 to 1993. During this period, the sector was gaining importance only in Spain and Portugal, where temporary work businesses were legalised only recently. The market potential is, therefore, still large.

Most Member States indicate that 1994 brought clear signs of recovery. In the United Kingdom, this recovery had started in 1993, as Table 2 shows.

**Table 1: Temporary work services**  
**Employment through temporary work businesses, 1993**

(thousands)	Employment per day	Total employment (3)	Employment as % of total employment	Expected level of employment 1994 (1)
Belgique/België	28.0	3 770.3	0.74	33
Danmark	1.4	2 636.6	0.05	1.8
BR Deutschland	105.0	36 528.3	0.29	110
España	30.0	12 457.7	0.24	N/A
France	235.0	22 021.4	1.07	275
Ireland	2.0	1 148.8	0.17	+
Nederland	112.0	6 613.8	1.69	123
Portugal (2)	3.5	4 509.1	0.08	N/A
United Kingdom	682.0	25 629.6	2.66	+
EU (5)	1 198.9	115 315.6	1.04	N/A
Österreich	8.0	3 543.0	0.23	+
Norge	4.0	1 970.0	0.20	N/A
Japan	(4) 236	64 362.0	0.37	-
USA	1 636.0	117 598.0	1.39	+

(1) For 1994, an estimate is given of the development of the employment figure; + indicates growth, - indicates decline.

(2) Data for 1991

(3) Data for 1992

(4) Estimate

(5) Estimate including the above-mentioned countries only

Source: CIETT, Bakkenist Management Consultants, Eurostat

**Table 2: Temporary work services  
Development of turnover**

(million ECU)	1990	1991	1992	1993	1993/92 (%)	1994 (1)
Belgique/België	944	978	1 028	939	-9	1 155
Danmark	N/A	51	51	42	-17	50
BR Deutschland	2 500	2 650	2 750	2 060	-25	2 250
España	98	163	195	189	-3	N/A
France	7 459	7 116	6 899	5 846	-15	6 770
Ireland	N/A	N/A	N/A	36	N/A	+
Nederland	2 531	2 542	2 495	2 248	-10	2 600
United Kingdom	6 414	5 772	5 772	7 000	21	8 000
EU (2)	19 946	19 221	19 190	18 360	0	20 500
Österreich	N/A	N/A	240	N/A	N/A	+/-
Norge	N/A	N/A	100	100	0	N/A
Japan	7 138	8 772	9 174	8 387	-9	8 371
USA	16 957	17 326	21 090	2 261	7	23 700

(1) For 1994, an estimate is given of the development of turnover as indicated by a + when growth is expected, and a - when decline is expected.

(2) Estimate including the above-mentioned countries only

Source: CIETT, Bakkenist Management Consultants

### International comparison

Total turnover in the EU was approximately 18 billion ECU in 1992, down from almost 20 billion ECU in 1990. Turnover in the USA, in comparison, was approximately 17 billion ECU in 1990 and is now estimated at 23 billion ECU. Market expectations in the USA are still positive. The turnover of the sector in Japan has decreased, and was estimated at over 8 billion ECU in 1993. In the new Member States, the sector is still not very developed, though it must be noted that the figures given are incomplete due to a lack of statistics from Sweden.

Currently, the world market is estimated at well over 50 billion ECU. All estimates are based on statements made by national federations, since no regular statistical surveys are taken in this sector, neither in the EU countries nor in other countries.

### Foreign trade

Basically, temporary work businesses operate on a local scale, whether they are a small, independent, one-office company or a larger (multi)national temporary work business enterprise. 'All business is local' is a saying which applies directly to this sector, with the possible exception of highly specialised businesses. Furthermore, it is difficult to send temporary workers across borders due to contradictory national legal regulations, thus limiting cross border activity. Temporary work businesses wishing to operate in foreign countries generally

do so by starting a local branch or by buying into a local company.

### MARKET FORCES

#### Demand

In the past, the enormous growth in demand for temporary work services clearly stemmed from the growing need for more flexible labour contracts. The favourable economic climate, however, also helped boost growth. As has been shown recently, the stagnation of economic growth or recession have caused zero to negative growth in most EU countries. Markets which are heavily effected by these trends are, for example, France, the Netherlands and the United Kingdom. In general, it is expected that growth for the industry will remain in line with general economic activity in the future, with the exception of countries where significant changes in regulations have taken place.

The fields in which temporary workers fulfil their assignments tend to differ between countries. In France and Germany, for example, the majority of temporary workers are blue-collar workers. In the United Kingdom, Denmark and Spain temporary workers are primarily active in the administrative or commercial fields, as is more or less the case in the United States and Japan. In some countries this is due to restrictive regulations. The differences are further illustrated by Table 3.

**Table 3: Temporary work services  
Temporary workers by sector, 1993**

(%)	B (1)	DK	D	E	F	IRL	NL	P	UK (2)	A (3)	JPN	USA
Agriculture	1	-	-	-	0.2	-	2	-	-	-	-	-
Industry	64	10	70	12	49	93	43	40	24	58	16	35
Construction	-	0	-	15	21	-	-	24	30	9	5	-
Commercial services	10	60	20	50	24	6	32	30	50	10	67	50
Other non-profit or governmental	0	20	-	20	-	1	23	30	2	2	5	0
Other fields	25	10	10	3	6	0	-	-	-	-	3	10
Total	100	100	100	100	100	100	100	100	100	100	100	100

(1) Other fields includes health care, EU, Horeca.

(2) Data for 1991

(3) Data for 1992

Source: CIETT, Bakkenist Management Consultants

The length of the contract varies from client to client, depending on the function which the temporary worker will fulfil. If the temp is called in to replace someone who is ill or on holiday, contracts are usually fairly short: from one day to several weeks. However, if a temp is needed because of an unfilled vacancy, or because the client is not certain whether the development of his business will allow him to hire an extra worker permanently, contracts can be extended to months or even a year or more. Contract duration is usually limited by national regulations, and the maximum period varies per country. Client companies often treat temping contracts as if they were trial contracts. Increasingly, they tend to offer a permanent contract to workers who have worked for them through a temporary work business.

### Supply and competition

The number of establishments can serve as a basis for market coverage calculations and concentration figures. The third column in Table 4 shows quite clearly that the sector is the most concentrated in Belgium and the Netherlands. Market coverage in terms of active population per establishment is highest in the Netherlands and the United Kingdom (last column). In these countries, there is one office for every 5 000 potential temps. Differences in market coverage are large, as can be illustrated by comparing this last figure to that of Spain: there, the number of persons one branch office serves is many times higher. These differences will diminish with the further development of the sector. Naturally, the market coverage figures also give an indication of the degree of competition in the different EU markets. In general, it can be said that competition is fierce in well-developed and/or stagnating markets (such as the United Kingdom) and moderate in less developed and/or growing markets (such as Spain). The workforce served per office in Japan and the United States indicate temporary work markets which are fairly developed.

The degree of differentiation in supply varies from country to country, depending on market demand and regulations, but is less within any particular country. An exception is a specialisation in client markets, medical staff only, for example, which does appear regularly. Prices and other terms offered are more or less the same, competition takes place through elements such as response time to a client request, distance

between client office and temporary work business, past performance of temps hired and other client services offered.

## INDUSTRY STRUCTURE

### Companies

Following is a list of some of the largest temporary work businesses operating in the EU, with their home countries noted in parentheses. In alphabetical order, they are: Adia (USA/CH), Blue Arrow (UK), BIS (F), ECCO (F), Manpower (USA), Randstad Groep (NL), and Vedor (NL). Their estimated total market share in the EU is 35 %. In the United States, the four largest companies are estimated to hold 30 % of the market. Temporary work businesses of EU origin account for over 80 % of the EU market (above percentages based on 1989 data). Many temporary work businesses operate within the same market under more than one name. Some have the same management, others operate more or less independently. Franchising is known to be practised by, for example, Manpower and Adia. The market leader differs per country; regularly, the leading position is held by a business with its home base in that country. Examples are the Randstad Groep in the Netherlands and Belgium and ECCO in France.

A notable phenomenon is the existence of cost-based government temporary work businesses in Belgium (T Interim) and the Netherlands (START), which have gained a considerable share of the market. At the same time, their operation has proven to be beneficial to the acceptance of organised temporary work in these countries, and thus to the market size.

### Strategies

In the past, temporary work businesses - particularly the larger enterprises - have diversified into less related services such as security, contract cleaning and maintenance, language services, computer software services, business information and financial services. The present trend is focused more on efficiency and upgrading, while expansion is strongly geared to services related to personnel management and internationalisation. In their efforts to improve the efficiency of their operations and the quality of their services, temporary work businesses are investing heavily in computer systems and net-

**Table 4: Temporary work services  
Data on enterprises, 1993**

	Number of enterprises	Number of local offices	Number of offices per enterprise	Population 15-64 1992 (thousands)	Population 15-64 per office
Belgique/België	93	542	6	6 682	12 328
Danmark	54	85	2	3 493	34 930
BR Deutschland	1 972	2 893	2	55 003	19 012
España	320	310	1	26 424	85 239
France	1 003	3 953	4	37 635	9 521
Ireland	44	245	5	2 218	9 053
Nederland	304	2 125	7	10 433	4 910
Portugal	168	300	2	6 595	21 983
United Kingdom	4 600	7 500	2	37 688	5 025
Österreich (1)	19	50	3	5 302	106 040
Suomi/Finland	N/A	N/A	N/A	3 385	N/A
Norge	65	102	2	2 767	27 127
Sverige	N/A	N/A	N/A	5 543	N/A
Japan	(2) 1 183	(3) 10 600	9	85 904	8 104
USA	7 200	17 000	2	163 778	9 634

(1) Members of local branch federation only

(2) Data for 1988; Japan's local branch federation had 217 members in 1992.

(3) Estimate

Source: CIETT, Bakkenist Management Consultants, Eurostat



**Table 5: Temporary work services  
Degree of regulation, 1993**

Liberal	Restricted	Prohibited
Belgique/België	BR Deutschland	Hellas
Danmark	España	Italia
Ireland	France	
Luxembourg	Österreich	
Nederland	Norge	
Portugal	Japan	
Suomi/Finland		
Sverige		
United Kingdom		
USA		

Source: CIETT, Bakkerist Management Consultants

works. The second trend (upgrading) is illustrated by the fact that some temporary work businesses are shifting towards temporary workers with higher educational qualifications and more experience.

The major temporary work businesses have extended their businesses internationally. Internationalisation takes place not only in EU countries - by acquisition or not - but also outside the Community, notably in the USA and the Far East (including Japan).

The TWBs have expanded into personnel management services for small and medium-sized enterprises, including: recruitment (including head-hunting), outplacement, pool-management and personnel training. This is triggered by the fact that the distinction between permanent and temporary employment is becoming less pronounced: as was mentioned above, a temporary contract often results in a permanent contract for the employee.

In the USA, there is also a clear trend towards providing personnel for entire non-core functions (outsourcing). In view of this trend the American association has even changed its name to the National Association of Temporary and Staffing Services.

In those countries with a liberal regulatory regime a shortage of qualified temporary personnel has proven to be an obstacle to growth. This shows the importance of education and training now provided by an increasing number of temporary work businesses. Typing, word-processing and low-level technical courses are forms of training that typically figure in their programme. Specific training tailored to the job or the individual is also common.

The issue of quality accreditation also has made its entrance into this sector. The countries in which the sector is well developed recently started efforts in this direction (e.g. Belgium, France, the Netherlands and the UK). This is a result of a more competitive market situation, combined with general trend in business towards a higher level of client service. Companies try to offer readily available and flexible services, while still complying to the high quality standards demanded.

### Impact of the Single Market

The Temporary Work services sector has a definite local/domestic character. Although cross border activity is increasing slightly, this is not substantial. Most of the European Union directives and measures have had little or no impact on the sector.

However, two important issues are currently being addressed which may have a profound impact the Temporary Work industry. At this point in time it is forbidden to provide temporary work services in Greece and Italy. Several multi-national tem-

porary work organisations have, in combination, started a lawsuit to confront the law prohibiting temporary work in Italy. This issue has now been brought before the European Court. A ruling is expected in the coming months. The second issue is a draft proposal which may affect the posting of temporary staff in other Member States and addresses, amongst other issues, pay and working time. It is, however, not clear if temporary work services will be included in this draft.

Some concern exists regarding the unfair competitive advantage the public sector has in some Member States. For example, in some instances, public sector companies have access to information not available to private companies, have extra (government subsidised) funding or certain tax advantages.

### REGIONAL DISTRIBUTION

Basically, temporary work business is local business. Most companies operate through a network of local offices, located in the near vicinity of either potential clients or potential temps. This differs for each country.

### REGULATIONS

Organised temporary work is widely practised in the majority of the Member States. There are, however, considerable differences in regulation between EU countries. Two countries, Greece and Italy, prohibit the operation of temporary work businesses. In these countries, illegal practices are known to exist. In Italy, the social partners are becoming increasingly aware of the benefits of temporary work and the negative effects of the illegal practices. The former Prime Minister had announced the intention to publish a new draft law in 1994, but due to the political situation this law has not been placed on the political agenda yet. Several Italian multinational TWBs joined to start a lawsuit to test the law prohibiting TWBs. The question already has been brought before the European Court.

A number of restrictions and requirements are common among the regulations in the other Member States, the most important being:

- requirements for the contract between the user and the temporary work business;
- registration and/or licensing of temporary work businesses;
- limitations to the conditions under which temporary work is allowed;
- limitations to the duration of contracts (varying from 3 to 24 months, or no restriction);
- requirements for wage levels and social security conditions.

For many countries within the EU one could say that 1994 was a year of change in regulations concerning TWBs. In general, a trend towards more liberalisation is visible. In Finland and Sweden, the regulations were liberalised almost completely in the beginning of 1994. Also, since mid-1994 temporary work has been allowed in Spain. In Germany, the maximum duration of an assignment has increased from 6 to 9 months and private placement is allowed since mid-1994. Double-placement has been required in this country, with the exception of long-term unemployment provided by the Employment Exchange. The trend in Germany is expected to go towards unlimited labour contracts with TWBs, as is common in most European countries.

In the United Kingdom, the government's initiative to delicense the recruitment industry became effective in January 1995. There is a reasonable chance that the law requiring manpower supply licenses in the Netherlands will be abolished in 1995. Together with a possible acceptance of temporary work in the building and construction industry, this could



open new possibilities for TWBs in this country. In Portugal the law will possibly be changed in 1995, allowing for a more flexible use of temporary services. Outside the EU, in Japan, the TWB regulations are scheduled to be reviewed in 1995, for the second time in the last ten years.

An indicative summary by the national branch federations of the degree of regulation is shown in Table 5. The statements 'liberal' and 'restricted' are relative, and should be taken as a means of comparing the EU countries to one another. The United States considers its regulatory regime liberal, while Japan characterises its regulation as restricted.

The Commission has put forward four proposals which are pertinent to the TWB sector. One, dealing with health and safety, was adopted. The remaining three (two on the so-called "atypical work" and one on the posting of workers) are expected to be adopted during 1995.

One of the most significant changes in the past year, although only concerning regulations indirectly, is the discussion that took place in the last International Labour Office (ILO) meeting. For the first time, the ILO acknowledged the role of private placement institutions like TWBs. Any changes of the ILO convention 1996, however, are not to be expected before 1997. If this convention is changed, countries like Italy and Greece will have to adapt their regulations to these changes, thus allowing for private placement.

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## OUTLOOK

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The expectations for growth vary from country to country. As anticipated in the 1994 edition, growth figures are improving in many countries of the EU, notably in Belgium, Denmark, France, Germany, the Netherlands and the United Kingdom. In these countries the growth figures for 1994 were likely to be expressed in double digits. In Portugal, however, growth should have been zero or negative in 1994. The national federations of temporary work in all countries expect continued growth for 1995.

In general, it is clear that the industry is dependent on the growth of the economy. Economic recession and full employment both tend to reduce turnover. The sector seems to thrive best in a climate of moderate or brisk economic activity.

In those countries where temporary work businesses are well developed, competition is strong. In the countries where the sector is less developed or as yet illegal, measures leading to a more liberal regulatory regime could still provide large growth impulses for the sector.

Written by: Bakkenist Management Consultants

The industry is represented at the EU level by: International Confederation of Temporary Work Businesses (CIETT). Address: 12-14 Denman Street, London W1V 7RN, United Kingdom; tel: (44 71) 439 3929; fax: (44 71) 734 2380.

# Industrial cleaning services

## NACE 923

In 1993, the industrial cleaning services sector reached a turnover of 21 028 million ECU (a 7.6 % increase over 1992), while the number of employees, totalling 1 961 030, had increased by 10 %, showing it to be one of the more important subsectors in Europe. The sector is subject to much restructuring, giving the big companies (over 1 000 employees) increasing economic power. Nevertheless, small companies (less than 20 employees) account for almost two-thirds of the total number of companies in the sector.

In the next few years, continued improvement in the areas of employee training and certification, as well as quality management, will be essential to its success as an expanding industry.

### INDUSTRY PROFILE

#### Description of the sector

The cleaning services provided by specialised cleaning contractors that will be considered in this chapter are : office cleaning, industrial cleaning (factories, nuclear power stations...), window cleaning, cleaning of hospitals and public transport, and small building maintenance. Other activities which may be carried out by cleaning companies but that are not covered here are : security services, waste management services, laundry and dry cleaning. In some Member States, chimney sweeping, facade cleaning, maintenance of areas around buildings and general sanitation are also part of industrial cleaning services.

The total turnover for the EU's industrial cleaning sector reached 21 028 million ECU in 1993 (see Table 1). The industrial cleaning sector remains one of the most economically important subsectors in the EU. Although the cleaning industry no longer records two-digit growth rates, as it did at the beginning of the decade, it still shows a sustained growth rate that reached 7.6 % in 1993.

While some countries did relatively well, with growth rates ranging from 2.3 % (for France and Germany) to 5 % (for Spain and the Netherlands), still others showed stronger growth

rates (10 % for Belgium and Denmark, and 20 % for Portugal). Turnover in the UK grew sharply in 1993, rising close to 20 % over 1992. Italy reached a 15.2 % increase in 1993 over 1991 (data for 1992 was not available).

The increase in the turnover mainly stems from an increase in the market penetration rate (see Table 2). Market penetration, extremely important for business services, measures the share of the total potential market to the market contracted out to cleaning companies. The market penetration rate is calculated on estimates of the sales of cleaning products and materials, among other things. At the end of 1993, the market penetration rate in Europe was estimated at 53 %, which is a 2 % increase over 1992. The UK, Portugal and the Netherlands, whose market penetration rates grew significantly in 1993, were responsible for this 2 % increase. The remaining countries were stable. The low market penetration rate in Denmark (30 %) accounts for its relatively low turnover compared to other countries with a similar level of development.

It should also be noted that the market penetration rate in the public sector is generally 10 % higher than the total penetration rate, ranging from 40 % in Denmark to 95 % in Portugal (see Recent Trends). In spite of the increase in the market penetration rate, which was over 50 % for most of the countries (see Table 2), the potential for business remains significant, and there is no sign of market saturation.

#### Recent trends

It is estimated that the public authorities contracted out the equivalent of 8 billion ECU worth of industrial cleaning services in 1993. In the cleaning sector, the rate of public market penetration (estimated at 70 %) is systematically higher than that of the private sector. The public procurement's share of the market is increasing in the EU, jumping from one-third in 1991 to an estimated 40 % in 1993. Cleaning services contracts of more than 200 000 ECU (falling within the scope of the directive 92/50/EEC on public services contracts - see section on regulation) make up an increasing part of the total public contracts. For example, they make up 35 % of the public contracts in Spain and the Netherlands, and 25 % of the contracts in the UK.

Office cleaning is traditionally more important, in terms of turnover, than other market segments. In 1993, it accounted for more than 52 % of the turnover. Office cleaning is the market segment in which in-house cleaning is estimated to be the most widespread, indicating a strong growth potential for cleaning services. The second most important market segment is industrial cleaning, which has a 13 % share of the

**Table 1: Industrial cleaning services  
Turnover**

(million ECU)	1989	1990	1991	1992	1993
Belgique/België	448	529	588	623	673
Danmark	385	401	442	576	632
BR Deutschland (1)	2 634	2 930	3 313	3 936	4 026
España	2 076	2 230	2 430	2 612	2 749
France (2)	2 693	3 065	3 976	4 242	4 339
Italia	1 997	1 971	3 906	(3) 3 906	(4) 4 500
Luxembourg	19	15	29	(3) 29	(3) 29
Nederland	917	1 146	1 396	1 661	1 747
Portugal	55	55	68	75	90
United Kingdom	1 610	1 563	2 395	1 875	2 243
EU (5)	12 836	13 906	18 542	19 535	21 028

(1) Figure 1993 does not include East Germany.

(2) Data prior to 1991 was undervalued.

(3) 1991

(4) Estimation

(5) Excluding Greece and Ireland

Source: FENI



**Table 2: Industrial cleaning services**  
Market penetration rate of cleaning subcontractors

(%)	1992	1993
Belgique/België	55	55
Danmark	30	30
BR Deutschland	65	65
España	60	60
France	48	50
Italia (1)	40	40
Luxembourg (1)	60	60
Nederland	63	67
Portugal	60	63
United Kingdom	35	39

(1) 1991

Source: FENI

market and includes the cleaning of factories, nuclear power stations and agri-food industries. Coming in third is windows cleaning with 10 %, followed by hospitals and transportation vehicles with 5 % and 4 % of the total market, respectively.

Hospital cleaning must be separated from the other market segments inasmuch as its requirements are very specific. It comprises, on the one hand, the cleaning of common spaces and the cleaning of rooms, with job features quite similar to

those of hotel cleaning (day-time work, full-time job with longer daily work hours) and, on the other hand, the disinfection of operating rooms or laboratories. The latter requires specific skills and training. Rooms and public spaces are often cleaned by in-house staff.

## MARKET FORCES

### Demand

Broadly speaking, the cleaning services market is one wherein demand pull is significant, due to a series of internal and external factors (e.g. economic downturn, fierce competition among services contractors, budgetary constraints on the client's side). Two current trends seem to have had a major impact on the cleaning market: the demand for quality and a broader range of services. It is, however, still difficult to either quantify or measure their impact on the industry.

### Supply and competition

There is no denying that cleaning service customers are demanding in terms of quality. But what is quality? And, how can it be measured objectively? Quality is not necessarily cleanliness, but instead comprises three intertwined components: technical quality; integral quality (which aims to improve quality and productivity) and quality control (which ensures that cleaning services meet the client's needs). Cleaning companies have sought an objective quality measuring system that will help them avoid conflicts with their clients over the pricing of their services. The difficulty lies in finding

**Table 3: Industrial cleaning services**  
Number of enterprises

(units)	1990	1991	1992	1993
Belgique/België	1 017	1 023	1 144	1 198
Danmark	2 300	2 300	4 000	4 100
BR Deutschland	3 349	3 432	4 568	4 739
España	5 500	5 100	5 000	5 000
France	7 831	8 000	9 155	9 172
Italia	5 500	6 500	(1) 6 500	7 500
Luxembourg	40	40	39	47
Nederland	2 540	2 924	3 106	3 277
Portugal	150	185	226	260
United Kingdom	5 345	5 345	6 000	5 800
EU (2)	33 572	34 849	39 738	41 093

(1) 1991

(2) Excluding Greece and Ireland

Source: FENI

**Table 4: Industrial cleaning services**  
Number of enterprises by employment size-class, 1993

(%)	0-5	6-19	20-99	100-499	500-999	1000 +
Belgique/België	46.9	30.3	16	5.2	0.7	0.9
Danmark	84.6	12.2	2.4	0.6	0.1	0.1
BR Deutschland	(1)	(1)	65	20	10	5
España	50.4	20	14	11	4	0.6
France	67.1	17.9	11.1	3.1	0.5	0.3
Luxembourg	55.3	12.8	31.9	0	0	0
Nederland	63.5	22	13.1	0.3	0.5	0.6
Portugal	41.9	19.3	23.1	11.5	1.5	2.7
United Kingdom	25.3	15.1	24.4	27	4.4	3.8

(1) Enterprises with 0-99 employees are shown under size class 20-99.

Source: FENI

**Table 5: Industrial cleaning services  
Number of employees**

(units)	1990	1991	1992	1993
Belgique/België	42 000	58 000	58 000	51 032
Danmark	21 000	24 000	26 000	26 000
BR Deutschland	457 500	466 200	473 400	601 600
España	190 000	200 000	200 000	200 000
France	203 700	215 300	239 481	238 727
Italia	350 000	330 000	(1) 330 000	350 000
Luxembourg	1 700	1 960	2 275	2 899
Nederland	131 450	146 000	158 107	166 122
Portugal	13 000	14 850	22 405	24 650
United Kingdom	270 000	300 000	277 800	300 000
EU (2)	1 680 500	1 756 350	1 787 468	1 961 030

(1) 1991

(2) Excluding Greece and Ireland

Source: FENI

a quality measuring system which is as objective as possible. Some countries have tackled this problem, achieving some significant results.

The Netherlands developed a relatively sophisticated system called VSR which is used by 250 companies on the Dutch market. It consists of a very precise list of criteria (i.e. a range of errors agreed to by the company and the customer) according to which the cleaning jobs are assessed. The assessment is carried out on a probability random sample. The level of quality is periodically controlled. Under the VSR system, a dividing line between "good quality" and "poor quality" can be drawn. The Germans, on the other hand, worked out a system called "Güteschutzgemeinschaft" that covers the entire market. In France, the CTIP (the International Technical Centre for Cleanliness) devised a system for quantifying cleanliness that is implemented by major granting authorities, covering 10 % of the French market.

At the same time, there is, on both the client side and the company side, a growing interest in certification, whereby cleaning companies are certified according to ISO norms. A substantial number of companies are in the process of earning their certification, which they will use for marketing purposes and to create a quality-oriented corporate culture.

The client's demand for high-quality services often clashes with their tendency to choose the lowest-priced tenderer. The companies have made their clients aware of the problem. The national professional organisations also have contributed to

the professionalisation of the cleaning sector by setting-up national quality labels and codes of conduct.

A wide range of support services other than cleaning has been incorporated into the services offered by some companies in order to meet client demand while simplifying the process of subcontracting by limiting the number of contractors. These services include: security services, catering, building maintenance, green spaces and rubbish collection. Such diversification at first was a trend primarily found on the British, and, to a lesser extent, the Dutch markets, but now has extended to Belgium, France and Germany. It is difficult to forecast how much further it could go, given that the demand for support services seems to be limited to a few large clients.

## INDUSTRY STRUCTURE

### Companies

In 1993, the number of cleaning companies operating in the European Union was 41 093, up 3.4 % over 1992. The number of companies increased in every country except the United Kingdom, where the recession hit the small cleaning companies (which either went bankrupt or were incorporated into larger ones), resulting in a 3 % decrease overall. Luxembourg and Portugal did remarkably well, with a 20 % and 15 %-increase between 1992 and 1993, respectively. The number of companies in the remaining countries was stable or increased only slightly (see Table 3).

The structure of the sector is characterised by the predominance of small companies (of less than 20 workers) which accounted for almost two-thirds of the total number. But it is worth mentioning that the number of bigger companies (with over 500 workers) rose significantly, because of take-overs and mergers (see Table 4).

### Strategies

The cleaning sector is very vital; many companies are created every year. These new companies are often quite small and run by managers with little or no previous experience. As a result, a large part of them have collapsed within the first two years of their existence. This phenomenon damages the sector's image and the market itself.

Since it is awkward to restrict entry into the cleaning sector (respect of free enterprise), the national professional organisations have taken steps for its professionalisation by launching internal quality labels (Marque professionnelle FEP in France, Cleaning Quality Label in Belgium, OSB+ certificate in the Netherlands), and by setting up a professional charter (code of conduct).

**Table 6: Industrial cleaning services  
Share of women and blue-collar workers in the total  
workforce, 1993**

(%)	Women	Blue-collar
Belgique/België	65	94
Danmark	70	85
BR Deutschland	79	88
España	75	90
France	63	94
Italia	80	95
Luxembourg	84	94
Nederland	68	85
Portugal	95	96
United Kingdom	65	85

Source: FENI

**Table 7: Industrial cleaning services  
Part-time workers, 1993**

	Part-time workers (as % of total)	Average working time (hours/day)
Belgique/België	80	4.7
Danmark	85	4.5
BR Deutschland	80	4.0
España	55	5.5
France	55	5.0
Italia	88	4.0
Luxembourg	91	3.5
Nederland	82	4.0
Portugal	82	6.0
United Kingdom	74	2.6

Source: FENI

The trend towards a greater concentration of the market and mergers was evident in all EU countries. As the recession hit the cleaning sector, some small companies collapsed or were taken over by bigger companies. The big companies are growing in importance not only in terms of turnover but also in terms of employment. In France, for example, close to 50 % of the workforce are employed by companies of more than 500 employees, which account for less than 1 % of the total number of companies.

#### Impact of the Single Market

This industry is characterised by the large number of small- and medium sized enterprises and the local and domestic nature of their business. Only the four largest European companies operate in all Member States, while the larger national companies operate in a small number of countries other than their home countries. This means that the Single Market Programme and its effects are only experienced by the larger companies. Generally, however, it is felt that the measures in the Single Market Programme have had a positive effect, although these are hard to quantify.

Within the framework of the Single Market, the industry is giving priority to three issues. Firstly, on an operational level, special attention is being paid to quality standards and control (ISO-series) to guarantee uniformity of standards and procedures. Secondly, access to financing is of importance as the industry consists of a large number of small and medium sized companies. Thirdly, the enlargement of the market through public procurement remains extremely relevant. Considering that some 60% of the market is represented by public contracts, the liberalisation of public procurement is essential.

**Table 8: Industrial cleaning services  
Labour costs, 1993**

(ECU/hour)	Wages (1)	Total cost of work
Belgique/België	7.28	14.11
Danmark	10.7	13.37
BR Deutschland	7.21	13.35
España	5.36	8.64
France	5.32	9.02
Italia	5.14	7.54
Luxembourg	8.85	12.38
Nederland	6.52	10.61
Portugal	1.76	2.19
United Kingdom	(2) 4.48	5.15

(1) Minimum guaranteed wage for an unskilled worker

(2) Minimum average wage

Source: FENI

In this industry, some 80% of the costs are represented by wages and social benefits. Due to the considerable differences in wage and benefit levels between Member States, some concern exists as to the competitive position of companies in certain countries. However, this concern may be irrelevant due to the local nature of the market and the restricted mobility of labour.

#### REGIONAL DISTRIBUTION

Cleaning contractors obviously must be located close to their clients, i.e. in industrial and urban areas. As a result, there is a high level of fragmentation in the sector. Those companies (especially the bigger ones) which develop activities in several regions usually operate via a network of local agencies.

In fact, most of the big groups are established in several countries, both EU and non-EU. The internationalisation of the groups is difficult to measure, however, since these large groups often enter new markets by taking over domestic companies. Cross-border provision of services is rare and is limited to either neighbouring regions or specific contracts.

#### EMPLOYMENT

The cleaning industry is one of the EU's largest employers, with 1 961 030 workers in 1993. Employment rose by close to 10 % between 1992 and 1993 (see Table 5). The inclusion of East German workers accounts for the sharp rise in employment in Germany. Women persistently have dominated the cleaning sector and accounted for 73 % of the total workforce in 1993. Blue-collar workers made up 90 % of the work-

**Table 9: Industrial cleaning services  
Development of turnover**

(%)	1994	1995	1996	1997
Belgique/België	7.2	4.1	4.0	3.8
Danmark	6.0	5.0	5.0	5.0
BR Deutschland	2.5	2.5	3.0	3.0
España	0.0	2.5	N/A	N/A
France	1.7	1.5	3.0	3.0
Italia	-16.0	-10.0	-3.0	0.0
Nederland	0.0	0.0	2.7	2.6
Portugal	7.7	6.6	7.7	4.8
United Kingdom	2.9	8.4	2.6	7.0

Source: FENI



**Table 10: Industrial cleaning services  
Development of employment**

(thousands)	1994	1995	1996	1997
Belgique/België	55	56	57	58
Danmark	27	27	28	28
BR Deutschland	605	610	616	622
España	200	205	N/A	N/A
France	256	260	266	273
Italia	340	330	325	320
Nederland	166	166	170	170
Portugal	26	27	28	29
United Kingdom	307	330	362	395

Source: FENI

force in 1993 while the technical and executive staffs accounted equally for the remaining 10 %. Non-EU migrant workers' share of the total workforce is constantly increasing in most EU countries, but especially in Belgium, where 48 % of the workforce is made up of migrant workers. The numbers for Germany, Portugal and the Netherlands are 30 %, 24 % and 15 %, respectively.

The prevalence of part-time work in the cleaning sector is one of its most significant features. More than 75 % of the total workforce are part-time workers. At the same time, the average working time, though slightly on the rise between 1992 and 1993, remains quite low with an average of four hours per day (see Table 7). Cleaning services are provided mostly before or after normal working hours (20 % are performed during the daytime). As a consequence, full-time work is quite uncommon. The working day is usually split into two non-consecutive periods (one in the morning and one in the evening). (see working time organisation in the section on regulations).

The minimum hourly wage for an unskilled worker in the cleaning industry (see Table 8) is generally comparable from Member State to Member State, averaging between five and seven ECU. However, the percentage of social contributions paid by the employer differs greatly from one country to another, pointing to discrepancies among the national social protection systems and varying labour cost structures (see Table 8). For instance, the Danish social contribution system between employers and workers varies greatly from that of other EU countries, and the gross wages of Danish workers are the highest of any EU country, with 10.70 ECU per hour. Meanwhile, there is no legal minimum hourly wage in the UK, and therefore the figure given below is an estimated average of minimum wages paid by the British cleaning companies.

The prevalence of part-time workers and the importance of fixed-term employment relationships makes it difficult for cleaning companies to implement far-reaching training policies, thereby hindering the professionalisation of the sector. In an effort to ameliorate the situation, the sector as a whole - companies, national professional associations and the European federation - is engaged in the promotion of training within the cleaning industry. The European federation (together with its social partner EURO-FIET) is involved in the European Commission-sponsored FORCE training programme, out of which a series of specific recommendations for the promotion of training and the professionalisation of the cleaning sector have been drawn.

## REGULATIONS

The cleaning industry is highly labour-intensive. Labour costs represent between 75 % and 85 % of the companies' turnover.

The cleaning industry is therefore highly sensitive to European legislation in the social field.

A directive on "working time organisation" was adopted in November 1993 but the cleaning sector could get a derogation with regard to weekly and daily rest periods (article 17 of the directive). The EFCI and EURO-FIET signed a recommendation on working time in December 1993 within the frame of the social dialogue.

The directive on "information and consultation of workers in Community-scale undertakings" is the first of its kind to be adopted within the frame of the Social Protocol (i.e. with the exception of the UK). The directive was adopted in June 1994 and will have a significant impact on top European cleaning companies.

Another major issue for the cleaning sector is the revision of the directive on "safeguarding of employees' rights in the event of a transfer of undertakings. In most EU countries, the cleaning contractors are obliged to keep all or some of the workers at a given site permanently, in the event of a change in the owner and/or contractor. The revision of the directive could lead to compulsory transfer in the case of service markets contracting-out (Schmidt Case). As seen above, atypical work relationships prevail in this sector. A draft directive was released, which aims to provide equal treatment for part-time workers and workers with fixed-term employment relationships. A number of other regulations also affect the cleaning sector, albeit to a lesser extent. These relate to issues concerning equal opportunities for women, health and safety at work.

The first series of professional regulations deals with freedom of establishment and access to cleaning activities. Access to cleaning activities is unrestricted, except in Germany and Luxembourg. A law is currently being drafted in the Netherlands on this matter.

Still another issue is the "directive on the award of services public contracts" (contracts of over 200 000 ECU). This directive does not require certification as such. But in the event that the granting authorities do require certificates, these shall refer to the quality insurance systems based on EN 29000 European standards and certified by independent bodies in conformity with EN 45000 European standards. But some problems may arise involving the harmonisation of accreditation procedures, certification of quality insurance systems and the mutual recognition of certificates among countries. In addition, the cost of certification procedures may hamper smaller companies. One solution comes from Belgium where the smaller companies can produce the "Cleaning Quality Label" when tendering for a services public market.

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## OUTLOOK

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The importance of the cleaning industry in terms of economic growth and stabilisation will expand, insofar as this labour-intensive industry will be instrumental in fighting unemployment. However, the professionalisation policy must be kept at the top of the agenda, in order to make the most of the opportunities that will arise. Issues such as training, quality, consultation and participation in national and European organisations, will be indispensable to the success of this sector.

Written by: FENI

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# Security services

## NACE 839.3

*Private security, including the installation of electronic security systems, alarm monitoring centres, transportation of valuables and manned guarding services, had an estimated turnover of approximately 26 billion ECU in 1994. About three-quarters of the security activities in the EU related to manned guarding services is subcontracted to 6 000 private security companies employing 297 548 people, with the remaining quarter handled by corporate security divisions, which employ an additional 96 172 security guards. The turnover by the private security companies is estimated at approximately 7.5 billion ECU, and the total number of security guards at 393 719. Figures and statistics may vary when compared to previous reports, since there has been a considerable improvement in market statistics that are reported by the national branch organisations in the EU countries, which are members of the European Confederation of Private Security Services (CoESS).*

*One notices drastic changes in statistics and figures in some countries, often caused by political or economic reorganisation. Take, for instance, the situation in the former East Germany, where an additional 400 private security companies were founded - mainly very small or even 'one-head operations' - following the German reunification in 1989. The reason for the change in the statistics related to the number of private security companies in the United Kingdom is the fact that in 1994 the small companies have been reported as well, accounting for an additional 1 000 companies operating there.*

*Many Member States are working hard to improve the quality of the security services provided. Many companies already have been certified in accordance with ISO standard 9000. Quality improvement in the education and training of employees has in some Member States resulted in forms of co-operation with the regular police in the field of preventive supervision, leading to private public partnership between the regular police and the private security sector in some cases.*

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### INDUSTRY PROFILE

#### Description of the sector

The term 'security' covers a variety of specific jobs within the sector. This monograph is based primarily on data concerning the 'manned guarding' sector, but also provides information on the transportation of valuables and other services.

Reliable statistics about the total (financial) volume of private security services could be obtained from only a few European countries. It is possible to get an idea of the state of the total private security market (including the installation of electronic security systems, alarm monitoring centres, manned guarding, etc.) by looking at the situation in the Netherlands, where accurate information is available. Based on such estimate, in the 12 EU countries (with 340 million inhabitants), we can estimate the total volume in private security to be approximately 26 billion ECU.

It is interesting to note the build-up of interest groups in Europe. Organisations of manufacturers, suppliers, users of security products and services as well as third parties, such as insurance companies, all may be considered as caretakers of the security sector in the EU, and are usually founded by existing national agencies.

The Confederation of Private Security Services (CoESS) for the manned guarding sector is also supported by the mem-

bership of the Federation of European Transport of Valuables (ESTA). In 1994, nearly all EU Member States were already members or had applied for membership through their national branch organisation.

The Association of European Manufacturers of Fire and Intruder Alarm Systems (Euroalarm) also plays an active role on the European level. In addition, Eurosafe, the European Committee of Safe Manufacturers' Associations aims at improved research and standardisation in the production of safes throughout Europe.

The European members of the American Society for Industrial Security (ASIS) founded ASIS-Europe. ASIS members are mostly individuals who are involved in private security as corporate security managers and can be considered as the 'users' of the security service industry.

The participation of organisations involved in accreditation, such as the European Organisation for Testing and Certification (EOTC) also has been noteworthy. Likewise, EFSAC (European Fire and Safety Advisory Council) plays a vital role in establishing certification requirements. A member of EFSAC is the European Association for National Insurance Companies (CEA), which develops, amongst other things, guidelines for security components and security installations.

Altogether, some 28 European organisations are involved in private security, playing a role in the accreditation, certification and standardisation of insurance companies as well as manufacturers, suppliers and users of security services.

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### MARKET FORCES

#### Demand

At the beginning of the nineteenth century, all of Europe saw the advent of night security services, which at that time were usually small-scale, locally-active and established in industrial areas. Not until after World War II did a substantial growth occur due to a number of factors: the prosperity brought by industrialisation, increased crime; weakened social supervision (e.g. by family, church etc.) and increased awareness of the necessity to protect one's own belongings (e.g. entrepreneurs) instead of considering it more as the responsibility of the authorities or the police. Preventive security activities were carried out by security staff employed by the company itself as well as by the contracted private security organisation.

Following the path of the industrial cleaning, maintenance and catering services, security activities became subcontracted more and more frequently. Besides subcontracting, we find the birth of externalisation, i.e. corporate security guards are transferred to a security organisation specially selected for the employer's specific needs, as set out in legal terms.

Preventive security has also become a profession, of which the duties have grown more complex. Whereas in the past they were mostly concerned with porter services, mobile surveillance and the like, present-day security guards perform critical tasks within the framework of the overall management of extensive projects that involve a wide range of crucial security functions.

In large industrial plants and exhibitions, security guards are in charge not only of access control but also fire prevention and sometimes fire fighting; they help perform traffic control and parking supervision on the grounds or beyond, and provide first aid. For all these purposes, they man control rooms from where the security of the production process is monitored as thoroughly as possible.

Another reason for the growth is the diversification of the security services sector. The uniforms (often an element of identification), recognition, mobility and up-to-date communication equipment represent an infrastructure that allows private security organisations to explore new fields of activity



**Table 1: Security services  
Main Indicators, 1993**

	Total number of security employees	Own security division	Private security companies	Share of subcontracting (%)	Security guards per 100 000 inhabitants
Belgique/België	10 959	2 500	8 459	77	110
Danmark	5 000	2 000	3 000	60	98
BR Deutschland	105 000	40 000	65 000	62	140
Hellas	2 000	600	1 400	70	20
España	41 000	750	40 250	98	106
France	67 000	7 000	60 000	90	118
Ireland	5 000	1 500	3 500	70	143
Italia	43 260	1 081	42 179	98	75
Luxembourg	800	240	560	70	200
Nederland	17 500	6 000	11 500	66	117
Portugal	15 000	4 500	10 500	70	146
United Kingdom	81 200	30 000	51 200	63	142
EU	393 719	96 171	297 548	76	116
Österreich	3 100	N/A	N/A	N/A	40
Suomi/Finland	3 500	N/A	N/A	N/A	70
Norge	3 500	N/A	N/A	N/A	81
Sverige	16 000	N/A	N/A	N/A	186
Schweiz/Suisse	7 500	N/A	N/A	N/A	110
EFTA (1)	33 600	N/A	N/A	N/A	104
EU + EFTA (1)	427 319	N/A	N/A	N/A	123

(1) Excluding Iceland and Liechtenstein

Source: CoESS

such as operating bridges and locks in water-abundant areas, management of nature reserves or preventive supervision in the recreational sector (campsites, beaches). Other activities include environmental screening in cooperation with companies or public authorities.

In many countries, there is some form of cooperation between the security services sector and public authorities. A common example is the security check of passengers in many international airports, where private security guards screen passengers under the supervision of the regular police force to ensure safe air travel. Less familiar forms of cooperation are the overseeing of detainees, traffic control, parking supervision in city centres and intendance of public transport particularly in large cities, where drug abuse in particular has caused the proliferation of crime. Security guards are also used to protect military interests and prevent criminal acts in prisons.

### Supply and competition

In many EU countries, much is being done to improve the quality of the service offered by security companies. Quality is increasingly becoming measurable in terms of: company management; i.e. organisation, procedures, etc.; staff performance, through education/training; and, finally, conditions of delivery.

In the countries where the relevant legislation exists, it often serves to promote this aspect of quality. Indeed, competition among security firms is first of all a matter of quality and much less a question of rates. In those countries where competition has focused on the costs of the service, there is little (if any) room leftover for financial investments in quality improvements. Although no unequivocal standard has been established as yet, it seems likely that the international quality standard for services (ISO 9000) will be applied as a certificate of quality assurance. Several security firms have been certified according to this standard and no doubt more companies will follow.

Mention also should be made of the enormous growth in the number of so-called one-head operations in the countries that

used to be a part of the Soviet Union (such as Hungary, Czechoslovakia, Romania, Poland etc.). Many ex-policemen, ex-military officers, etc. have founded their own private security companies on a very small, local basis, mostly without any laws or regulations pertaining to privacy, the use of protective fire arms, or criminal record checks of owners, staff or executives. These new operations could compete with similar companies which have blossomed in the former East Germany.

## INDUSTRY STRUCTURE

### Manned guarding services

The private security industry in Europe is very much alive and well. With an estimate of 26 billion ECU as total turnover, it shows its importance for industry in the EU.

The manned guarding sector fulfils a vital role in the security service business. CoESS members produce a turnover of approximately 7.5 billion ECU, with some 370 000 guards employed by over 6 000 companies, indicating that each company has an average of about 60 employees.

Many of these companies, however, are operating in small local areas, and are 'one-head operations'. But, in most countries, 80 % of the national turnover is achieved by 20 % of these larger, private security companies, which often operate on an international scale. The larger companies employ an average of 300 guards, while the remaining 5 000 companies have an average size of only 10-15 employees per company.

The security transportation sector in Europe shows an additional 50 000 employees, responsible for 1.8 billion ECU and manning 9 000 armoured cars throughout Europe.

### Transportation of valuables

The security transportation sector in Europe represents 1.8 billion ECU turnover, with 48 000 persons employed in 452 companies, manning 9 000 armoured vehicles.

**Table 2: Security services  
Employees in private security companies, 1993**

	Number of security companies	Number of security guards	Average number of employees per company
Belgique/België	33	8 459	256
Danmark	40	3 000	75
BR Deutschland	1 290	105 000	81
Hellas	20	1 400	70
España	580	41 000	70
France	944	60 000	64
Ireland	150	3 500	23
Italia	788	43 260	55
Luxembourg	7	560	80
Nederland	150	11 500	76
Portugal	120	10 500	88
United Kingdom	2 000	81 200	41
EU	6 122	369 379	60
Österreich	42	3 100	74
Suomi/Finland	110	3 500	32
Norge	55	3 500	64
Sverige	200	16 000	80
Schweiz/Suisse	50	7 500	150
EFTA (1)	457	33 600	74
EU + EFTA (1)	6 579	402 976	62

(1) Excluding Iceland and Liechtenstein  
Source: CoESS

As a sub-sector of the private security industry, security transportation operates in some countries of the European Union under very strict national regulations. In addition to the regulations for guarding, transportation of valuables is submitted to prescriptions regarding the vehicles, weapons and the employees' personal protection.

The work involved in armoured transportation includes diverse activities such as: coin processing, cash and note processing, cheque encoding and ATM servicing. The banks represent the biggest segment of customers for the transport of valuables, making the industry (and prices) very dependent on the evolution of the banking sector.

There is a fundamental difference between classic security guard services - where the organisation is only liable for carrying out an assigned commission dependably and professionally - and a security transport business, which has a far greater responsibility. The owner actually and physically hands over his valuables to the security transport firm, which is then in possession and complete charge thereof and thus, as a carrier, assumes full liability for compensation in case of loss or damage.

Transport contracts guarantee point-to-point delivery of the transported goods. This makes the transporter fully liable towards his clients for the perfect execution of the move under

**Table 3: Security services  
Market leaders, 1993**

Country	Company
Belgique/België	Group 4 Securitas - IMS SA, GMIC Security SA
Danmark	ISS Securitas A/S, Boligoministeriet, Cerberus Group Denmark A/S
BR Deutschland	Gesellschaft für Eigentumschutz GmbH, Niedersächsische Wach- und Schliessgesellschaft Eggeling & Schorling K.G., Wach- und Schutzdienst Fritz Kotter GmbH & Co
España	Prosegur, Prosesa, Esabe
France	SPS, SGI, Adia- Protectas
Ireland	Securicor, Group 4, ADT Security Systems
Italia	Vigilanza Città di Milano SpA, Cittadini dell'Ordine SpA
Luxembourg	Securitas SA Securicor SA, Securite Civile S.A.R.L.
Nederland	Nederlandse Veiligheidsdienst, Randon Beveiliging, VNV
Portugal	Securitas, Ronda, Grupo 8/Transegur
United Kingdom	Security Guards, Group 4 Securitas, Securicor
Österreich	Group 4 Securitas
Suomi/Finland	Suomen Teollisuuden Vartiointi Oy, Servi Turvapalvelu Oy, Suomen Vartiointi ja Sulkemis Oy
Norge	Securitas A/S, Verdisikring A/S, Norsk Industrivakt A/S
Sverige	Securitas AB, ABAB, SSS
Schweiz/Suisse	Securitas AG, Protectas SA, Wache AG

Source: CoESS

**Table 4: Security services  
Employment in transportation of valuables, 1993**

	Number of companies	%	Number of employees	%	Number of vehicles	%	Turnover (million ECU)	%
Belgique/België	5	1	1 500	3	419	5	72	4
Danmark	2	0	100	0	23	0	4	0
BR Deutschland	160	35	6 500	14	1 150	13	181	10
Hellas	12	3	260	1	103	1	5	0
España	15	3	2 600	5	830	9	126	7
France	10	2	6 500	14	1 100	12	362	20
Ireland	4	1	200	0	60	1	6	0
Italia	220	49	3 800	8	1 300	14	359	20
Luxembourg	4	1	100	0	50	1	4	0
Nederland	7	2	1 000	2	300	3	46	3
Portugal	3	2	450	1	170	2	21	1
United Kingdom	17	2	16 000	35	3 500	39	628	35
EU	459	100	39 010	100	9 005	100	1 814	100

Source: ESTA

all circumstances. Special insurance is taken by the transporters to cover all risks.

Consequently, with the shipment of valuables, business relationships are based on a high level of mutual trust, between principal and transport organisation on the one hand, but equally between the transporter and its insurance company on the other hand. Insurance companies covering transport risks exercise great influence over security transport companies.

The insurers are able to make strict conditions covering every aspect of transit or storage including the specifications of security vans, armoured cars, and all technical equipment involved, the most important factor being the quality and trustworthiness of the personnel employed to deal with valuable transports.

The quality of the services are directly dependant on the degree of training received by the personnel. Legislation in some EU countries specifies minimum educational standards.

High technology to protect crew members from attacks is progressively being introduced. The self-destruction of the transported valuables is used as a complementary security device in normal transports.

### Impact of the Single Market

In this sector, a distinction must be made between (manned) guarding services and the transportation of valuables.

In the segment of guarding services, the opinion exists that the Single Market Programme has on the whole had a positive effect. However, these effects are hard to quantify, mainly because of the fact that this segment still operates in a local environment with restricted cross border or transnational activity. Companies that are active in numerous Member States do this through local representations. These local representations, acquired through mergers or acquisitions, operate according to local laws and legislation, thereby making the ease of cross border operations a less important issue.

The most important priorities being faced by this sector are the harmonisation of legislation applicable to the industry in the different Member States, harmonisation of the social dimension regarding working time, night and day work and worker safety as well as the setting of training and quality standards.

The Single Market has not materialised in the transportation of valuables segment. Contrary to the envisaged goals, new

legislation was developed by a number of Member States, thereby further hampering the cross border functioning of this segment. The perception exists that Member States feel the need to protect their national identity and integrity. To achieve this, they create new legislation not compatible with the existing and that of neighbouring States. This is applicable to for instance direct and indirect taxation, cross border payments and the technical requirements stipulated by different Member States in order to be allowed to carry out an assignment. This has resulted in the opinion that the ease of operating to countries outside the Union is greater than operating within the Union itself.

### REGULATIONS

There are considerable dissimilarities between the laws and regulations related to security services across Member States. These laws and regulations are, of course, subject to change. The information supplied below was valid in late 1990 and early 1991. Since then, three EU countries have adopted new statutes: Spain (1992), Portugal (1993) and the Netherlands (1994). New legislation is under preparation in Italy.

Most European countries have some form of laws or regulations pertaining to security services. One noticeable exception is the United Kingdom where no government rules exist whatsoever. Germany too is atypical, particularly considering the size of the sector there. This country does have some incorporated legislation but no specific legislation.

A number of duties are included in the security officer's job description. In some countries the array of duties is quite wide. In Sweden the tasks include the production of identity cards and assistance in fire-fighting. In Germany a considerable amount of activities are connected with the maintenance of public order. In Spain part of the duty is to pursue and arrest lawbreakers.

All European countries (excluding the United Kingdom) have mandatory licence and practical requirements which are generally the same. Although such harmonisation exists, a number of countries enforce special requirements, including:

- compulsory third-party liability insurance (Belgium, France, Portugal, Spain and Switzerland);
- restrictions for those who have previously been employed professionally in the police force or have been in the military (Belgium and France), or, conversely, the requirement to

have accomplished one's military service to be allowed to work as a security guard (Spain); and

- the inability to enter the security services sector after filing for bankruptcy (France).

The requirements and the duration of the various types of schooling for security officers in Europe are quite diverse. In Germany, there is no unified set of educational guidelines, whereas in the Netherlands, the schooling is organised quite thoroughly.

Laws and regulations with regard to equipment (uniform, weapons, identification and even guard dogs) are on the whole similar in all countries. Wearing a uniform is compulsory in all but four countries. The uniform shall not resemble the police uniform.

Carrying arms is permitted in all Member States except Denmark, the United Kingdom, the Netherlands and Norway. Laws and regulations regarding arms sometimes are contained in the fire arms legislation of the country in question. In other countries, a separate article is included in the security legislation.

In most countries employees in the private security services sector are obliged to carry an identity paper; Austria is an exception. In Spain, although it is not really a proof of identity, security guards are required to wear a badge, which is easily recognisable.

As for government supervision, Belgium, the Netherlands, Portugal and Spain stipulate annual reporting to the Ministry in charge. In Sweden and Norway supervision is in the hands of the police.

The amount of possible sanctions varies widely. In the Netherlands there is only the possibility of withdrawing the licence. Belgium, Denmark, France, Norway, Portugal, Spain and Switzerland have, in addition to that sanction, the possibility of imposing fines and/or imprisonment.

Other noticeable clauses include:

- security firms are not to concern themselves with or intervene in political or labour conflicts (Belgium and France);
- a certain amount of force may be used in a case where a person offers resistance against arrest (Finland and Sweden);
- the wages of a security guard must not be lower than the starting salary of a police officer (Greece);
- approval from the Prime Minister is required if someone wishes to exercise other activities simultaneously with security activities (Austria); and
- each private security organisation is assigned an exclusive number, which must be noted on any document and in any publication the firm produces (Spain).

## OUTLOOK

Europe proves to be an interesting market for the private security business. Several facts lead to the expectation that growth of the sector (estimated at between 5 and 8 %) will be seen in the coming years. The first factor, which is providing hope for much of EU industry, is the generally better economic conditions being experienced by most of the Member States as at the end of 1994.

In addition, development in sub-contracting will lead to further growth of individual security (guard) companies on a national and an international scale. Also, growing statistics in (large-scale) crime will continue to make it necessary for investment in crime prevention by both the public and private sectors.

Written by: CoESS and ESTA

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# Car rental

## NACE 844

The market for long-term car rentals is still relatively new in Europe, while the market for short-term leasing is dominated by a few large companies. Both markets are stimulated by the enormous growth of mobility. Nevertheless, the sector has some problems to deal with, car theft being the most important one. Car theft has become a real burden for car rental companies as insurance companies do not accept the risk of car theft with respect to short-term leases. On the market for long-term leases car theft has resulted in high insurance premiums. For these reasons, the industry is taking considerable initiatives for prevention. In 1994 and 1995 both markets will be stimulated by the onset of general economic recovery. In the long run, growth is expected to continue.

### INDUSTRY PROFILE

#### Description of the sector

Car rental is the most important subsection of NACE 84 in terms of turnover. The branch deals with the commercial rental of motor vehicles (passenger cars, vans and trucks). Car rental with a driver is not included, as it belongs to the taxi business classified in NACE 722.

A distinction can be made between short-term rental (a few days) and long-term rental (contract hire and leasing). The latter is basically used for business purposes. The former is used for both business and tourism purposes, but is mostly used for the temporary replacement of vehicles which have been involved in an accident.

In 1991, total turnover in France, Germany and the Netherlands totalled 8 621 million ECU. Compared to the GDP of these countries, on average the car rental branch accounted for 0.3 % of GDP.

The largest short-term car rental markets can be found in France, Germany and the United Kingdom. In 1993 France and the United Kingdom accounted for 25 % and 23 % of the EU total of short-term passenger car rentals, respectively. The German stake was 19 % of the EU total.

Germany is by far the largest market for long-term car rentals. In 1993 the German fleet amounted to nearly 2.4 million passenger cars and 230 000 light vans. The United Kingdom ranks second, with 1 million passenger cars and 70 000 light vans.

#### Recent trends

Over the 1985-1993 period, the EU market for short-term car rental has grown considerably. For ten Member States (Germany and Denmark excluded) the fleet of passenger cars and light vans increased by an average annual rate of 5.1 % and 3.9 % respectively. Except for the United Kingdom, growth was evenly distributed over the years. Growth rates, however, differ drastically per country. While the fleet of passenger cars almost tripled in Belgium and nearly doubled in France, Greece and the Netherlands, growth rates were much smoother in Italy, the United Kingdom and Spain over the same period.

The economic recession in recent years has resulted in a levelling-off of aggregate growth rates with respect to the fleet of passenger cars and light vans. From the country-specific data it appears that the car rental branches in the United Kingdom and Germany have been hit the hardest by the recession, resulting in a decrease in the number of rental cars in those two countries.

The average rental period for a passenger car stabilised at 4-5 days in 1993. For light vans and commercial vehicles the average period was 2-3 days.

The utilisation rate is the percentage of time the vehicles are actually earning money. In 1993 this rate varied from 57 % to 70 %, which is stable compared to the 1991 rate. The 1993 utilisation rates for light vans and commercial vehicles or trucks utilisation, however, were down from the 1991 figures. For light vans, the average utilisation decreased from 59 % to 51 %. For trucks, the same figure dropped from 65 % in 1991 to 56 % in 1993.

If compared to the market for short-term rentals, the growth rates of the number of vehicles for long-term car rentals were higher over the 1985-1993 period. For six EU countries (Belgium, France, Italy, the Netherlands, Portugal and the United Kingdom) an average annual growth rate of 9.6 % was recorded with respect to the number of cars.

In the United Kingdom, the economic recession in recent years has resulted in a dramatic decrease of total number of

**Table 1: Car rental**  
**Main indicators, 1991**

	Number of enterprises	Turnover (million ECU)	Number of persons employed
Belgique/België	607	738	(5) 1 202
Danmark	370	180	1 253
BR Deutschland (3)	4 735	4 807	N/A
Hellas (1)	(4) 585	N/A	1 397
España (3)	1 065	N/A	4 894
France	1 213	2 103	9 775
Ireland (1)	42	N/A	405
Luxembourg	16	N/A	125
Nederland	618	1 711	4 000
Portugal (2)	225	N/A	N/A

(1) 1988

(2) 1989

(3) 1990

(4) Number of local units

(5) Number of employees

Source: Eurostat; Mercure



**Table 2: Car rental**  
**Number of vehicles for short-term rentals**

(units)	1985	1987	1989	1991	1993
<b>Number of cars (units)</b>					
Belgique/België	3 875	7 406	7 249	11 500	15 000
Danmark (1)	N/A	N/A	5 256	5 450	5 270
BR Deutschland	(2) 53 000	(2) 57 000	(2) 65 000	125 000	110 000
Hellas	13 200	N/A	12 800	24 000	27 800
España	30 000	25 000	33 000	31 500	40 000
France	78 000	90 000	95 000	105 000	140 000
Ireland	9 000	9 500	10 500	11 750	14 250
Italia	30 000	36 000	38 000	41 000	40 000
Luxembourg	N/A	1 535	1 650	1 650	1 450
Nederland	11 185	15 300	17 000	19 000	22 500
Portugal	12 035	16 600	23 500	24 750	23 370
United Kingdom	110 000	13 000	140 000	132 800	128 500
Österreich	1 900	2 609	2 724	3 150	2 635
Norge	N/A	N/A	N/A	6 190	6 800
Sverige	13 200	19 000	23 000	23 000	18 000
Schweiz/Suisse	9 000	N/A	9 500	9 000	9 200
<b>Number of light vans (units)</b>					
Belgique/België	760	1 648	1 748	1 835	1 800
Danmark (1)	-	-	-	-	-
BR Deutschland	N/A	N/A	N/A	N/A	N/A
Hellas (3)	0	0	0	0	0
España	650	600	1 250	1 170	2 000
France	35 000	35 000	35 000	50 000	45 000
Ireland	70	N/A	N/A	N/A	N/A
Italia	2 200	2 300	2 800	3 400	3 100
Luxembourg	N/A	120	120	120	100
Nederland	4 555	5 000	5 500	6 000	7 250
Portugal	280	350	2 347	4 240	5 030
United Kingdom	30 000	33 000	38 000	34 200	37 000
Österreich	180	210	302	320	300
Norge	N/A	N/A	N/A	250	170
Sverige	2 900	3 000	3 000	3 700	2 700
Schweiz/Suisse	N/A	N/A	N/A	N/A	N/A
<b>Number of commercial vehicles (units)</b>					
Belgique/België	290	514	720	470	500
Danmark (1)	N/A	N/A	N/A	N/A	N/A
BR Deutschland	(2) 13 000	(2) 14 000	(2) 15 000	35 000	20 000
Hellas (3)	0	0	0	0	0
España	N/A	N/A	45	40	50
France	N/A	N/A	15 000	16 000	16 000
Ireland	100	N/A	N/A	N/A	N/A
Italia	N/A	N/A	N/A	N/A	N/A
Luxembourg	N/A	5	5	N/A	N/A
Nederland	501	600	650	700	760
Portugal	N/A	N/A	N/A	N/A	N/A
United Kingdom	12 500	18 000	27 000	12 500	14 000
Österreich	70	70	84	100	85
Norge	N/A	N/A	N/A	360	330
Sverige	N/A	N/A	N/A	275	200
Schweiz/Suisse	N/A	N/A	N/A	N/A	N/A

(1) Light vans included in cars.

(2) Excluding Eastern Germany.

(3) Not rented

Source: ECATRA

vehicles for long-term rentals (-22 %). The other Member States were not seriously affected by the recession with respect to this market.

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## MARKET FORCES

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### Demand

The growth of the European car rental market is affected by three factors: general economic growth, airline traffic growth and consumer attitudes.

Between 20 to 30 % of short-term car rentals is distributed at airports. The supply of car rental services is a reflection of the demand for flexible and efficient transportation for business travellers. The fly-drive concept - either booked in advance or privately arranged - also increases the tourist's flexibility and reduces his or her dependence on public transport.

The ongoing European integration, the extension of the number of EU Memberships and the intensifying trade with Eastern Europe will increase international business traffic. This increasing mobility will have a positive effect on the market for short-term car rental. Growing demand can be expected from tourists, as they become more and more independent and adventurous, a tendency which benefits the car rental industry.

In long-term car rental, a growing need exists for advantageous financing and tax systems. Companies tend to sell their fleets and lease them back in order to benefit from such systems. Also, the trend towards concentration on their core business stimulates companies to outsource all activities concerning their car fleets.

### Supply and competition

A fierce competition exists, especially between the big, international car rental companies. These companies court the business sector as well as the leisure sector with a most flexible pricing policy, based on partial-cost thinking. At the same time, the performance standards (car plus service) have been expanded and improved substantially. Induced by the increasing competition and the high growth rates in the swelling pan-European market, much attention also is given to cost reductions and economies of scale in the operating systems. As a consequence, the modern computerised reservation systems (e.g. Avis' worldwide Wizard network) have become an essential competitive edge. Beside the price and service aspects of competition, a comprehensive presence at major locations such as airports, and in primary and secondary cities, is also an important advantage for these companies.

The partial-cost oriented pricing policy of the big car rental companies is possible because of the effects of rationalisation and declining costs resulting from the size of the companies. Perhaps an even more important factor is the sector's strong financial and/or contractual relationship with the automobile industry.

Companies involved in short-term rental compete for customers by offering a wide range of services. Express desks, self-service returns and reward schemes for frequent clients (e.g. Avis' Club, Hertz's Gold Club and Eurodollar's First Choice Card) appeal to the business clients. For the leisure traveller, rental companies have organised all sorts of arrangements together with airline companies and tour operators. An example of a very successful new product is the fly-drive arrangement, the success of which has led to the rail-drive and rail-sail-drive arrangements that are now available.

A new development in the industry is the rental of electric cars. These cars help to reduce air pollution and promote cleaner and quieter roads. In Rochelle (F), 90 electric vehicles are running already. They can be recharged at public car parks, shopping centres and rail and bus terminals. Measures have

been taken to encourage their use, including reserved car parking.

In response to the growing need for advantageous financial agreements, competition on the market for long-term car rentals is also intensifying. This increased competition forces leasing companies to focus on driving down costs and improving customer service. Furthermore, bank-owned lessors face competition from manufacturer-owned lessors.

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## INDUSTRY STRUCTURE

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### Companies

Commercial short-term car rental is provided by companies either exclusively or in combination with other business activities. The majority of the big companies are in this business exclusively, sometimes in combination with car leasing. The small and medium-sized companies, however, combine car rental with other business activities, in affiliation with gasoline stations, motor vehicle dealerships and auto repair shops/garages. For the most part, car rental is not the major activity in such companies.

The five big car rental companies in Europe are Avis, Budget, Eurodollar, Europcar and Hertz. Together, these five multinationals represent over 50 % of the market in Western Europe. The remaining share of the car rental market is accounted for by a great number of small, medium-sized and larger firms of local, regional and nation-wide importance, which frequently enter into horizontal cooperation arrangements in order to improve their efficiency.

Hertz, the largest car rental company worldwide, is owned by Park Ridge Corporation, in which Ford Motor Company holds a majority equity share. After Hertz, Avis is the second biggest car rental firm worldwide. Avis Europe, in which the Belgian Lease International and (to a lesser degree) General Motors and the American parent company Avis Inc. hold shares, is the market leader in Europe, ahead of Europcar.

Budget is the third largest car rental company worldwide, with a fleet of 250 000 vehicles and 3 600 outlets in 140 countries. It operates its own network (in Belgium and in France), as well as a franchise network. Despite difficult market conditions, its own network grew at a rate of 15 % in 1991.

Europcar was created in 1989 by a merger of InterRent, a 100 % Volkswagen subsidiary (which until then was the market leader in Germany) and Europcar, the leading car rental firm in France and the United Kingdom, a subsidiary of the Belgian-French travel firm Compagnie Internationale des Wagons-Lits et du Tourisme. Reorganisation, rationalisation and network adjustment took place in 1990 and 1991. With counters in about 260 airports in 79 countries, Europcar holds about one-third of the world market. Europcar is trying to establish a global presence through cooperation with Eurodollar.

Eurodollar International is the European franchise of the American group Dollar Rent A Car Inc. Dollar in turn belongs to Chrysler Corporation, which also owns Thrifty Rent A Car. Eurodollar owns and franchises outlets in 20 European countries. It has 700 locations in Europe and offers more than 70 000 vehicles (worldwide this figure is 125 000 in 1 800 locations).

Both bank-owned and manufacturer-owned lessors are operating in the long-term rental market. In most cases the lessors offer a range of leasing products, though car leasing is still the most important lease product

### Strategies

Some differences can be observed between the distribution strategies of big car rental companies. Avis and Hertz rely primarily on their extensive station networks at airports. Avis

**Table 3: Car rental**  
**Number of vehicles for long-term rentals**

(units)	1985	1987	1989	1991	1993
<b>Number of cars</b>					
Belgique/België	25 000	38 000	58 000	101 500	110 000
Danmark	N/A	N/A	N/A	N/A	N/A
BR Deutschland	(1) 700 000	N/A	(1) 1 200 000	2 200 000	2 375 000
Hellas	N/A	N/A	3 200	5 000	9 000
España	N/A	N/A	5 500	7 000	N/A
France	143 000	180 000	260 000	335 000	405 000
Ireland	N/A	N/A	N/A	N/A	N/A
Italia	85 000	115 000	80 000	105 000	115 000
Luxembourg	N/A	N/A	N/A	N/A	N/A
Nederland	85 000	136 000	182 800	213 670	265 000
Portugal	2 800	4 000	19 000	59 600	102 500
United Kingdom	610 000	960 000	1 300 000	1 260 900	1 044 800
<b>Number of light vans</b>					
Belgique/België	3 000	N/A	N/A	N/A	N/A
Danmark	N/A	N/A	N/A	N/A	N/A
BR Deutschland	(1) 50 000	N/A	(1) 150 000	300 000	230 000
Hellas (2)	0	0	0	0	0
España	N/A	N/A	80	100	N/A
France	80 000	80 000	82 800	75 000	73 000
Ireland	N/A	N/A	N/A	N/A	N/A
Italia	17 000	20 000	2 600	3 000	3 360
Luxembourg	N/A	12	17	N/A	N/A
Nederland	14 550	23 280	31 200	23 140	46 000
Portugal	50	150	1 300	12 070	10 300
United Kingdom	71 000	80 000	95 000	108 400	70 000
<b>Number of commercial vehicles</b>					
Belgique/België	900	N/A	N/A	N/A	N/A
Danmark	N/A	N/A	N/A	N/A	N/A
BR Deutschland	N/A	N/A	N/A	N/A	N/A
Hellas (2)	0	0	0	0	0
España	N/A	N/A	N/A	N/A	N/A
France	60 000	60 000	61 200	64 000	64 000
Ireland	N/A	N/A	N/A	N/A	N/A
Italia	N/A	N/A	N/A	N/A	N/A
Luxembourg	N/A	45	45	N/A	N/A
Nederland	450	720	1 000	7 650	15 000
Portugal	N/A	N/A	N/A	N/A	N/A
United Kingdom	60 000	60 000	70 000	36 820	31 250

(1) Excluding former East Germany.

(2) Not rented

Source: ECATRA

also has a comprehensive presence at train stations throughout Europe. Hertz has a strong foothold in British train stations. Europcar's presence at the major European airports is rather poor. Rather, it has a significant presence in the primary and secondary cities of Europe.

In order to take advantage of these networks exclusive contracts or partnerships have been signed or started with the transport companies, travel agencies and hotel chains. Avis, for instance, has exclusive contracts with the French, Belgian and Luxembourg railroads. In addition, there are cooperation agreements with most of the big travel agencies, many airlines (e.g. Lufthansa) and hotel chains. Hertz has numerous fly-drive agreements with airlines, e.g. its "Business-drive" programme in partnership with British Airways. Hertz also has an exclusive agreement with British Rail, and other cooperation agreements exist with the national railroads of the Netherlands.

In addition, the provided products and services are interrelated with the existing networks and cooperation agreements. For instance, in combination with British Rail, Hertz introduced its "Intercity-drive" programme. In 1991, a number of products were introduced for the leisure traveller, such as the "Holiday-saver" programme in Europe. Europcar is especially active in special products in the non-airport segment of the market. One specialty of Budget is the provision of luxury cars. Of all car rental firms, Budget maintains the largest Mercedes fleet and is, in fact, the biggest customer of Mercedes in the world.

A clear pricing policy and constant high level of service are becoming increasingly important. This trend favours the big car rental companies which have evenly high performance standards, large station networks and extensive integrated operating systems. With their extended networks, more econo-



mies of scale and even better financial and/or contractual interrelationships can be attained.

The numerous small and medium-sized car rental firms focus on the non-airport and often local segments of the market. These include the rental of substitutes for accident-damaged cars (turnover share approximately 50 %), the rental for business purposes (around 30 %), the rental to tourists (about 15 %) and the rental for other private purposes (roughly 5 %).

In geographical terms, much growth can be expected from the economic development of Eastern Europe. Europcar, for instance, is extraordinarily active in East European markets; it entered the Soviet market in 1989, and the East German market in 1990. In addition, it has licensees in Czechoslovakia, Hungary, Yugoslavia and Bulgaria.

### Impact of the Single Market

Car Rental is an extremely competitive market. The five largest European companies have a market share of more than fifty percent, the rest being made up of small and medium sized enterprises. Competition is primarily based on price, the level of service and the flexibility the client demands and experiences.

Car Rental is increasingly becoming a cross border activity. This calls for measures to harmonise legislation in the different Member States. Due to for instance the considerable differences in (indirect) tax levels, the consumer is being confronted to large price differences, decreasing the transparency of pricing within the sector. In terms of service, the client, be it the business traveller or the tourist, increasingly demands standardisation in the different Member States. Therefore, companies are addressing the obstacles which currently inhibit this standardisation.

The industry identifies further liberalisation of financial services and the ease of cross border payments as having priority. In addition, due to the large proportion of small and medium sized enterprises in the sector, minimisation of the financial and administrative burden is of importance.

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### ENVIRONMENT

On the whole, car rental activity has a negative impact on the environment. Negative considerations include car pollution and the economic costs of car accidents. Positive environmental considerations include the substitution effects resulting from rail-drive arrangements instead of using a car or aeroplane.

With respect to car pollution some favourable developments can be noted, such as the increasing use of smaller sized cars and relatively new cars in rental fleets, particularly in the Western European countries. Further, car rental fleets get regular maintenance and inspection, which contributes to energy efficiency and the minimisation of harmful exhaust gas emissions. However, in Southern EU countries car rental firms frequently have older, poorly maintained cars in their fleets.

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### REGULATIONS

One of the most important problems in the car rental industry is vehicle theft and conversion. In 1993 ECATRA's short-term rental members absorbed a loss of 11 550 vehicles, representing a value of 160 million ECU - nearly 2 % of their total fleet. This far exceeds the pre-tax profits of business in the industry. Similarly, for long-term leasing, insurance companies have had to pay out colossal sums, which has caused premiums to soar. Insurance companies rarely accept the risk of insuring short-term rentals against car theft. Theft by juveniles accounts for the majority of vehicle crime. Enormous losses are involved and the problem has been aggravated by the abolition of custom control at national borders.

The industry is taking considerable initiatives for prevention. These include the development of a data bank on a pan-European basis, which will provide an immediate signal if someone involved in previous rental frauds tries to hire a vehicle. Other suggestions have included the removal of any rental markings on vehicles; a contractual ban on travel to non-EU and non-EFTA countries; more dialogue and cooperation between concerned bodies; a call for improvement of car security systems by car manufacturers, a microchip security system on rental cars and car security cards.

The envisaged harmonisation of VAT and excise duties is important for the industry as well. Currently, large variations exist in the EU countries causing rental companies to charge different prices, which has a direct affect on the consumer by causing less clarity in the market on the whole. It also creates bothersome inflexibilities in international car renting.

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### OUTLOOK

The markets for short- and long-term car rentals are both expected to grow in the coming years. Growth will stem primarily from the increasing mobility induced in part by the economic recovery, but also by an autonomic non-cyclical component. Growing business travel in the wake of the completion of the EU internal market, economic recovery in the EU and Eastern Europe, as well as continued expansion of Europe-wide tourism will stimulate the car rental market positively in the future.

Car rental has become a true alternative to the use of a self-owned automobile or truck. For short-term car rental there is an increasing tendency to use rail or aeroplane services in combination with a rental car for both business and tourism. Long-term car rental benefits from the increasing need for flexible financing of car and truck fleets.

In view of the above, growth in the car rental industry is envisaged to be relatively strong. In 1994-95 a recovery from poor 1993 figures can be expected. Growth rates are expected to reach 3 % on average. For 1995-97 a real expansion of close to 5 % is expected.

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# Leasing

## NACE 84

The market for equipment leasing is still relatively new in Europe, although its level of development is not the same in all European countries. In general, however, the leasing market has yet to fully mature, despite its already existent popularity in the European service sector. In some EU countries, some legal obstacles hindering the sector's growth remain, while in others competition is intense and new parties have entered the leasing market. Despite its relatively immature stage of development, the leasing market does have a cyclical character. The market for equipment leasing has suffered from the economic recession in recent years. In 1994 some signs of economic recovery can be noted which will further encourage leasing activity. This positive development is expected to continue in the future.

### INDUSTRY PROFILE

#### Description of the sector

NACE 84 covers renting, leasing and hiring of movables, of which leasing is the most important. The leasing of real estate is excluded. Consequently, figures only refer to the leasing of movables, or the so-called equipment leasing. More specifically, the following types of equipment leasing will be

dealt with: leasing of agricultural machinery and equipment (without permanent staff; part of NACE 841); leasing of construction machinery and equipment (without permanent staff; part of NACE 842); leasing of bookkeeping and office machines, electronic data processing equipment and cash registers (without permanent staff; part of NACE 843); leasing of cars (part of NACE 844); leasing of other means of transport without a driver (part of NACE 845); and leasing of other movables (part of NACE 847).

Leasing is defined differently by the Member States. Comparisons across Member States therefore have to be interpreted cautiously. Broadly speaking, leasing refers to the transfer of a good from the lessor (the owner) to the lessee, who can make use of the good upon the making of regular payments. While leasing concerns an operation of a medium- or long-term nature, renting refers primarily to the transfer of a good in the short term (hours, days, etc.) between two persons on payment of a fee.

Principally, two major categories of leasing contracts are distinguished: the financial lease and the operational lease. Financial leases are contracts with full pay out (full amortisation). These are, in principle, irrevocable, and do not provide for maintenance and service (the legal ownership stays with the lessor, but the economic ownership shifts to the lessee). Furthermore, in several Member States the financial lease includes an option for the lessee to buy at the expiration date.

An operational lease is a contract with non-full pay out (partial amortisation): the lessee only uses the capital equipment for a portion of its normal service life, and there are normally

**Table 1: Leasing**  
**Main indicators (1)**

	1990	1991	1992	1993
<b>Number of companies (units) (2)</b>				
Belgique/België	63	59	54	53
Danmark	19	18	24	21
BR Deutschland	74	89	96	108
Hellas	4	8	7	5
España	106	97	85	69
France	127	129	113	257
Italia	142	122	91	98
Irland	18	17	17	17
Luxembourg	8	5	5	5
Nederland	21	23	23	24
Portugal	18	20	26	29
United Kingdom	75	73	84	86
EU	675	660	625	772
<b>Turnover (million ECU)</b>				
Belgique/België	1 534	1 671	1 512	1 271
Danmark	780	707	485	456
BR Deutschland	N/A	16 561	19 050	19 877
Hellas	97	139	201	N/A
España	7 569	7 170	5 120	2 558
France	15 111	13 100	11 214	9 103
Italia	13 368	13 426	9 334	6 279
Irland	864	866	841	978
Luxembourg	172	121	167	108
Nederland	2 559	2 411	2 830	2 570
Portugal	1 041	1 288	1 557	1 422
United Kingdom	18 799	18 081	16 022	17 056
EU	N/A	59 687	68 336	N/A

(1) Only members of the national associations.

(2) Companies which offer only equipment leasing as well as companies which offer equipment leasing and real estate leasing.

Source: Leaseurope

**Table 2: Leasing  
Importance of leasing of machinery according to turnover, 1993**

(%)	Machinery and industrial equipment	Computer and business machines	Road transport vehicles	Motocars and railway, rolling stock	Ships, aircraft	Others
Belgique/België	16.4	29.6	14.9	30.5	0.4	8.2
Danmark	23.2	27.9	20.2	9.6	8.1	11
BR Deutschland	11	18.1	8.1	51.9	4.9	6
España	40	6.9	30.5	10.2	0	12.4
France	35.5	17	24.5	21.8	0	1.3
Ireland	30.1	10	19.9	40	0	0
Italia	60.5	3.3	15.7	15.8	3.5	1.1
Luxembourg	12	19.4	22.2	41.7	0	4.6
Nederland	13.2	27.9	15.4	9.6	24.7	9.1
Portugal	31.2	13.2	16.2	27.7	0.4	11.3
United Kingdom	24.9	13.2	12.9	38.5	6.9	3.6

Source: Leaseurope

one or more additional users. The leasing rates and payments are calculated at a fraction of the purchase value. Furthermore, an operational lease can, in principle, be cancelled. This form of leasing ordinarily calls for the lessor to maintain and service the leased equipment, and the costs of this maintenance are either built into the lease payments or contracted for separately: the legal and economic ownership stay with the lessor.

The industry's total turnover in 1993 reached 62 billion ECU (more than 1 % of GDP in all EU-countries). The European leasing activities are mainly concentrated in Germany and the United Kingdom. Both countries accounted for 60 % of total EU turnover in 1993.

#### Recent trends

The US was the first country to set up and develop leasing operations. In the early years of leasing, US-manufacturers of capital goods dominated the leasing market: They used leasing operations mainly as a marketing instrument in order to stimulate the sales of their core products.

The European market for leasing has always been dominated by bank-owned lessors. In the market for leasing these companies showed huge growth figures in the 1970s and the 1980s.

In recent years the economic recession in the EU has led to a decrease in investment, thus hampering growth rates. In some Member States, the recession and increasing competition between leasing companies have resulted in a shake-up of companies. In 1993 the UK already showed some signs of

recovery and during 1994 the economic developments in the other Member States have become more favourable for further sectoral growth.

#### International comparison

The leasing market in the US is relatively well-developed, with a leasing ratio (share of leasing in total investments) above 30 %. Japan has lagged behind, but is now making up for it with high growth rates.

Within Europe, the EU leasing market is far more developed than that of Eastern Europe. The countries which have shown the most rapid recovery from the post-communist inactivity - Poland, the Czech Republic and Hungary - are leading the development of western-style leasing in Eastern Europe.

In 1993 US lessors recorded high growth rates, especially in their domestic markets. Their European leasing activities, on the other hand, suffered from the unfavourable economic conditions. In contrast with Europe and Japan, the largest US lessors are manufacturer-owned (GE Capital, AT&T Capital Corporation and IBM Credit Corporation).

#### MARKET FORCES

##### Demand

The European leasing market has gradually undergone significant changes in terms of suppliers, customers and products. Before 1990 leasing operations concentrated on office equip-

**Table 3: Leasing  
Analysis by type of customer according to turnover as share of all leased goods, 1993**

(%)	Agriculture	Industry	Services	Central and local government	Consumer	Others
Belgique/België	2.2	29.9	53.4	3.4	0	11.1
Danmark	1.5	23.2	28.1	8.3	0	38.8
BR Deutschland	0.5	35.1	51.9	1.9	10	0.5
España	1.5	37.9	47.6	0.7	0	12.2
France	5	38	41	2	14	0
Ireland	5.7	15.3	48.5	0	30.5	0
Italia	0.4	57.8	18.7	3.1	5.9	14.1
Luxembourg	0	21.3	70.4	0.9	0	7.4
Nederland	0.9	24.7	51.3	4.8	1.6	16.7
Portugal	2	44.2	35.7	7.7	0.1	10.3
United Kingdom	4.3	28.1	53.6	14	0	0

Source: Leaseurope



**Table 4: Leasing**  
**Breakdown of investment leasing by field of use, 1993**

(million ECU)	Agriculture	Industry	Services	Public administration	Consumers	Other
Belgique/België	28	380	679	43	0	141
Danmark	7	106	128	38	0	177
BR Deutschland	103	6 970	10 326	387	1 988	103
España	39	969	1 218	19	0	313
France	455	3 459	3 733	181	1 275	0
Ireland	56	150	474	0	298	0
Italia	27	3 631	1 173	193	370	885
Luxembourg	0	23	76	1	0	8
Nederland	23	634	1 319	124	42	428
Portugal	29	628	507	109	2	147
United Kingdom	736	4 798	9 139	2 383	0	0

Source: Leaseurope

ment. Nowadays, all kinds of goods can be leased, ranging from machines and industrial equipment to road transport vehicles, ships and even aircraft.

The decreasing role of office equipment is reflected in a lower share in total turnover of leasing machinery. In 1993 only 15.1 % of total turnover could be attributed to office equipment against 17.1 % in 1992. Although turnover stabilised in 1993, 'Motorcars' (including car leasing) remained the largest category, and it could increase its share in relative terms even further. 'Ships, aircraft, railway and rolling stock' was the only category that could record some substantial growth in absolute terms.

It appears that the service sector is still the largest customer of leasing products, although its share decreased in 1993 (from 48.4 % to 46.6 %). Further, it seems that leasing to private persons (mainly car leasing) has increased in both absolute and relative terms. To an increasing extent private households are attracted by the favourable leasing conditions offered by the car manufacturers resulting from poor car sales.

There are, however, signs of recovery. In the UK business volumes are increasing. Demand for leasing in the public sector is growing throughout the EU as is the demand for operational leases.

### Supply and competition

Originally, leasing companies were mainly manufacturer-owned and tried to stimulate their sales by offering additional

services for customers. A second family of leasing companies was formed by financial institutions which, because of their financial expertise, were able to overtake the manufacturers in several Member States. The European market continues to be dominated by bank-owned lessors. But there is some indication that this will change, as manufacturer-owned lessors again are increasing their market shares.

The recession has led to a serious shake-up of the European leasing industry. In recent years the number of leasing companies in Germany has halved from about 1 400 to 700. Throughout Europe there is intense competition for good quality credits with a consequent decline in margins.

## INDUSTRY STRUCTURE

### Companies

The European leasing market is still dominated by German, French and UK bank-owned leasing companies. Société Générale, which suffered from a drop of more than 15 % in turnover, stood down from first place, changing position with Lombard. Ford Credit Europe started operations in 1993, thereby indicating the threat posed by the manufacturer-owned companies.

### Strategies

The intensifying competition forces leasing companies to focus on driving down costs, improving customer service and identifying profitable niches by developing new leasing facilities

**Table 5: Leasing**  
**Breakdown of investment leasing by type of asset, 1993**

(million ECU)	Machines and industrial equipment	Office and computer equipment	Road transport vehicles	Motocars and railways rolling stock	Ships, aircrafts	Other equipment
Belgique/België	208	376	190	388	5	104
Danmark	106	127	92	44	37	50
BR Deutschland	2 194	3 588	1 601	10 326	981	1 187
España	1 024	177	760	260	0	317
France	3 234	1 546	2 226	1 982	0	115
Ireland	294	98	195	391	0	0
Italia	3 799	209	985	992	222	72
Luxembourg	13	21	24	45	0	5
Nederland	340	717	395	248	635	235
Portugal	444	187	231	394	5	161
United Kingdom	4 251	2 245	2 208	6 565	1173	614

Source: Leaseurope

**Table 6: Leasing  
Breakdown of investment by primary contract term, 1993**

(million ECU)	up to 2 years	up to 5 years	up to 10 years	longer than 10 years
Belgique/België	0	1 208	63	0
Danmark	13	275	161	7
BR Deutschland	2 982	12 920	2 981	994
España	0	2 374	184	0
France	27	8 138	911	27
Ireland	259	639	80	0
Italia	107	5 597	470	105
Luxembourg	0	108	0	0
Nederland	0	2 442	128	0
Portugal	237	1 152	33	0
United Kingdom	3 257	10 123	1 900	1 776

Source: Leaseurope

and/or specialising in certain selected markets. Bank-owned lessors are responding to the threat of manufacturer-owned lessors by offering leases alongside mainstream bank products, to take advantage of the parent bank's retail network; as well as by setting up specialised subsidiaries.

### Impact of the Single Market

The leasing industry is very sensitive to changes in the economic cycle. The recent recession has had a considerable negative effect on revenues. Therefore it is difficult to determine exactly what the financial and economic effects of the Single Market Programme have been.

Leasing has a very prominent financial and legal aspect. A very important role is envisaged for the Single Market Programme in harmonising rules and regulations concerning finance and (company) law which differ significantly between Member States. As yet, the uniformity desired by this sector on these issues has not been reached.

The leasing market has a predominantly domestic character. In order to stimulate cross border business, issues such as the freedom of movement of capital need to be addressed. In addition, harmonisation of accounting rules and taxation are required in order to create a true and fair competitive environment for leasing companies operating in different Member States.

### REGIONAL DISTRIBUTION

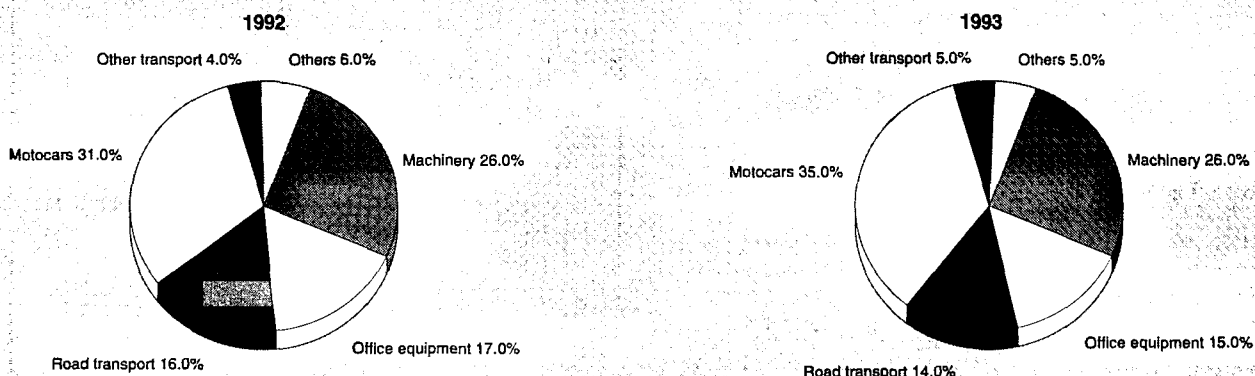
Leasing activities are mainly concentrated in industrial areas. Differences between the penetration of leasing products cannot be explained by cross-border regional patterns but are more a consequence of differences in the regulatory environment between Member States. A wide variety of civil law, fiscal and accounting rules exists in the EU. In some countries, such as Germany and the UK, this environment has stimulated leasing activity, whereas in other countries regulations have hampered market growth.

### ENVIRONMENT

The Green Paper on remedying environmental damage fails to answer the question of whether or not the responsibility for any damage of leased equipment can be addressed to lessors. Although the wording of this Paper can be interpreted in several ways, it does not require any position to be taken. The instances in which the lessor's liability could be invoked are, in reality, very limited.

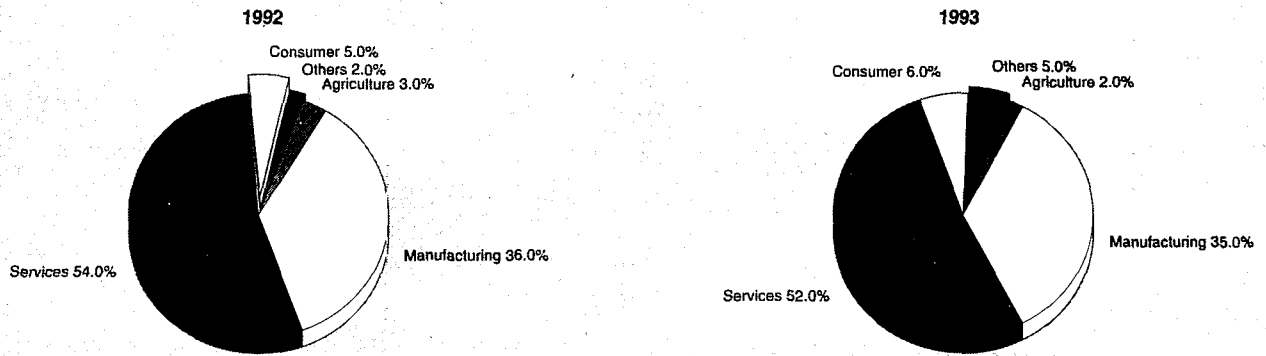
Generally speaking, lessors of equipment have even less reason to be implicated in the costs of remedying environmental damage than do banking organisations, because lessors are merely concerned with the leasing of individual items of equipment

**Figure 1: Leasing  
Equipment leased by type of asset in the EU**



Source: Leaseurope

**Figure 2: Leasing**  
**Equipment leased by type of customer in the EU**



Source: Leaseurope

and rarely obtain the detailed information about the day-to-day business of its customers which is available to banks. Further, it is for that reason that lessors are rarely able to influence lessees about the manner in which operations may be carried out.

There are, however, some indirect consequences for the leasing industry if environmental measures are taken. The introduction of a carbon tax will influence mobility, which could affect the leasing market negatively. Such a tax, however, will only be implemented in the long run and the direction and magnitude of its impact is not quite clear.

Other measures aiming to discourage car traffic and/or stimulate other traffic modes might affect the leasing market. Although such measures on a national level have not been very successful yet, in the long run some successes will be realised.

## REGULATIONS

Since its establishment in 1991, the Accounting Advisory Forum discussed the accounting for leasing contracts. With respect to accounting rules, major differences between Member States exist. Accounting operates according to two methods: the economic approach and the legal approach.

The economic approach neglects the legal content of a contract and interprets the economic content ('substance over form'). This interpretation is decisive for the capitalisation of the leased good: the economic owner is allowed to capitalise and depreciate the leased good. This means that with financial leasing, the lessee (economic but not legal owner) can enter the leased good in his balance sheet, while with operational leasing the lessor (economic and legal owner) is allowed to capitalise and depreciate the leased good. This approach is also called the Anglo-Saxon method, and is advocated in Europe by the UK, Ireland, the Netherlands and Belgium.

The legal approach gives the right to the legal owner to enter the leased good in his balance sheet. Consequently, no distinction with respect to accounting rules is made between financial and operational leasing, since in either case the lessor is the legal owner. This approach is used in most countries of continental Europe, notably France and Germany.

In October 1993, the Forum discussed the accounting for lease contracts for the last time. According to the Forum the capitalisation of leased assets and recognition of income should be guided by existing national accounting methods. However, a "benchmark" is recommended for disclosure of the notes

of annual accounts. Although no distinction is made between the capitalisation of leased assets and income recognition, a distinction between the financial and operating leases is drawn for disclosure purposes.

On the first of January 1994, a new directive came into force for the monitoring and control of large exposures (a risk which exceeds 10 % of own funds) of credit institutions. It states that a credit institution may not incur an exposure to a client or group of connected clients of a value exceeding 25 % of its own funds. The total amount of large exposures may not exceed 80 % of its own funds. Exemptions for risks taken have been made by credit institutions on their parent company, on other subsidiaries of the parent company and on their own subsidiaries, as long as these companies are subject to supervision on a collective basis.

## OUTLOOK

The economic recession seems to have come to an end in most Member States. Economic recovery will positively affect leasing operations as investments will increase. The first signs of recovery in the leasing market are already reflected in the UK growth figures. An increase of leasing operations for other EU countries in Western Europe is expected for 1994. In the Mediterranean EU countries, a full recovery is not expected until 1995.

Further growth is expected as economic development and the accompanying increase in investments will continue in 1994-1997. All types of assets are expected to show a growth with respect to leasing operations. Investments in office machinery and computer equipment are expected to grow because of the increasing penetration of these goods and the intensifying importance of services in most Member States. The decline of hardware prices, however, will offset this positive evolution somewhat.

Investments in machinery and construction equipment, which show a relatively high cyclical character, are expected to increase because of the favourable economic climate. Furthermore, the growth and change of the former East Germany will result in a significant increase of leasing activities in Germany. Also, the evolution of East European countries like Hungary and Czechoslovakia can offer new opportunities for EU leasing companies.

Car leasing is still the largest segment in the leasing market and is expected to retain and even strengthen its leading po-

sition in the 1994-1997 period. This sector is not expected to become negatively affected by environmental measures against car traffic, as no serious measures on a European level will come into force during this period. For the moment, car leasing is only hindered by the fact that, in some Member States, leasing to private households is not allowed.

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# Franchising

*Franchising is a means of adaptation to local conditions without losing the benefits of global concerns, ideas and scales. Within the EU, franchising has become the most dynamic business development strategy. France is by far Europe's leading franchise country and second after the USA at the world level. The outlook is bright as franchising has an important role to play in the promotion of EU trade and has the tools for that purpose.*

## INDUSTRY PROFILE

### Description of the sector

Franchising is a strategy of business development that has remarkable success all around the world. Nevertheless, there exists a specific European form of franchising because the European culture has given this strategy a specific colour, a clear concern for balance and transparency.

Franchising is a means of achieving adaptation to local conditions without losing the benefits of global concerns, ideas and scales. Therefore, Italian or Belgian franchising is quite different from German or French franchising. The basic definition of franchising, contained in the Code of Ethics, is accepted by all members of the European Franchise Federation and by the European Commission.

Franchising is a system of marketing goods and/or services and/or technology, which is based upon a close and ongoing collaboration between legally and financially separate and independent undertakings, the Franchisor and its Individual Franchisees, whereby the Franchisor grants its Individual Franchisees the right, and imposes the obligation, to conduct a business in accordance with the Franchisor's concept.

The right entitles and compels the Individual Franchisee, in exchange for a direct or indirect financial compensation, to use the Franchisor's trade name, and/or trade mark and/or service mark, know-how, business and technical methods, procedural system, and other industrial and/or intellectual property rights, supported by continuing provision of commercial and technical assistance, within the framework and for the term of a written franchise agreement, concluded between the parties for this purpose.

### Guiding principles of franchising

The Franchisor is the initiator of a franchise network, composed of itself and its Individual Franchisees, of which the Franchisor is the long term guardian.

Obligations of the Franchisor. The Franchisor shall:

- have operated a business concept with success, for a reasonable time and in at least one pilot unit before starting its franchise network;
- be the owner, or have legal rights to the use, of its network's trade name, trade mark or other distinguishing identification; and
- provide the Individual Franchisee with initial training and continuing commercial and/or technical assistance during the entire life of the agreement.

Obligations of the Individual Franchisee. The Individual Franchisee shall:

- devote its best efforts to the growth of the franchise business and to the maintenance of the common identity and reputation of the franchise network;
- supply the Franchisor with verifiable operating data to facilitate the determination of performance and the financial statements necessary for effective management guidance, and allow the Franchisor, and/or its agents, to have access to the Individual Franchisee's premises and records at the Franchisor's request and at reasonable times; and
- not disclose to third parties the know-how provided by the Franchisor, neither during nor after termination of the agreement.

Recruitment, advertising and disclosure. Advertising for the recruitment of Individual Franchisees shall be free of ambiguity and misleading statements.

### A specific organisation

In 1972, the European Franchise Federation (EFF) was created, as an international non-profit association assembling all national Franchise Associations or Federations established in Europe. Members of national associations are Franchisors settled in the country. The aims of the EFF are:

- promotion of franchising in Europe;
- protecting the franchise industry by promoting the European Code of Ethics;
- influencing and encouraging the development of franchising in Europe;

**Table 1: Franchising**  
**Main indicators, 1993**

	Number of franchisors	Number of franchisees	Turnover (billion ECU)	Persons employed by franchisees
Belgique/België	135	2 495	3	N/A
Danmark	42	500	N/A	N/A
BR Deutschland	420	18 000	10	N/A
Ellas	N/A	N/A	N/A	N/A
España	250	20 000	2	N/A
France	500	30 000	31	310 000
Ireland	20	N/A	0	N/A
Italia	361	17 500	8	50 000
Luxembourg	N/A	N/A	N/A	N/A
Nederland	340	12 120	7	69 750
Portugal	70	N/A	N/A	N/A
United Kingdom	396	24 900	6	188 500

Source: EFF, national franchise associations and federations



- representing the interests of the franchise industry in international organisations, such as the European Parliament;
- promotion and representation of the European franchise industry and its members world-wide; and
- exchange of information and documentation between national associations or federations in Europe and the World.

Today, the EFF has 12 members. To reinforce its statistical basis, the EFF is creating the first European Franchise Data Bank. However, the following statistics are still under the responsibility of each national association and should, therefore, be interpreted more as estimations.

## MARKET FORCES

### Demand

The last 20 years have seen quite an evolution in the channels of distribution. Stronger competition resulted in increased specialisation and the emergence of new ideas, with franchising being one of them. Within the EU, it has become the most dynamic business development strategy. More than 3 000 franchisors and 250 000 franchisees achieved an annual turnover of over 75 billion ECU in 1993.

In Europe, franchising was first adopted in retail sectors, where, with some exceptions, the traditional forms of cooperation were not much used. It was also adopted in completely new business sectors, like do-it-yourself shops, fast food restaurants and car rentals. Although North American franchisors found their way to Europe, many national franchise networks were developed. Despite growing internationalisation, most national markets are still held by national networks.

### France

France is by far the leading country in Europe in franchising and comes second in the world after the USA. In 1993, there were 500 franchisors and 30 000 franchisees realising a turnover of 31 billion ECU. This represents 12 % of French retail turnover.

Franchising first appeared in the north of the country, where the major wool manufacturer Pingouin led the way in 1929. It then spread to the confection sector, giving a strong impetus to the growth of product franchising, which today represents 70 % of all franchising in France. Within product franchising, personal equipment represents 30 % of the market, the food industry 20 % and home equipment 20 %. The remaining 30 % consists of service franchising, which at present is achieving an annual growth rate of 20 % in areas such as fast foods, hotels, instant printing, car maintenance, etc.

Big trade marks such as Chanel, Yves Saint Laurent, Pierre Cardin are part of the French culture. The French franchising system gives much more importance to the trade mark than to know-how. The trade mark is considered the symbol of the franchise network identity.

Franchising in France is moving towards increasingly innovative and performance-oriented forms in services for the individual consumer or business. In these areas, a new trend is appearing. Franchisors are considering franchisees more like partners with an increased freedom in their actions, as long as the network's image is preserved.

Of the franchising networks present in France, 95 % are French. The remaining 5 % are mostly American fast food chains. Success in French franchising is best measured in terms of employment. In 1993, it is estimated that 10 000 jobs were created or saved by franchisors and franchisees.

### United Kingdom

The United Kingdom has 396 franchisors and 24 900 franchisees which realised a turnover of 6.4 billion ECU in 1993. In recent years, growth in turnover has been 25 %; mostly

due to expansion in services and specialised retail businesses. Characteristics of the United Kingdom are:

- the absence of confection franchises. In 1989, the UK had 7 confection franchises, while France had 150;
- the great influence of American franchises. For the US, the UK has been a natural gateway to Europe. Most US franchisors started their European strategies with an English subsidiary. Consequently, almost 30 % of the franchise networks in the UK are American. The UK is the leading country for Master Franchise.

### Germany

With 420 franchisors and 18 000 franchisees, German franchising realised a turnover of 10 billion ECU in 1993. Germany has become an important franchising country in Europe. However, because of its co-operatively structured retail industry with strong "Buying Groups", franchising did not really take off until 5 years ago. It has mostly developed in food distribution (with large groups like Spar or Eisman), in pottery and household equipment, followed by personal equipment and services. Service franchising in Germany is largely made up of fast-food chains.

Growth in German franchising will receive extra stimulus from the development of eastern Länder and countries. In 1993, distribution of franchisees in the western and eastern Länder were 81.2 % and 18.8 %, respectively.

### The Netherlands

With 340 franchisors, 12 120 franchisees and a turnover of 6.8 billion ECU, franchising represents 12 % of retail turnover in the Netherlands. Except in the fast food sector, developed generally in Europe by American franchisors, most franchisors are Dutch (soft drinks bottlers and petrol not included).

### Belgium

Belgium counts 2 495 franchisees sponsored by 135 franchisors with a turnover of 3.3 billion ECU. Here, franchising has revealed itself as a successful strategy for 15 years, and expands according to the French model. Product franchising is preponderant, while service franchising is only recently developing. Currently, 50 % of the franchise networks in Belgium are Belgian, with the GB Group being the largest franchisor.

### Italy

Italy has 361 franchisors and 17 500 franchisees achieving a turnover of 7.5 billion ECU. Italy experienced a sudden expansion in 1987 which lasted two years, with an important development in personal equipment. Franchising seems perfectly adapted to the needs of the country, which has experienced a severe recession and a rapidly spreading culture of individual entrepreneurship at the same time.

Still, however, franchise turnover is very low compared with total retail turnover, representing only roughly 1.2 %. Very few foreign franchisors, mostly American and French, have settled in Italy.

### Spain

Franchising is a rather new distribution channel in Spain. Taking off only in 1988, it expanded very quickly. Until 1991, the annual growth rate was almost 70 %. Today, Spain has 250 franchisors and 20 000 franchisees, realising an annual turnover of 2.3 billion ECU.

Expansion is mostly due to foreign franchisors. In 1991, only 58 % of franchisors were Spanish. However, the trend is now changing. An important number of national networks have been established, resulting in the Spanish Franchise Association being founded in October 1993.



Traditional economic areas are personal equipment, confection and food distribution. Service franchising is still not developed, but needs are obvious in sectors like car services, hotels, restaurants, as well as in specialised retail business.

### Portugal

In the past four or five years, Portugal has experienced the same evolution as Spain. Today, 70 franchisors and 800 franchisees are operating.

### Eastern Europe

In Eastern Europe franchising may be a way to import managerial know-how and an efficient retail structure. Countries like Hungary have grabbed this opportunity and today have a successful franchising sector.

### Impact of the Single Market

The most positive effect of the Single Market Programme is the freedom it brought about concerning the movement of persons, goods and capital, factors which are essential for this industry. A high degree of harmonisation exists regarding the legal aspects governing this sector. This was established before the inception of the Single Market, most notably by the Block Exemption of 1989. The regulatory framework remains very limited, making the Franchise industry an example of self-regulation. Self-regulation is based on and enhanced by a European Code of Ethics.

However, considerable barriers still exist on the product level. Member States impose different rules and requirements on products, making certain products acceptable in some Member States but unacceptable in others. The same is true for environmental measures which may vary considerably from one country to the next. It is clear that these two aspects need further harmonisation.

The need for a single currency and easy access to financing by small- and medium sized enterprises are considered to be the most important current priorities within the Franchising industry.

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## REGULATIONS

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While franchising occurs in many forms in the various EU Member States, its regulatory framework is very homogeneous, mainly ruled by two texts: the Block Exemption and the European Code of Ethics.

### The Block Exemption

Before 1986 no specific national laws existed and jurisprudence was poor, with the notable exception of France. In this context, a French company, Pronuptia, provoked the first judgement of the Court of Justice of the European Communities favourable to franchising. Article 85(1) of the Treaty of Rome, establishing the European Economic Community, prohibits cartels between suppliers of commodities. However, the Pronuptia ruling took into account, for the first time, both the interests of the consumer and of a new economic being: the network in which franchisor and franchisee together fight their competitors, and whose identity and image need real protection. It was the first step towards a global exemption for franchising from Article 85(1). This was in recognition of the fact that consumers benefit from the combined purchasing power and higher service level that franchisees are able to offer in comparison with independent, individual entrepreneurs, and that franchising does not in itself harm competition.

After four other individual exemptions, Yves Rocher, Computerlands, Charles Jourdan, and Service Master, the block exemption for franchising was passed in 1989. The EU regulation covers product and service franchising (Art 1) only if the interest of the final consumer is taken into account (Art 4). Franchising was at last recognised as a distinct form of

business, establishing a common legal basis for the development of franchising in EU Member States.

### The European Code of Ethics

Since the beginning of franchising in Europe, there has been a real concern for ethics and self-regulation. The first Code of Ethics created by the French Franchise Federation in 1971, followed by a European Code in 1972 permitted a smooth development of franchising, becoming a reference for all partners of franchising: franchisors, franchisees, lawyers and consultants, administrations, and governments. It is also increasingly used by courts throughout Europe as a benchmark of franchising standards.

Since 1992, a new European Code, drafted in close consultation between the European Franchise Federation and the Directorate-General XXIII of the European Commission (which has responsibility, inter alia, for Trade and Distribution), has been promoted in all countries where the EFF has members. The absence of specific laws in EU Member States is proof, if any is needed, of the power of a self-regulating effort, a code of ethical conduct and fair behaviour in an economical environment.

### The Franchise agreement (extracts of the Code of Ethics)

The Franchise Agreement shall comply with national law, European Community law and the European Code of Ethics and any national extensions thereto. Essential minimum terms of the agreement shall include the following:

- the rights granted to the Franchisor;
- the rights granted to the Individual Franchisee;
- the goods and/or services to be provided to the Individual Franchisee;
- the obligations of the Franchisor;
- the obligations of the Individual Franchisee;
- the terms of payment by the Individual Franchisee;
- the duration of the agreement which should be long enough to allow Individual Franchisees to amortise their initial investments specific to the franchise;
- the basis for any renewal of the agreement;
- the terms upon which the Individual Franchisee may sell or transfer the franchised business and the Franchisor's possible pre-emption rights in this respect;
- provisions relevant to the use by the Individual Franchisee of the Franchisor's distinctive signs, trade name, trade mark, service mark, store sign, logo or other distinguishing identification;
- the Franchisor's right to adapt the franchise system to new or changed methods;
- provisions for termination of the agreement; and
- provisions for surrendering promptly, upon termination of the franchise agreement, any tangible and intangible property belonging to the Franchisor or other owner thereof.

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## OUTLOOK

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Franchising has, more than ever, a role to play in the modernisation of commerce, not only because the existence of the network allows a rapid diffusion of technological discoveries (e.g. the computerised cash register that can treat and analyse sales data), but also because franchise is a means of making alliances for the benefit of the franchisor, the franchisee and the consumer.

Franchising is adapting to a new environment and may be showing the way to a new and better model of European

distribution. It should then be a means of standardisation. Franchising is a strategy that makes it possible to keep the advantage of scale economies, while respecting the identity of all the partners. Thanks to its centralised and flexible structure, and to the clear common interest which preserves the network's image, franchising makes it possible to redistribute decisions at the right level.

Now more than ever, franchising has an important role to play in the promotion of trade within the EU. Indeed, it has all the relevant tools for that purpose. It is certainly a way to grab the opportunities of a changing market. The present evolution promises a radiant future.

Written by: EFF

The industry is represented at the EU level by: European Franchise Federation (EFF). Address: Rue La Boétie 60, F-75008 Paris; tel: (33 1) 53 75 22 24; fax: (33 1) 53 75 22 20.

# Fairs and exhibitions

*Stemming from a long European tradition, Fairs and Exhibitions (F&E) make up one of the most important business service sectors in the EU. At the end of the 1980s, the sector generated around 17 000 million ECU of annual spending, thanks to the work of close to 500 000 employees. Eighties growth petered out more or less at the end of 1991 due to the economic recession, and exhibitions are still suffering to some extent. Despite current uncertainty about future development in the business, signs of recovery do exist, varying across exhibition sectors and countries.*

## INDUSTRY PROFILE

### Description of the sector

Fairs and exhibitions are trade activities linked to specific, extraordinary places and times in which suppliers and buyers gather together in a coordinated, organised fashion, seeking to exchange goods, services and information. Exhibition centres and organisers centralise the activity. They attract exhibitors and visitors interested in enhancing their sales opportunities, image, contacts and market knowledge. Objectives differ depending on the type of event. General fairs and professional exhibitions are the two main types of F&E, although the latter type is the more significant.

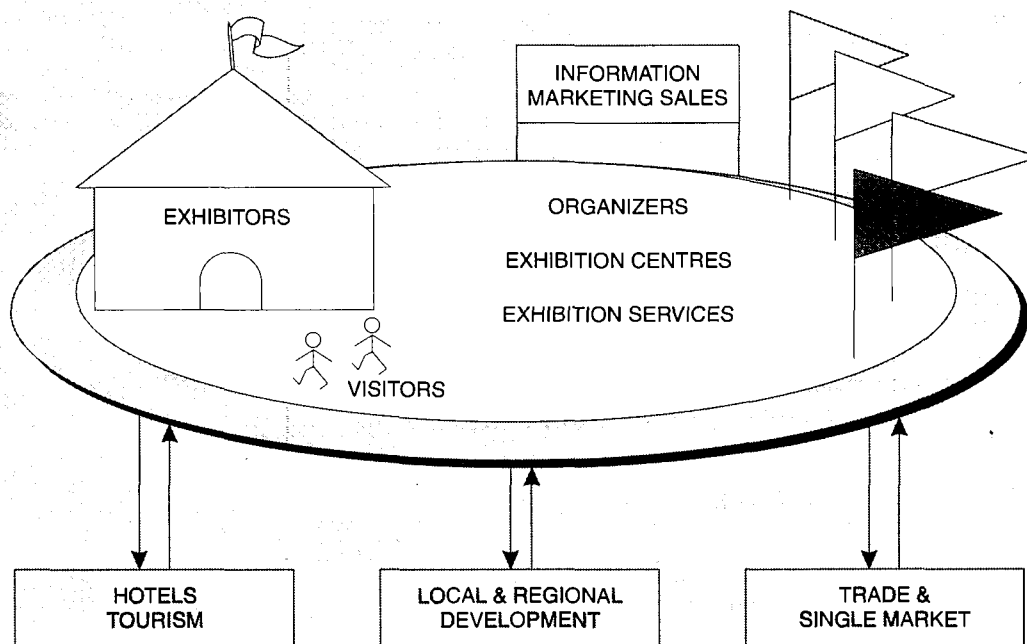
As is shown in Figure 1, supply of F&E is made up of organisers, exhibition centres and exhibition services, while demand is comprised of exhibitors and visitors. The affected local environment includes tourism supply (mainly accommodations, transportation and restaurants), the affected economic sectors (i.e. the local industries that are promoted as

a direct consequence of F&E activity), the public sector (mainly local authorities and governments) and public and private investments (e.g. when improvements are made to exhibition centres and their surroundings).

Since economic statistics are not available, some estimates have been made to measure the sector's overall economic importance. Thus, Table 1 shows available estimates from visitor and exhibitor spending, taking into account the number of major fairs in Europe. The F&E sector covers 3 500 to 4 000 fairs throughout the European Union, not counting local fairs held in small cities and villages. Depending on the criteria used, 100 to 300 exhibitions may be considered as being international in nature. Located in more than 300 cities, F&E generate around 17 000 ECU in direct visitor and exhibitor spending. Exhibition spin-off effects create close to 500 000 full-time equivalent jobs, 70 000 of which are in the exhibition sector itself. Profits from sales, plus contracts, contacts, and other benefits resulting from exhibitions obviously cannot be estimated.

To make a country-by-country comparison of the exhibition industry, Table 2 shows the results of the Feria data base (Eurostat), which gathers data from reports of national professional associations. Although some statistical problems (e.g. coverage and methodological problems) persist, the overall results are significant. Germany is the exhibition industry's leading country, with the highest figures in the number of exhibitors, net rented area and foreign visitors. France could be considered as the second most important exhibition country, as it features the major European exhibition city, Paris. Exhibition activity is also significant in the United Kingdom, Italy, Spain and the Benelux countries. Compared to these, other EU countries have but a minor standing. The relative importance of the major European exhibition countries is shown in Figures 2 and 3. Considering the EU as a whole, each year the sector moves some 450 000 exhibitors all over

**Figure 1: Fairs and exhibitions**  
**The fairs and exhibitors world**



Source: Author

**Table 1: Fairs and exhibitions  
Economic weight, 1990 (1)**

	Number of fairs and exhibitions	Total direct spending (million ECU)	Number of persons employed
Belgique/België	190	900	26 000
BR Deutschland	600	5 000	144 000
España	250	1 700	49 000
France	600	2 700	78 000
Italia	700	2 500	72 000
Nederland	240	800	23 000
United Kingdom	660	1 500	43 000
Sub-total	3 240	15 100	435 000
Rest of EU	200	1 500	43 000
EU	3 440	16 600	478 000

(1) All data are estimates. Spending calculations are based on different reports from professional associations without a common methodology. Employment is calculated according to a factor of 0.37 jobs created per 12 900 ECU spent (EIF report). Compared to D, F and especially UK data, the rest of the countries can be considered as overestimated. Sources: AUMA report (D), FFSS report (F), EIF report (UK), Eurostat

**Table 2: Fairs and exhibitions  
Geographic distribution - Annual average over 1988-1991**

	Number of fairs covered	Number of cities covered	Net rented surface (thousand sq. m)	Number of exhibitors	Of which, foreign (1) (%)	Number of visitors (millions)	Of which, foreign (1) (%)
Belgique/België	19	3	443	6 530	10	2.30	7
Danmark	N/A	1	N/A	4 500	30	0.60	15
BR Deutschland	188	23	6 657	121 250	(2) 30	14.70	16
España	183	16	2 000	35 004	8	6.80	4
France	273	31	4 571	101 614	(2) 20	15.30	(2) 5
Italia	148	33	3 963	80 958	14	9.90	8
Luxembourg	8	1	162	3 071	24	1.10	N/A
Nederland	37	3	699	11 879	13	2.10	6
Portugal	46	2	259	7 424	17	0.90	3
United Kingdom	333	19	N/A	76 329	(2) 11	5.90	(2) 6
Sub-total	1 235	132	19 200	448 558	11	60.00	50
Rest of EU	30	3	300	2 000	N/A	3.00	N/A
EU	1 265	135	19 500	450 558	11	63.00	4

(1) Percentages of foreign exhibitors and visitors are medians of available data, including local and general non-international fairs. Because of aggregation procedures the percentages are undervalued, particularly in the most international places.

(2) Direct estimates made by AUMA (D), Paris-Nord Villepinte (F) and the EIF report (UK).

Source: Eurostat Feria Database based on European Trade fairs (B, NL), Bella Center (DK), FKM (D), AFE (E), OJS (F), AEFI (I), FIL (L), FIL-Bdo Binder (P), EIF (UK).

Europe, renting 20 million square metres of net area. Between 1988 and 1991, the number of fair visitors totalled 63 million.

### Recent trends

Since late 1991, the economic recession has affected the exhibition industry. As in other service sectors, the effects of the 1970's petrol industry crisis were negligible for the industry, whereas the effects of the recent crisis are still evident. As enterprises have tightened their marketing budgets, their exhibition budgets have been cut. Therefore, exhibitors scale down the area they rent and try to limit their spending at fairs. Visitors reduce their spending as well, but in some exhibitions the flow of visitors is increasing. In 1993 and 1994, the situation has varied widely by sector, country and individual exhibition. In some exhibitions, enterprises which formerly had decided not to attend now have returned; in others, they remain absent. Some enterprises trust in exhibitions' counter-cyclical effects and consider exhibitions as an important weapon for fighting against the recession. While some

countries still labour under the effects of a tough recession (France, Italy and Spain), the United Kingdom is displaying an impressively rapid recovery.

### International comparison

Although the major world exhibitions usually take place in Europe, the exhibition industry is also very important in the US and Japan. Although they do not share the same historical tradition, their exhibition sector has grown greatly in recent decades. In the US, exhibition activities began in the mid-1980's, creating a strong operation on the US economy. Some estimates given by the IAEM (International Association for Exposition Management) indicate that each year there are approximately 6 000 to 8 000 major exhibitions held, and that 85 million people, including international visitors, attend exhibitions in the US. The forecast for 1995 is that 90 million persons will attend. Lately, investments in the US, Japan and the south-eastern countries have become increasingly important. Atlanta, Los Angeles, Chicago, Las Vegas, Tokyo, Osaka,

Makuhari, Hong Kong and Singapore are some of the cities whose international positions are advancing. As a result, the international differences between Europe and the US and the Asian cities are becoming less significant than they were before.

### Foreign trade

The broad, Europe-wide F&E market involves a hefty volume of intra- and extra-EU trade. Unfortunately, the lack of statistics makes it difficult to find data on foreign trade. However, it is possible to estimate some trade figures by looking at the following variables: direct spending, percentage of foreign exhibitors and visitors and percentages belonging to the EU. Assuming the percentages of foreign exhibitors and visitors to be 20 % and 3 % on the average, and that exhibitor spending is around half of total spending, 12 % of total spending in a single country may be estimated to be made by foreign countries. In overall terms, that is more than 2 000 million ECU. It is mostly intra-EU trade, since more than half of foreign exhibitors and visitors come from EU countries. The rest may be divided into two parts: spending in country of origin (20-25 %) and spending in Europe. Thus, extra-EU exports may be estimated at 500 to 800 million ECU. EU spending in other countries cannot be estimated. The distribution of exports derived from spending can be seen in Figure 4.

## MARKET FORCES

### Demand

Most economic sectors use fairs as a tool for self-development. However, there are three kinds of sectors more liable to generate exhibitions. They are: sectors with vaguely-defined demand, technological changes and incomplete distribution networks; sectors with a high degree of innovation, such as the fashion textile and clothing sector; and sectors with a certain degree of imperfect or asymmetric information due to their scattered supply or demand or to widely differing processes or qualities. On the other hand, strongly concentrated manufacturing industries and some highly non-material service industries are less involved in exhibitions.

The relative importance of specialised exhibition sectors is shown in Table 3. Excluding general fairs because of their poor data coverage and increasingly clear differences with specialised exhibitions, the more important sectors are textiles and clothing, lifestyle, sports and other industries. Characteristics vary according to the indicators. For example, sectors open to the public (e.g. general fairs), make up a large portion of fairs, cities, exhibitions and visitors. However, they are less important in terms of foreign participation. Professional exhibition sectors, however, cover a wide range of fairs and cities, and some of them feature high percentages of foreign participation.

There are several reasons that would motivate a business to participate in exhibitions. The major functions of exhibitions may be summarised as shown in Figure 5. According to the European survey carried out by the Paris-Nord Villepinte exhibition centre, most enterprises decide to participate in order to develop a commercial policy (35.6 %) and to promote their own image (26.3 %). Other incentives are less definitive: to expand internationally (12.3 %); to study the competition (10.6 %); to make direct relations (8.1 %) and to launch new products (7.2 %). However, although some reasons are more important than others, the decision to participate in exhibitions usually involves an evaluation of a set of factors and depends on the company's size. Although a considerable part of the exhibition world is linked to major enterprises, small and medium-sized enterprises are participating more than before, becoming an emerging market.

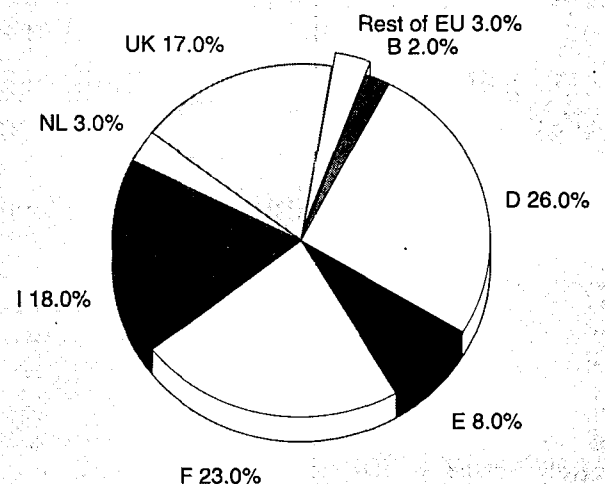
### Supply and competition

There are three categories of exhibition suppliers: 1) organisers, exhibition centres and professional organisations; 2) exhibition service firms such as stand constructors, consultancies, business services, restaurants, etc.; 3) the city where the exhibition is being held, which itself offers reception services such as hotels, infrastructure, transportation, local government policies, etc. Each category has its distinct problems and outlooks.

The major competition is concentrated around international fairs. Organisers, exhibition centres and local administrations try to attract exhibitions from the most powerful, narrowest segments of the market. In many economic sectors, no more than two to six international fairs can be held successfully during a single year. The leaders in this market are the German cities, with competition between Frankfurt, Köln, Hannover, Munich and Düsseldorf. In France, international exhibitions compete with one another for venues in Paris. In the UK, Birmingham and London compete for the British share of the international market. In Italy, Milan is the major city, though other cities, such as Bologna, host some important fairs. In Spain, Madrid and Barcelona hold the major exhibitions, followed by Valencia and Seville. In the Benelux countries, the main cities are Brussels, Amsterdam, Utrecht and Luxembourg. Other EU cities hosting international fairs are: Copenhagen, Helsingør, Lisbon, Braga, Athens, Thessaloniki and Dublin. Obviously, the more local the exhibitions are, the less competition they face. Scores of cities host hundreds of small and medium-sized exhibitions which play an important role in regional economic development.

Among the factors increasing competition in 1993 and 1994, two are noteworthy: the increasing demand for information, quality and prices, and the growing internationalisation of markets. Other competitive factors, such as the arrival of new mobile organisers or State intervention, hold much less relative importance than these other two, and depend on the country and sector. Prices have not changed significantly, although the situation is heterogeneous. Some countries are cheaper than the rest in terms of the cost of renting space (Germany and the UK, for instance). In other countries, prices can vary fourfold, depending on the individual exhibition. In any case, the real price of participating in exhibitions includes the costs of additional spending, living, transportation and, more im-

**Figure 2: Fairs and exhibitions**  
Geographic distribution of number of exhibitors - Annual average over 1988-1991



Source: Author



**Table 3: Fairs and exhibitions**  
**Fair and exhibition markets - Annual average over 1988-1991**

(%)	Number of fairs and exhibitions	Number of cities	Net rented surface	Number of exhibitors	Foreign exhibitors	Number of visitors	Foreign visitors
Agriculture, forestry, fishery, etc.	5	8	7	6	8	7	8
Food industry, restaurant & hotels, catering	6	8	5	7	6	5	4
Textiles & clothing, footwear & leather goods, jewellery	13	6	10	13	14	4	9
Public works, building, mining, completion & extension	5	7	7	5	6	4	6
Furnishing, household appliances, houseware, lifestyle, perfumery, arts & crafts	10	9	11	10	7	8	9
Health, hygiene, protection at work	3	4	2	2	2	1	1
Environmental protection	2	2	1	1	1	1	1
Transport, traffic	4	6	4	3	3	7	10
Information, communication, office, packaging, entertainment electronics	6	7	6	6	8	5	7
Sports, games, leisure, music	11	10	12	11	11	14	22
Other industries, trade, services, culture, education	13	10	10	12	10	7	8
Art & antiques	3	6	1	2	2	1	2
General fairs	15	14	20	17	10	33	8
Multibranch fairs	1	1	2	3	7	1	2
Other fairs (difficult to classify)	3	2	3	3	4	3	4
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Eurostat

portantly, the opportunity costs, i.e. the costs a firm will pay if it does not attend.

### Production process

Due to the vigorous competition and the unique features of F&E, innovative processes are highly important to the sector. New technologies are being used to provide technical facilities for stands and transportation. In addition, new spaces are being used to house complementary activities such as conferences, demonstrations, special meetings, etc. Finally, exhibition services are improving in quality and quantity. The first and last factors took the lead in 1993 and 1994.

A relative rise in staff specialisation through training courses could also be considered. However, training and professionalisation still have a long way to go before they offer real opportunities to industry participants. Organisers, as well as visitors and exhibitors, co-produce exhibitions, regardless of the type of education and specialised skills their deputies have. General and specific skills in the economic sector involved in the exhibition are much more important than specific exhibition skills. A major source of specialisation comes from the out-sourcing and externalisation of some (both routine and advanced) services, allowing for tighter concentration on the more important exhibition functions.

## INDUSTRY STRUCTURE

### Companies

Due to the large number of local exhibitions organised in Europe and the lack of statistics, the number of companies operating in the F&E market is difficult to estimate. At least 1 200 organisers exist in Europe. While most small cities organise only one or two major fairs, major cities can organise between 10 and 150 events. Some estimates put the overall turnover of organisers at some 4 000 million ECU. There are two main types of organisers: those which are exhibition centres as well as organisers, and those which operate independently of exhibition centres. The first type is more prevalent

in Germany, the Netherlands and Denmark. The separation of functions predominates in the UK, France and the United States. When organisation and exhibition centres are one in the same company, they usually are state-run, semi-public, or public institutions. When organisers are independent, they are usually professional associations or private non-state companies.

Some of these private companies are specialists in organising exhibitions only, and of those operating in Europe most are British. Such is the case of Blenheim Group PLC, Reed Exhibition Companies, Andry Montgomery Network, MacBrooks Exhibition Limited and EMAP International Exhibitions Ltd. Three of those producing important percentages of their turnovers in foreign countries are the Blenheim Group (80 % in France, Italy, Spain, Sweden, Denmark, the United States, Japan and Singapore), the Reed group, (65 % in France, Belgium, the Netherlands and Switzerland) and the Montgomery network (85 % in US, Germany, Saudi Arabia, Bangkok, Malaysia, Thailand, Singapore, Hong Kong, Indonesia, Australia, Africa and China).

Most of the rest of the major organisers are also exhibition centres. That is the case for all of the leading German centres, especially Messe Frankfurt, Leipziger Messe, Köln Messe, Messe München International, Düsseldorf Messe; and Messe Basel in Switzerland, the Ente Autonomo Fiera di Milano in Italy, and IFEMA and Fira di Barcelona in Spain. In some cases, the linked-to-exhibition-centre organisers have started to organise exhibitions far from their home city, in foreign countries, becoming a sort of hybrid of linked and unlinked organisers. These are represented by Messe Frankfurt, with exhibitions in the United States, Japan and Hong Kong.

The leaders in the exhibition centre segment are well represented by the European Major Exhibition Centre Association (EMECA). Most of the major European exhibition centres are members: Barcelona, Basel, Birmingham, Brussels, Frankfurt, Leipzig, London, Lyon, Madrid, Milan, Paris-Villepinte, Paris and Utrecht. Altogether, these centres represented 3.6 million square m gross built area, 272 thousand exhibitors

**Table 4: Trade fairs**  
**Major exhibition centers in Europe, 1993 (1)**

	Land area (hectares)	Gross built surface (thousand sq. m)	Net exhibition space (thousand sq. m)	Number of exhibitors	Number of visitors (thousands)	Number of exhibitions
Barcelona	25	140	116	19 765	2 054	33
Basel	9	267	151	16 845	1 188	33
Birmingham	147	256	158	33 761	2 153	108
Brussels	58	163	114	11 021	2 349	50
Frankfurt	40	540	274	38 455	2 285	49
Leipzig (2)	60	250	179	11 350	850	51
London	17	225	104	17 000	2 795	117
Lyon	108	119	93	5 228	953	23
Madrid	97	210	103	16 333	1 653	41
Milan	38	510	304	35 231	2 262	71
Paris-Villepinte	110	276	164	32 436	1 281	38
Paris	36	440	212	21 895	3 500	105
Utrecht	26	209	108	12 762	1 282	65
Total	(2) 771	3 604	2080	272 082	24 605	784

(1) Major non-members of EMECA are Hanover, Dusseldorf, Cologne, Munich, Vienna and Valencia.  
 (2) The figures refer to the old exhibition center. The new center will be opened at the end of 1995.  
 Source: EMECA

and close to 25 million visitors in 1993 (see Table 4), and they held almost 800 exhibitions in all. These data show how concentrated the sector is in the major exhibition divisions. The Major Exhibition Centres, members of EMECA, represent roughly 20 % of the global market in terms of the number of fairs, but considering the number of exhibitors assessed for European countries (for both large public and professional exhibitions, source Eurostat), they should represent up to 50 %. A great number of exhibitions held in EMECA Members' facilities are trade exhibitions and are very internationally-oriented: 66 % of their exhibitors attend international exhibitions while 34 % attend national and regional ones.

### Strategies

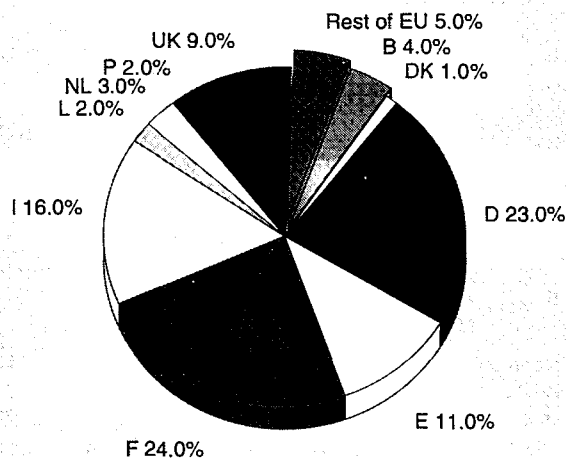
During the economic recession, dynamics of the F&E business have remained vigorous. Competition has not stopped. Most international exhibitions operate in narrow markets, where only a few cities can possibly come out on top. The major international exhibitions are held in Germany. In many sectors,

the remaining countries look to secure second- or third-place positions.

Three strategies can be discerned which result from the current dynamics:

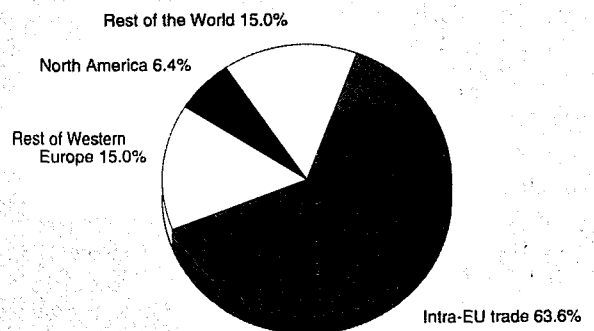
- **Investments:** The economic recession might be expected to mean a reduction in investments. However, the dynamic context of the sector has averted reductions, and there has been a surge in investments. Cities and local governments are investing in exhibition centres; organisers and exhibition centres are investing in new services. The case of Frankfurt Messe is illustrative of this, as it has put money into organising exhibitions in the US and Asia.
- **Innovation:** The changing factors are forcing organisers and exhibition centres to outline more careful strategies, with an aim to reducing costs and improving the quality of the exhibition services. Customer service has become

**Figure 3: Fairs and exhibitions**  
**Geographic distribution of number of visitors - Annual average over 1988-1991**



Source: Author

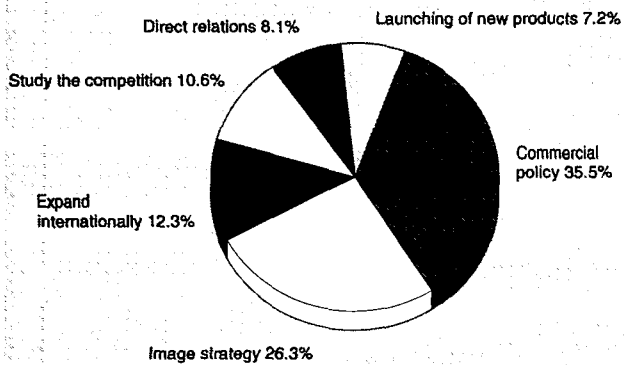
**Figure 4: Fairs and exhibitions**  
**Distribution of EU exhibition exports, 1990 (1)**



(1) Estimates  
 Source: Author



**Figure 5: Fairs and exhibitions**  
**Exhibition participation - Explanatory factors, 1992**



Source: Paris-Nord Villepinte Tenth Anniversary

a priority, and service professionalisation is therefore on the upswing.

- Specialisation: Organisers look for more professional, better-specialised exhibitions, so, for example, the separation between open public days and professional days remains important. Major cities and exhibition centres, however, look for a diversification of sectors and exhibitions in an attempt to get the most out of the potential exhibition days that an exhibition centre can hold. On the other hand, some medium and small cities are highly specialised in one or two sectors, which are sometimes very international. This is the case of Bordeaux (Vinexpo), Cannes (Midem), and Oslo (Nor'Shipping'), Nürnberg (Toys), among others.

### Impact of the Single Market

All the measures targeted in the Single Market Programme are of importance to this sector. However, the international and mobile character of this sector has in effect had the consequence that measures designed to enhance the freedom within the European Community were taken long in advance of the inception of the Single Market. Examples are the free movement of persons, goods and capital and certain measures concerning direct and indirect taxation.

Any effect that the inception of the Single Market Programme may have had in terms of turnover, number of visitors, etc., was probably offset by the most recent recession, making an exact quantification of the effects nearly impossible.

- The remaining internal barriers are particularly those linked to language differences and differences in culture. In considering external barriers, one has to appreciate that this sector already operated in a global environment. Therefore, the inception of the Single Market has not significantly improved the internal movement of goods and services as compared to business with non-European Union countries.

### REGIONAL DISTRIBUTION

F&E play a key role in regional development. Exhibition activities generate regional spending and business in both the short and long term. In the short run, exhibitions mean spending from visitors and exhibitors. This professional tourism involves accommodation, transport, communications, business services, leisure services, etc. Such spending is always positive for host regions and cities, regardless of the exhibition's success. But the success of an exhibition also involves additional

short-term economic benefits when new contracts, distribution networks and business are achieved.

In the long term, exhibitions can be a key factor in developing some sites, since political support runs parallel to the exhibition centres' growth and infrastructure needs. From the business point of view, exhibition sectors obtain some long-term benefits since a certain rationalisation and reorientation of production and consumption is spurred on by exhibitions.

There is a certain relationship between regional economic welfare and exhibition development. However, factors other than regional economic income explain an exhibition's success. Exhibitions are located in cities that feature one or more of these factors: tradition, population, income, infrastructure, conditions appropriate for tourism, public investment and support policies, international city standing, exhibition centre size and regional industrial composition. The top exhibition cities are led by Paris, followed by the German cities of Frankfurt, Hannover, Cologne, Düsseldorf and Munich, as well as Milan, Birmingham and London. Bologna, Barcelona, Madrid, Amsterdam, Berlin, Valencia, Utrecht and Essen are also important. Ranking and classifications vary widely, according to the criteria on which they are based.

### ENVIRONMENT

F&E can also be used to test and promote environmental policies. New exhibition centres are rather like pilot cities, in which new methods of organisation are tested. These are the main areas in which F&E tend to contribute to a better environment: a) spatial distribution (helping to clear congested areas); b) classification of constructions (low-rise buildings, modern lines, safe structure); c) transport organisation (intensive electric transportation, close to airports); d) waste treatment (new processes for ecological waste treatment); e) green areas and reforestation. Once an exhibition centre organises its own urban development, it begins generating positive external economies. Technological hubs, enterprise investments and infrastructure can arise, improving economic growth rates and local living conditions.

During recent years, agents have focused on waste treatment processes. German cities in particular are studying new possibilities to procure an effective ecological system for recycling and eliminating waste material generated at fairs and exhibitions.

### REGULATIONS

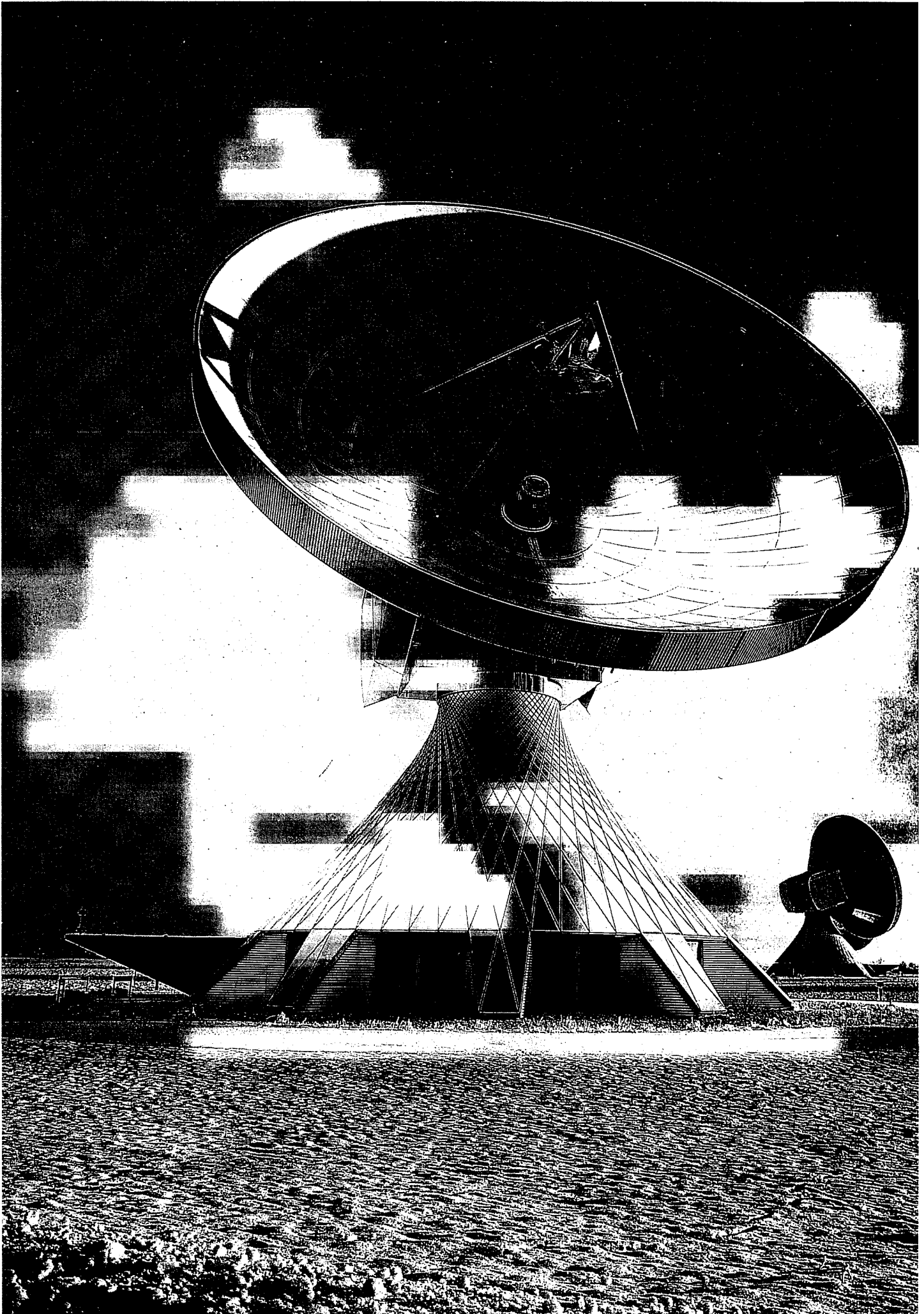
The State has a considerable influence on the sector. Local, regional and national administrations have certain tools for regulating, controlling and promoting F&E activities. The use of these tools varies from country-to-country (e.g. differences between Germany and France) and city-to-city (e.g. differences between Birmingham and London). Some governments are more interventionist than others. In general, there are two levels of possible participation, one legal and the other economic.

- Regulation issues: Regulation of general activity and the granting of rights (specific laws); granting of licenses and permits for developing activities; restrictions on product imports (soon to end, due to the Single Market); criteria of recognition (e.g. nationality).
- Economic issues: Support for exhibition centres (investments in infrastructures, exhibition centre improvements); economic aid for supply (subventions for organisation, subventions for invitations and participation, special fiscal handling); economic aid to demand (export policy instruments, subventions for an enterprise's participation).

Recent trends imply that legal issues and regulations are losing their importance, while the role of economic issues is aug-







## NACE 839.2

The EU software and computing services market reached a market volume of 63 billion ECU in 1994, representing the second largest market in the world. Between 1992 and 1994 the market grew by 4.4 % per year, and an annual growth of 5.6 % is anticipated for 1994 to 1996. The software products segment generally shows higher growth rates than does the services segment. The still very fragmented market structure is going through a globalisation and concentration process. New multimedia applications and the emergence of a pan-European information infrastructure have created a huge growth potential for the market.

### INDUSTRY PROFILE

#### Description of the sector

The software and computing services sector comprises different kinds of software and services activities which usually are split into the following categories:

- systems software and utilities to operate hardware, ensure program integrity, etc.;
- application software, i.e. programs which provide packaged solutions for specific applications;
- professional services, which comprise customised or contractual software development or services;
- processing services, classified as bureau-type services for problem-solving and transaction processing based on the time charged or transactions processed;
- network services, that is, chargeable services for management, processing and messaging; and

Many of these activities are interrelated with the IT hardware sector. Strong relations also exist between the telecommunications hardware and services sector and the electronic information services sector.

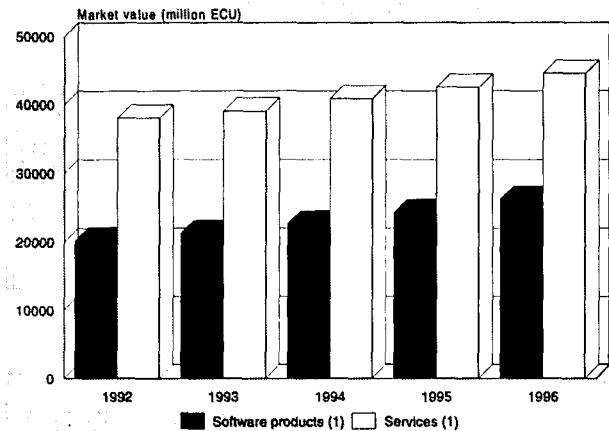
With 63 billion ECU in 1994 the software and computing services market represents 56 % of the total IT and 26 % if telecoms hardware and services are included. Outside the sector, one sees that the EU software and computing services market is three times the size of the market for electrical household equipment.

#### Recent trends

Whereas the software and computing services market in the 1980s showed double-digit growth rates, the market in the 1990s is following a more moderate growth pattern. In 1994, the market grew by 5.3 % to 63 billion ECU and is expected to show growth rates of above 5 % in 1995 and 1996. Thus, software and computing services will remain one of the major forces driving the whole IT market (see Table 1 and Figure 1). The software products market, with 22.5 billion ECU in 1994, represented 36 % of the total market volume and realised a growth of 6.4 %. In 1995 and 1996 a growth of 7.5 % and 8.0 % is anticipated for this segment. This above-average growth of software products is mainly due to the ongoing shift from large range hardware systems to smaller computer systems.

Within the software products market, system software reached a market volume of 10.5 billion ECU in 1994 and realised a growth of 5.0 % against the previous year. With growth

**Figure 1: Software and computing services EU market for software and services**



(1) Expressed in constant exchange rates of 1993.  
Source: EITO

rates of 5.8 % in 1995 and 6.3 % in 1996 predicted, growth will remain stable.

The application software market is further profiting from the ongoing hardware downsizing and standardisation of solutions on the one side, and the spread of PCs with packaged software solutions into the small office / home office (SOHO) and private consumer markets on the other. Between 1992 and 1994 the application software market grew yearly by 6.9 %, reaching a market volume of 12 billion ECU. For 1995 and 1996 growth rates of 8.9 % and 9.4 % are envisaged. Due to an ongoing price decline in this market segment, these growth rates do not take into account the increasing penetration of application solutions in the market.

With 40.9 billion ECU, computing services represent 64 % of the software and services market. And, with an average growth rate of 3.6 % between 1992 and 1994, the development is far more moderate than in the software products domain. This will continue into 1995 and 1996, when growth rates of 4.2 % and 4.7 % are anticipated (see Figure 2).

Market share and growth differ significantly within the service segments. Professional services, with 20.1 billion ECU or 49 %, represented the largest services segment in 1994. Between 1992 and 1994 this segment grew by 6.0 % per year and growth should remain at this level in 1995 and 1996. The driving forces of this segment are IT consulting and outsourcing, whereas individual software processing is affected by the transition to standardised application solutions.

Due to the ever-increasing trend towards client-server applications, distributed computing network services realise the highest growth rates in the services sector. Network services grew yearly by 11.7 % between 1992 and 1994, and growth rates of 14.0 % and 15.5 % for 1995 and 1996 respectively will keep software and services the fastest growing segment.

#### International comparison

Western Europe represents the second largest world market for software and services (see Table 2). Of the world market volume of 223 billion ECU in 1994, the US held 44 %, western



**Table 1: Software and computing services  
West European market by segment (1)**

(million ECU)	1992	1993	1994	1995	1996
<b>EU</b>					
Systems software	9 555	10 010	10 507	11 115	11 812
Application software	10 527	11 163	12 021	13 095	14 327
Software products, total	20 082	21 173	22 528	24 210	26 139
Professional services	17 896	18 669	20 109	21 266	22 579
Processing services	6 852	7 147	7 473	7 813	8 183
Network services	1 318	1 455	1 644	1 874	2 165
Hardware maintenance and support services	11 998	11 783	11 643	11 641	11 667
Services, total	38 064	39 054	40 869	42 594	44 594
Software and services, total	58 146	60 227	63 397	66 804	70 733
<b>EFTA</b>					
Systems software	1 327	1 420	1 542	1 682	1 831
Application software	1 080	1 128	1 246	1 359	1 472
Software products, total	2 407	2 548	2 788	3 041	3 303
Professional services	2 917	3 186	3 454	3 723	3 994
Processing services	1 470	1 486	1 506	1 513	1 523
Network services	284	313	343	388	425
Hardware maintenance and support services	1 588	1 574	1 560	1 557	1 577
Services, total	6 259	6 559	6 863	7 181	7 519
Software and services, total	8 666	9 107	9 651	10 222	10 822
<b>EU+EFTA</b>					
Systems software	10 882	11 430	12 049	12 797	13 643
Application software	11 607	12 291	13 267	14 454	15 799
Software products, total	22 489	23 721	25 316	27 251	29 442
Professional services	20 813	21 855	23 563	24 989	26 573
Processing services	8 322	8 633	8 979	9 326	9 706
Network services	1 602	1 768	1 987	2 262	2 590
Hardware maintenance and support services	13 586	13 357	13 203	13 198	13 244
Services, total	44 323	45 613	47 732	49 775	52 113
Software and services, total	66 812	69 334	73 048	77 026	81 555

(1) Expressed in constant exchange rates of 1993.  
Source: EITO

Europe 33 % and Japan 15 %. With 119 billion ECU projected for 1996, the US will reach a world market share of 45 %, whereas western Europe - with 82 billion ECU or 31 % - will lose some of its share (see Figure 3). Japan's share is expected to stabilise at 14 %.

This shift in market share is due to the fact that between 1994 and 1996 the US market (22 %) will grow twice as fast as the West European market (12 %) and the Japanese market (9 %). The world market in total will grow by 18 % during this period. As an emerging market, Eastern Europe will realise a market growth of 27 % between 1994 and 1996, though the market volume will stay very low, with only 1.8 billion ECU.

Structural differences also exist between the major world market regions. While in western Europe software products made up 35 % of the total software and computing services market, this share was 31 % in the US and only 19 % in Japan in 1994. The share of software products will increase in all three regions through 1996. The highest increase in software products will be gained by Japan with a share of 24 % in 1996. This can be explained by Japan's later shift from proprietary to open solutions.

## MARKET FORCES

### Demand

As the data processing budgets of European users are currently stabilising, they tend to choose the most cost-effective solutions regarding their software supply. Together with the shift from mainframe-based to client-server and open solutions, packaged software solutions clearly benefit from this development. Additionally, due to the ongoing price decline in the software products market, more and more users benchmark their internal software and service departments against independent providers. In a 1993 users' survey taken in the four major European countries (F, UK, D and I) for example, 44 % of users expected an increase in their packaged software investment, whereas only 9 % expected a decrease. Keeping in mind the price decline of packaged software, this implies a substantial shift away from individual software and towards software products.

Furthermore, professional users are undergoing a substantial business re-engineering process in the direction of inter-operability and communication of different business functions and are even linking suppliers with customers. This has implications on the need for software solutions as regards portability. This trend on the user side also favours standardised, packaged software product solutions. Another fast growing

**Table 2: Software and computing services**  
**World market value by major regions (1)**

(million ECU)	Software		Services		Software and services	
	1994	1996	1994	1996	1994	1996
Western Europe	25 316	29 442	47 732	52 114	73 048	81 556
Eastern Europe	436	552	956	1 215	1 392	1 767
USA	30 402	38 430	67 360	80 922	97 762	119 352
Japan	6 404	8 029	26 916	28 384	33 320	36 413
Rest of world	3 691	6 180	14 167	17 527	17 858	23 707
World	66 249	82 633	157 131	180 162	223 380	262 795

(1) Expressed in constant exchange rates of 1993.  
 Source: EITO

user segment is private households which, due to their special needs and price-sensitivity, push the development of the software products market even further.

Regarding user attitudes on services, no distinct picture of the future development can be drawn. On the one hand, a relative decline of user demand in traditional hardware support services is brought about by the shift from mainframe-based to computer-based solutions. On the other hand, the increasing complexity of the IT systems (distributed computing, local and wide-area networks) generates an important demand in the IT management support and training on the user side. As a result, outsourcing of the whole or partial management of the information system has become a specific issue for IT users, though in Europe it is still very limited as regards market value. The above-mentioned 1993 survey on IT user trends also showed that 75 % of the users interviewed did not anticipate any need for data centre outsourcing services.

Demand by end market shows a different pattern. Table 3 shows that European IT expenditures in 1993, not including the branch for packaged software, generally grew on a two-digit level and with an average rate of 12 %. For the different vertical markets, the increase was at least twice as high as for the expenditures in outside services, which showed an average increase of 6 %.

The private home use of IT is a new potential area of strong demand. Compared to the traditional professional industrial and services market, it is likely to outrun the traditional customer base for software and computing services. Already, nearly 50 % of the PCs sold are purchased by private cus-

tomers, so the packaged software products which are easy to use in the home will be the first to tap into this market.

Additionally, new applications for home use (e.g. home banking and shopping, interactive television, etc.) are just starting to penetrate the market. Thus, new demand is emerging for the computing services as facilitators and providers of the necessary tools for these applications. However, this new demand will not arise directly from the homes but rather from the professional vendors of these new applications and services.

### Supply and competition

Within the software and computing services market there exist different types of vendors, each with a specialised product focus. The market is shared by hardware vendors, independent software vendors and independent services vendors. The latter focuses largely on special services like facilities management, processing services, IT consulting and training.

Within the software products segment, hardware vendors accounted for 41 % and independent software vendors for 59 % of the 1994 market (see Table 4). In addition to their traditionally strong position in the systems software market, hardware vendors - due to the trend of bundling hard- and software to a complete IT solution - play a key role in packaged software as well. As PC solutions have an increasing share of the hardware market and, as independent software vendors have a dominant position in this market segment, the market share of hardware vendors in the software products market will decline from 43 % in 1992 to 40 % in 1995.

**Table 3: Software and computing services**  
**European information technology expenditure growth by end market, 1992/1993**

(%)	Total expenditure	Outside services	Packaged software
Banking	3.8	4.5	10.0
Insurance and other finance	3.3	6.1	11.1
Discrete manufacturing	0.6	3.9	8.3
Process manufacturing	1.2	7.1	21.1
Health care	-3.0	2.9	4.0
Business and other services	4.6	5.9	10.4
Transport/communication utilities	1.1	5.8	10.4
Retail trade	1.7	9.5	20.1
Wholesale trade	0.1	5.3	12.9
Government	2.6	5.5	12.3
Education	4.2	5.2	14.8
Other	5.0	-3.0	2.1
Total	2.3	5.9	12.3

Source: EITO



**Table 4: Software and computing services  
Market share by type of vendor**

(%)	1992	1993	1994	1995
Software products				
Hardware vendors	43	43	41	40
Independent software vendors	57	57	59	60
Professional services				
Hardware vendors	15	15	16	16
Independent software vendors	85	85	84	84

Source: EITO

Key players in the software products market are US-based vendors, especially for systems and horizontal software. The major focus of European-based software product vendors is on vertical software solutions. In the global software market environment, Japanese vendors have not been (and are not expected to be) active. Due to the relatively high labour costs of software development, several European and US-based software product vendors have started to have their software products developed by companies in Eastern Europe and India, where cheaper labour is available.

Computing services is the domain of independent software and services vendors (see Table 5). In the professional services market in 1993, independent software vendors had a market share of 78 % against 22 % for systems vendors. This is due to the fact that in the services sector it is essential to be close to the customer; and social, cultural, administrative and regulatory issues have to be taken into account. Therefore, the majority of services vendors focus on regional and country markets. In the professional services segment in 1993, independent European software vendors held a market share of 63 % compared to 15 % for US-based independent software vendors.

Nonetheless, the competition on the traditional market for independent computing services vendors is increasing. Hardware vendors are improving their services on the facilities management and systems integration side and are able to provide services not only all over Europe, but, in fact, to customers worldwide. In addition, due to new applications and services in the realm of multimedia and information superhighways, new competitors (like telecoms carriers and media vendors) have arisen in the services environment. This development also favours globally-oriented vendors, which profit from their critical size. As a consequence, the smaller, local software and services vendors increasingly will lose market shares.

### Production process

Software technologies and product features play a key role in the user acceptance of IT solutions, as well as in the competitiveness and effectiveness of software vendors. Two recent trends are described below.

- Systems software: the increased use of open standards like X/OPEN and UNIX and the enduring lead of PC operating systems in connection with graphical user interfaces. The market tends to promote object-oriented solutions and a move towards relational and distributed database management systems.
- Applications software: As IT has become a nearly universal tool within the professional environment and is just penetrating private households, the requirements have changed substantially in this segment as well. Applications software now has to provide tools and serve the professional users' needs for interactive communication, information, coordination and cooperation via local or wide-area networks, so that groupware concepts and management information systems and work flow automation become more common.

**Table 5: Software and computing services  
Professional services - Market share by vendor type**

(%)	1993	1996
Systems vendors	22	25
US-based independent software vendors	15	17
European-based independent software vendors	63	58

Source: EITO

For all these new solutions, it is essential that the user has the same object-orientated command structure so that s/he can easily change between different applications. Due to these developments, application software vendors are directed to provide cross-platform applications. Furthermore, by emerging object-oriented programming, vendors expect encapsulation and reuse of software in order to shorten development time and to increase their ability to respond more quickly and flexibly to market needs.

## INDUSTRY STRUCTURE

### Companies

It is estimated that more than 16 000 software and services companies with over 300 000 employees exist in western Europe. The vast majority of these companies have less than 20 employees, and several of those are companies with no more than five employees. Only a few large software and services vendors are in the market. Most of these larger companies are located in the UK, France and, to a lesser extent, in Germany. This group of vendors mainly has pan-European activities, whereas most of the smaller and medium-sized vendors are often regionally focused.

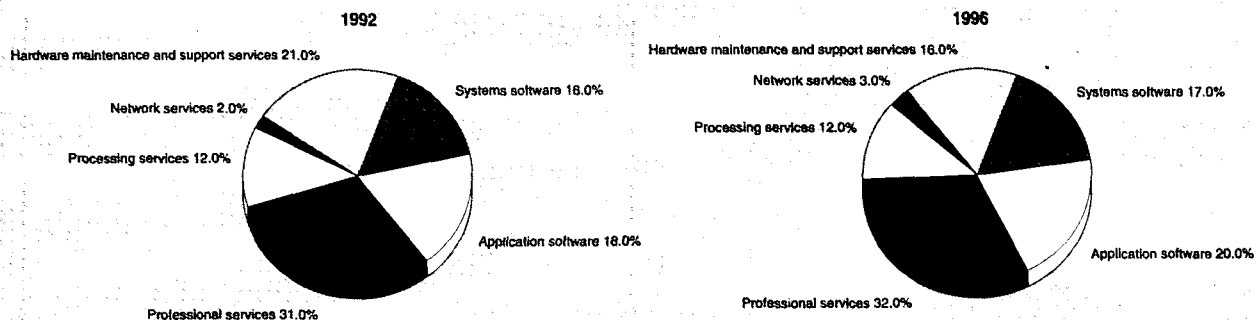
The software and services market is experiencing an increased concentration of market share though. The top seventy vendors in western Europe represented 63 % of the packaged software market and over 70 % of the professional services market in 1993. Table 6 shows the development of market shares of the top ten vendors in the larger EU country markets between 1991 and 1993. Whereas concentration in the software market for France, Germany and the UK has reached about 20 % market share of the top ten vendors, in Italy the market is still more fragmented with 14 %. In the services market of Italy and the UK, the top ten vendors hold a market share of more than 30 %. At the same time, the top ten vendors in France and Germany obtained a market share of only about 20 %.

### Strategies

As customer requirements have changed substantially recently, the future success and market position of software and service



**Figure 2: Software and computing services  
EU software and services market by segment**



Source: ETO

vendors will depend on which strategy is followed to fulfil these new requirements. For systems manufacturers, the key issues are technology ownership, international infrastructure and the ability to provide global integrated solutions.

The success of independent software vendors will depend on competitive prerequisites like having a global market and strategic scope, as well as a global infrastructure and international presence to service customers while covering a large number of vertical markets. In addition, it is decisive for services vendors to have the capacity and ability to address business process re-engineering needs and to leverage on the experience and scale economies from larger contracts. These new customer requirements lead to the need for large-sized vendor structures.

Whereas this trend favours systems manufacturers and US-based independent software and services vendors which already operate on a global infrastructure, European vendors have just begun to adjust their portfolio according to these requirements. Consequently, several major mergers and acquisitions, joint ventures and alliances have taken place in the last few years. The main strategies behind this concentration trend are: synergies, scale-economies and cost-cuts in R&D; completion of the product portfolio; and broadening of the customer and country base.

For systems vendors and suppliers of software and services alike, the major focus in regard to M&A is the completion of their product portfolio to strengthen their position in the field of systems integration. Independent services vendors primarily try to strengthen their pan-European presence. For independent European software vendors, all three major strategies lead to a variety of mergers, acquisitions and joint ventures.

A new form of acquisitions and alliances has emerged. It is the strategic repositioning against the background of multimedia applications and the building up of the information superhighways. In this context, traditional software and services vendors are joining forces with telecoms, media and consumer electronics vendors.

#### Impact of the Single Market

The software and computing services industry is largely composed of SME's operating at a local level. Even multinational groups are composed of independently operating national subsidiaries. The major exception is the packaged software sector which is dominated by US producers. The industry has therefore been relatively little affected at least directly by Single Market measures on the free movement of goods and people and the provision of services. Nevertheless, the Single Market has encouraged companies to expand internationally in order

**Table 6: Software and computing services  
Industry concentration - Top 10 vendors market share**

(%)	1991	Software 1992	1993	1991	Services 1992	1993
Belgique/Luxembourg	12.6	14.8	20.6	12.2	21.1	19.5
Danmark	12.7	14.9	19.6	24.2	44.8	16.8
BR Deutschland	12.9	18.0	20.8	9.9	16.2	19.8
España	11.7	14.3	34.1	33.8	26.1	50.1
France	23.5	19.0	22.8	23.5	33.4	22.3
Italia	14.0	13.2	13.9	45.0	40.1	30.8
Nederland	10.4	12.8	22.2	73.7	67.7	34.9
United Kingdom	17.4	17.1	21.9	23.5	30.9	32.7
Österreich	5.3	9.8	20.4	12.6	15.8	15.9
Suomi/Finland	33.8	23.6	37.5	35.2	30.2	26.2
Norge	16.3	26.0	27.8	21.4	25.0	14.2
Sverige	15.6	17.9	26.4	26.3	22.4	26.5
Schweiz/Suisse	3.8	5.6	14.9	10.1	11.6	7.6

Source: ETO



**Table 7: Software and computing services  
Market value by country (1)**

(million ECU)	1992	1993	1994	1995	1996
Belgique/Luxembourg	2 072	2 136	2 219	2 321	2 416
Danmark	1 659	1 705	1 783	1 882	1 977
BR Deutschland	18 020	18 907	19 950	21 164	22 485
Heilas	119	149	178	214	261
España	2 081	2 022	2 072	2 184	2 363
France	12 867	13 071	13 511	14 232	15 089
Ireland	234	260	288	319	345
Italia	7 320	7 465	7 625	7 930	8 351
Nederland	3 248	3 367	3 518	3 688	3 878
Portugal	257	274	293	315	342
United Kingdom	10 269	10 873	11 961	12 556	13 224
EU	58 146	60 229	63 398	66 805	70 731
Österreich	1 341	1 415	1 520	1 647	1 787
Suomi/Finland	848	866	909	954	998
Norge	1 317	1 387	1 449	1 510	1 570
Sverige	2 493	2 613	2 748	2 862	2 981
Schweiz/Suisse	2 665	2 826	3 026	3 248	3 486
EFTA	8 664	9 107	9 652	10 221	10 822
EU+EFTA	66 810	69 336	73 050	77 026	81 553

(1) Expressed in constant ECU of 1993.  
Source: EITO

to take advantage of public procurement or to follow clients who themselves have been encouraged to expand internationally. In this way big companies are becoming bigger and competition is becoming stronger, especially for small companies.

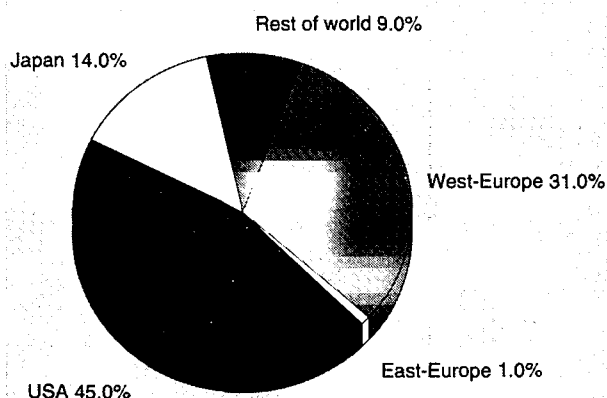
#### REGIONAL DISTRIBUTION

Table 7 shows that the EU software and services market follows the general economic weight of the individual EU countries. France, Germany, Italy and the UK alone represented 84 % of the total market in 1994 (see Figure 4). These are also the countries where the majority of software and services vendors are located and the larger vendors are based. With no more than 0.5 % each, Greece, Ireland and Portugal have the lowest share on the EU software and services market.

Counter to 1992 and 1994, no shift in the country share will occur until 1996. The smaller country markets could realise the highest growth rates between 1994 and 1996. For instance, while France and Germany will grow by 5.7 % and 6.2 % annually in this period, Greece and Ireland can achieve an annual growth of 21.1 % and 9.4 %, respectively.

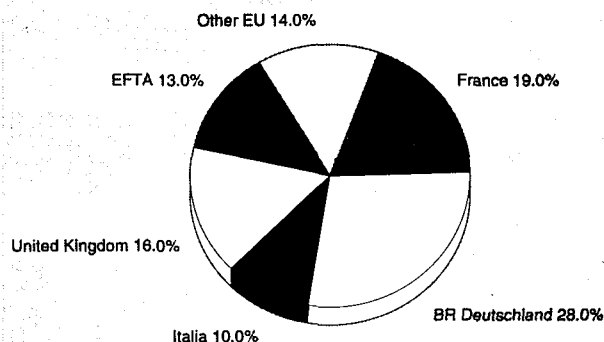
Within the EFTA countries, Sweden and Switzerland have the largest markets for software and services, comprising 60 % of the total 1994 EFTA market. Between 1994 and 1996 EFTA countries will realise an average annual growth of 6 %, which is similar to the EU growth. The EFTA countries together represent 13 % of the combined EU and EFTA software and services market in 1994.

**Figure 3: Software and computing services  
World software and services market by region, 1996**



Source: EITO

**Figure 4: Software and computing services  
West-European software and services market by major  
country areas, 1994**



Source: EITO

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## REGULATIONS

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In order to promote the competitiveness of European industry and the efficiency of public services, the European Commission launched a new Telematics Applications Programme for the period of 1994 to 1998 which is based on several of the EU initiatives from the last five years. The program's emphasis is on new multimedia telematics, the importance of user requirements and finding affordable solutions. The program foresees the following sectors:

- telematics for administrations: tools and support services for trans-European applications;
- telematics for transport: network management, operation, control and services for travelling, freight and fleet operations;
- telematics for research: remote collaboration, teleworking and information services;
- telematics for education and training: innovative tools and applications;
- telematics for libraries: applications and services for interconnected services and access to networked information resources;
- telematics for urban and rural areas: teleworking and tele-services;
- telematics for health care: telemedicine and new services;
- telematics for the disabled and elderly: information and communication systems;
- exploratory actions;
- telematics engineering: process re-engineering and application engineering;
- language engineering; and
- information engineering: electronic publishing, information dissemination and retrieval.

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## OUTLOOK

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Regarding the future development of the European software and services market, three major trends can be observed. They are: the globalisation and concentration on the supply side, the penetration of new markets and, finally, growing inter-connectivity.

Local European country markets increasingly will open up to outside competition, thus enforcing local software and services vendors to globalise in the same way. In order to stay competitive, they will need to build up scale economies and a trans-European infrastructure. This development will lead to an increasing concentration within the European market as the globalisation process encourages mergers, joint ventures and alliances between the small and medium-sized independent software and services vendors.

As the traditional professional market segments mature, IT vendors are focusing their activities on the small and home office market, as well as on the private home market, where a huge potential for growth exists. Packaged software vendors will be the main beneficiaries of this development and, as far as horizontal solutions are concerned, the large international software vendors will maintain their dominant position. In the vertical solutions environment, independent European vendors will have a potentially stronger position, as they are nearer to the customer and can benefit from their better knowledge of the specific requirements of SMEs.

The globalisation process on the customers side and the spread of distributed computing and client-server-architectures against the background of business process re-engineering will further increase the market for software and services solutions, which serve the need for a free flow of information and interactive communication of data, voice and video via local and wide-area networks. The emerging private home market and the building up of a pan-European information infrastructure represents a huge potential for new applications and services addressed to new groups of customers.

Written by: Eurobit

The industry is represented at the EU level by: European Computing Services Association (ECSA). Address: Avenue de Cortenbergh 79-81, B-1040 Brussels; tel: (32 2) 736 6003; fax (32 2) 736 6004.



# Electronic information services

## NACE 839.2

Total revenues of professional electronic information services and products are rapidly increasing: they reached 4 212 million ECU in 1992, that is 21.4 % more than the previous year. More than 86 % of the revenues came from on-line services, while just 2.3 % came from professional audiotex services and 11.2 % from off-line information products.

The most consulted on-line information services are, by far, financial and business data bases: altogether they account for 87 % of the total turnover of the on-line information market, while scientific and technological databases, government, news and other databases account for 13 % of the EU market. Most of the segments operate internationally, like the financial and scientific information services. In these markets global suppliers are the most important players. In spite of the increasing dominance of the USA competitors, Europe has several world ranking information and publishing corporations that can compete globally. In some other important segments of the market, like in the company profiles one, national suppliers are the most important players because they have a deep knowledge of their domestic market.

Banking, financial and other services companies are the most important users of professional services. However, thanks to the development of audiotex and CD-ROM, the mass market is also growing in importance. Audiotex proves to be a very fast growing medium. The diffusion of videotex services, on the contrary, is very slow, with the notable exception of Teletel services in France. The substantial growth of optical media such as CD-ROM is particularly noteworthy and announces the birth of the new consumer information market in the EU.

### INDUSTRY PROFILE

#### Description of the sector

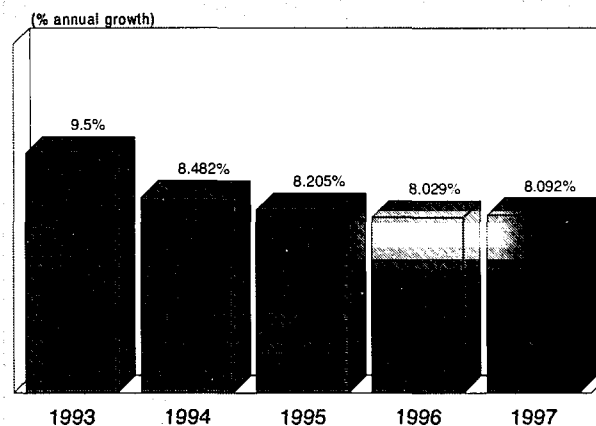
The sector includes on-line and off-line electronic information services, such as on-line databases, real time or not real time electronic information and CD-ROM databases. The major companies in the sector come from different categories of business: they can be publishers, information brokers, computer vendors or software producers.

Professional electronic information is related to various fields, like financial data, market research, business information, international and national laws and regulations, news, science and technology, or patents. In fact, the field of information that can be provided electronically is unlimited and growing continuously.

In the 1970s, when on-line services started developing in Europe, they were highly linked to the science and technology field and the majority of databases were on scientific subjects and came from public organisations. Afterwards, electronic information services increasingly became a specific business area through the growth in popularity of the financial and economic databases.

Videotex technology was introduced in the early 1980s by telecom carriers that wanted to offer easy access to information (data, text, graphics) via telephone lines. Videotex is billed to customers through a central billing system (or kiosk). Audiotex services (information and entertainment services offered via telephone by private and public companies and also billed through a kiosk system) were launched by EU telephone carriers in the late 1980s and early 1990s.

Figure 1: Electronic information services  
Worldwide online service sales forecast



Source: Simba/Communications Trends

Internet, the computer "network of networks" that supplies on-line services to over 30 million users worldwide and 7 million users in Europe in 1994, offers growing opportunities for the electronic information services industry. This network, in effect, gives access to a huge community of users, and offers possibilities to target specific user groups. The number of Internet users increases by one million each month. Recently initiatives have been announced in order to create commercial "areas" on the Internet network, like CommerceNet. In the EU the Internet commercial services are offered by EUNet, which announced to have 10 000 customer organisations in Europe in 1993; additionally, there are many Point of Presence suppliers (e.g. Demon, Inet, PTT Nederland, etc.) who may use EUNet facilities but who market their services separately.

CD-ROM and other off-line optical media were introduced into the professional market in the 1980s, but made large inroads in the consumers market in the 1990s. The CD-ROM information industry is composed of publishers and computer companies. CD-ROM titles comprise subjects like: general interest and leisure, arts, humanities, education and training, computers and computer programmes, advertising, design, marketing, business, languages, law and science.

The Information Market Observatory (IMO), being part of the European Commission DGXIII, strives to improve the knowledge and understanding of the European electronic information services markets. It has co-financed a joint undertaking of associations and research institutions in the EU Member States to analyse the European supply of electronic information services. This survey was coordinated by EIIA (European Information Industry Association) and the results have been published in an EIIA report in 1993.

#### Recent trends

The electronic information services sector is very dynamic and has posted continuous growth over the recent past: from 1989 to 1992 turnover in current prices increased by 19.2 % annually, faster than the economy as a whole and also faster than other dynamic markets of the information technology sector. In spite of this, electronic publishing still represents a small percentage of the total turnover of traditional publishers.

EIIA survey figures show that the EU-based electronic information supply industry as a whole has not been seriously affected by the recession of 1991 and 1992, with the exception

**Table 1: Electronic information services  
Main indicators for the EU (1)**

	1989	1990	1991	1992
Number of employees (2)	26 461	27 663	33 331	36 913
Online revenues (million ECU)	2 203	2 492	3 122	3 643
Geographic distribution of online revenues (3) (%)				
National sales	26.0	26.0	28.7	34.4
Intra-EU sales	35.0	38.3	39.3	34.0
Export sales	39.0	35.7	32.0	31.6
Revenues by subject content (2) (%)				
Finance	68.4	70.6	60.2	53.8
Business	27.3	25.2	28.8	33.2
Government	1.6	1.6	5.8	7.7
STM (4)	2.1	2.0	3.2	3.5
Other	0.6	0.6	2.0	1.8
Online revenues by type of service/ product (%)				
Real-time	58.1	59.0	57.2	53.6
Non-real-time	41.9	41.0	42.8	46.4

(1) Figures re-stated using 1992 exchange rates.

(2) Online and offline services

(3) Excluding videotax

(4) Science, technology and medicine

Source: EIIAVEC survey

**Table 2: Electronic information services  
Online and offline service revenues in EU, USA and Japan**

(billion ECU)	1989	1989	1990	1991	1992
EU	2.5	2.8	3.1	3.3	3.6
USA	5.0	6.0	6.9	8.2	9.3
Japan	0.7	1.0	1.2	1.3	1.3

Source: Information Market Observatory

of the information services linked to the financial sector (especially real time services which are the most mature sector of the industry). Optical media continue to post strong growth, but still generate low revenues compared to on-line services.

According to the EIIA survey, in 1992 total revenues of professional electronic information averaged 4 212 million ECU, up 21.4 % from 1991. 86.5 % of these revenues (3.6 billion ECU) came from on-line information, while 11.2 % (471 million ECU) came from off-line information (such as magnetic and optical media, document delivery, consultancy) and 2.3 % (97 million ECU) from audiotex professional services.

On-line services turnover increased by 16.7 %, from 3 121 million ECU in 1991 to 3 643 million ECU in 1992. In 1992, 53.6 % of the revenues originated from real-time services (mostly financial services), the remaining coming from non real-time services. By far the most consulted services are financial and business data bases: altogether they accounted for 87 % of the total turnover of the on-line information market in 1992. From 1991 to 1992 financial data bases turnover fell by about 12 % while business data bases turnover was flat. Other kinds of electronic information, like scientific, technological and governmental, play a minor, but increasing, role: the latter has in fact the highest growth rate.

Off-line information services grew more quickly than on-line services: from 1991 to 1992 with a growth rate of 55.3 %. CD-ROM revenues generated by EU-based publishers amounted to 153 million ECU, almost twice the value reported

the previous year. A remarkable leap in the CD-ROM market is expected in the next few years because of the planned introduction of many new multimedia titles by the major publishing and computer companies, and because of the rapid penetration of CD-ROM drives both in the professional and in the consumer market. Out of the overall EU production of commercial CD-ROM titles, 39 % came from the United

**Table 3: Electronic information services  
Databases by subject area in the world, 1992**

	Number of databases	Share of total (%)
Business	2 624	33
Science/technical/engineering	1 492	19
Law	885	11
Health/life sciences	728	9
General	700	9
Social sciences	447	6
News	385	5
Humanities	314	4
Multidisciplinary (academic)	296	4
Total	7 871	100

Source: Gale Directory of Databases

**Table 4: Electronic information services  
Number of CD-ROM and multimedia CD enterprise  
and titles, 1994**

	Number of enterprises	Number of titles
Europe	1 781	1 583
America	1 508	3 299
Asia	222	341
Australasia	84	99
Middle East	32	13
Africa	6	6
Total	3 633	5 341

Source: TFPL Publishing

Kingdom, 16 % from Germany, 12 % each from Italy, France and the Netherlands.

Employment is increasing as well. In 1992, the EU total number of employees in the electronic information services sector was close to 37 000 (10.7 % more than in 1991). The workforce employed in off-line services, accounting for 17 % of the total, posted strong growth in 1992 (+68 % to 6 300), while the number of workers employed in on-line services slightly dropped to 23 000 (down 3 % from 1991).

#### International comparison

According to IMO, in 1992 the EU market of on-line and off-line information services was less than half the USA market (9.3 billion ECU), but was also almost three times the size of the Japanese market (1.3 billion ECU). Moreover, the electronic information market showed stronger growth in the USA than in the EU (while, hit by the economic downturn, the Japanese market was flat in 1991-1992), thus increasing the gap between the EU and the USA.

North America is the greatest worldwide producer of on-line ASCII databases. In 1992 there were 1 269 database producers in the USA, 792 in the EU and 182 in the rest of the world. In both the EU and Japan, USA suppliers account for about one-third of the market.

In 1992 Japan was the world's largest single audiotex market, followed by the EU, then the USA, while the EU videotex market is by far the largest single market in the world.

In 1992 there were 4 millions of CD-ROM drives installed worldwide (nearly twice the number reported the previous year). The USA had the highest installed base of players (67 %

of the total, or 2.7 million). In the same year, there were 400 000 CD-ROM players installed in Europe (almost 10 % of the total number), and 1 million units in Asia (because of the large Japanese market).

According to the UK-based publisher TFPL, in 1994 there is a total of 1 781 CD-ROM publishers and multimedia enterprises in Europe (compared with 640 at the end of 1992). At the same time, the number of CD-ROM titles produced by EU publishers only reaches a total of 1 583, giving an average of less than one title per publisher. This compares with 1 508 multimedia CD-ROM enterprises in the USA, with an output of 3 299 titles.

The USA electronic information suppliers have some very significant points of strength: economies of scale in large English-speaking domestic and international markets, economies of scope through major supermarket host services. Moreover they enjoy a big producer and user experience and, in general, a strong information technology industry and a very high level of public and private investments on R&D.

#### Foreign trade

Most of the on-line revenues of EU suppliers came from Member States' consumption, this was 70.9 % of total revenues in 1992. 39.5 % of suppliers' revenues came from national markets and 31.4 % from intra-EU trade. Videotex and audiotex services are almost exclusively consumed in the country of origin. Exports outside of the EU account for 29.1 % of total revenue. Figures about imports are not available, though a trade deficit with USA seems very likely.

Over 90 % of CD-ROM revenues of EU suppliers originate in the EU, with titles suppliers mostly addressing their national market. On the other hand, although precise figures are not available, the volume of CD-ROM titles imported into the EU (especially from the USA) is undoubtedly high.

### MARKET FORCES

#### Demand

End users of information services are a very broad category which can be divided into business and residential customers. So far the business users have been the most important customer segment due to their bargaining power and their use of the most sophisticated data bases. The business end users of on-line electronic services can be identified mainly among the following categories: banks and finance, services and research companies, media, manufacturing and commercial companies, institutions, universities, unions and other associations.

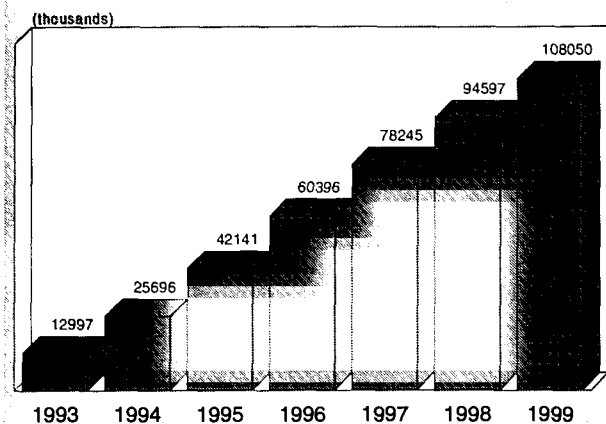
The most requested subjects are related to financial and business information. Banks, financial and insurance companies

**Table 5: Electronic information services  
Top 10 subject areas for CD-ROM by number of titles in the world, 1994**

	Number of titles	Share of total (%)	Change 1993/94 (%)
General interest, leisure	1 043	19.0	73.8
Arts, humanities	724	13.2	61.9
Education, training, careers	631	11.5	48.8
Computers, computer programmes	510	9.3	47.8
Advertising, design, marketing	429	7.8	53.2
Business, company	426	7.7	60.7
Languages, linguistics	417	7.6	61.6
Crime, law, legislation	399	7.3	34.3
Science, technology	386	7.0	37.8
Maps, geography	332	6.0	26.7

Source: TFPL Publishing

**Figure 2: Electronic information services  
Worldwide CD-ROM drive installed base at year end (1)**



(1) Forecasts for 1994-1999  
Source: Freeman Associates Inc.

are the most important users of on-line financial and business data bases, together with the main industrial and commercial companies. Information services are used by industrial and commercial companies to assist them to verify clients' and suppliers' reliability (consulting business data bases), while the enquiry of scientific, technological and patents databases supports R&D activities.

According to EIIA, there are approximately 1.25 million business users of on-line professional services in the EU (600 000 professional users of non-videotex services, and 800 000 of videotex services, with a possible overlap between the two categories of users).

The residential customers mainly utilise cheap and user-friendly technologies, like audiotex and videotex. CD-ROM are used by both segments of users, but most of the demand still comes from the professional users (lawyers, accountants, tax advisors, etc.) who need timely and extensive information

to assist them in their planning, marketing and production functions. According to EIIA, in 1992 EU CD-ROM publishers sold close to 78 000 subscriptions to professional users and over 250 000 discs of non-subscription products. However, the mass market is developing more quickly than the professional one, thanks to the marketing push of personal computer suppliers that seek to diversify into new markets to reduce dependence on the saturated business segment. The computer industry targets the residential customers for multimedia systems (personal computers with integrated CD-ROM drives). Publishers also try to penetrate this new market, as evidenced by optical media which - if they are not likely to substitute the traditional paper-based publishing products - already post significant penetration in the mass markets of the United Kingdom, Germany and France.

Audiotex is a fast growing medium, as it is easily accessible (only a telephone is needed to access this service). In 1993, audiotex services were already available in almost all of the EU countries thanks to the deregulation process which is currently underway. The growth of this service is favoured by the diffusion of dial tone multifrequency telephone sets. In 1992 the total revenue generated by the EU audiotex market reached 836 million ECU, with a potential growth of 150 % to 2 billion ECU by 1995. Revenue is generated exclusively on a national basis and mainly originates from consumer-oriented services. 87 % of the EU revenue is concentrated in three Member States: the United Kingdom, France and the Netherlands.

By contrast, the diffusion in the EU of videotex services is very slow. Videotex technology was mainly developed in France by France Telecom. In the 1980s, France Telecom supplied free terminals to a large number of users, creating demand for information services supplied by private providers. Currently, there are about 7 million Minitel service users and more than 10 000 information providers. In 1993 the Minitel market accounted for more than 80 % of the European market for videotex services. The most popular Minitel services are telephone directories, tourism and transport information and reservation services, home banking, home shopping, weather news and other information and entertainment services. Videotex is also developing in Germany (where almost 500 000 terminals were installed at the end of 1993) and Spain (over 400 000 terminals), while its diffusion is still limited in the United Kingdom and Italy. In Germany and Spain professional information services are the most popular ones. Because of

**Table 6: Electronic information services  
Audiotex - Premium rate markets and DTMF line penetration (1)**

(million ECU)	1992	Market size 1993 (2)	1994 (2)	Year of launch	DTMF line penetration 1992 (%)
Belgique/België	10.8	15.4	23.7	1989	55
Danmark	24.8	25.5	30.6	1990	95
BR Deutschland	11.7	53.7	488.0	1992	10
Hellas	0.0	10.1	20.2	1993	10
España	54.1	117.0	139.0	1992	40
France	280.0	348.4	435.4	1986	62
Ireland	6.5	8.8	14.0	1986	60
Italia	0.7	144.0	290.2	1993	35
Luxembourg	0.0	1.0	1.6	1993	77
Nederland	99.6	105.0	127.7	1990	40
Portugal	1.8	15.6	41.6	1991	10
United Kingdom	346.7	367.9	424.5	1986	33
EU	836.6	1212.3	2036.6	36	

(1) DTMF = dual tone multi-frequency. Premium rate services are information services billed through a central billing or kiosk system offered by the telecom operator.

(2) Estimates.

Source: Overview of the Audiotex PRS Market; IMO Working Paper 93/3; EP Journal



**Table 7: Electronic Information services**  
**Selection of mergers and acquisitions of European information enterprises, 1993/1994**

	Target company	Nature of business	Acquirer	Comments
1994	Thompson Directories (UK)	Telephone directories	US West (USA)	Buying into content/ new market
	Software Toolworks (USA)	Multimedia software/ videogames	Pearson (UK)	New market entry/ expertise
1993	Thames TV (UK)	TV broadcasting	Pearson (UK)	TV expansion
	Official Airline Guide (USA)	Airline data & reservations	Reed/Elsevier (UK/NL)	Extending market share
	InfoPro (USA)	Online host	Questel (F)	Buying market share
	Extel (UK)	Financial data services	Financial Times (UK)	Buying market share
	Quotron (USA)	Real time financial data services	Reuters (UK)	Buying into USA market share
	Vamp Health (UK)	Computer services for UK doctors	Reuters (UK)	Expanding into medical sector
	Data-Star (CH) Elsevier (NL)	Online host Publisher	Knight Ridder (USA) Reed (UK)	Buying market share Merger

Source: IMO: Mergers and Acquisitions in the Electronic Information Services Industry; Interactive Media International

the different technical standards of the videotex systems, there is not an EU integrated market in this area.

### Supply and competition

The business data bases market is divided into many segments according to the content of the data bases. Generally, a few operators control the market in each segment. For instance Reuters (UK), Telerate (USA), Telekurs (CH) and a few other companies control the market for real time financial information services, while operators like Dun & Bradstreet (USA) and the Japanese Teikoku Databank are among the main firms in the company profile area of data bases. Esa-Irs, Questel (F), Dialog (USA) are the main competitors in the scientific and technological services markets.

Scientific and financial information services are typically an international market where global suppliers are the most important players. Global competitors are generally USA and EU companies. In some other important market segments (such as laws and company profiles) national suppliers are the most important because of the deep knowledge of their domestic market, with the exception of Dun & Bradstreet (USA) in the company profiles segment.

While the on-line information market is rather concentrated and international, barriers to entry are low for the potential suppliers of content for the consumer CD-ROM market. As a result, together with the EU biggest publishers, there are hundreds of CD-ROM titles producers. United Kingdom database publishers are the most important producers of commercial CD-ROM titles in Europe, followed by suppliers from Germany, Italy and the Netherlands.

Most of the companies that provide audiotex and videotex entertainment and information services are domestic-based. In each country there are hundreds of companies supplying these kinds of services. For instance, in the videotex business there are more than 18 000 service codes in France and more than 3 000 information providers in Germany. Cultural, linguistic and, to a certain extent, technical differences, prevent services from going international.

**Table 8: Electronic information services**  
**Forecast for interactive CD title sales**

(million ECU)	1994	1997	2000
Europe	59.8	727.4	5 676.0
USA	39.6	545.2	3 096.0

Source: Alan Barker. The Market for CD-i

**Table 9: Electronic information services**  
**Offline product revenues in EU (1)**

(million ECU)	1989	1990	(2) 1991	1992
Magnetic media	29.3	33.1	65.5	40.6
Optical media	22.2	29.1	86.1	152.7
Document delivery	11.9	12.8	39.4	118.7
Consultancy	109.5	113.2	27.8	16.2
Other	110.9	112.6	85.0	143.5
Total	283.8	300.8	303.8	471.8

(1) Figures re-stated using 1992 exchange rates

(2) Breakdown estimated

Source: EII/AVEC survey



## INDUSTRY STRUCTURE

### Companies

Although the USA competitors dominate the information services industry, many EU information and media corporations can compete worldwide, like Reuters, Reed International (UK) and Elsevier (NL) which merged in 1993, Pearson-Financial Times (UK), Bertelsmann (D) and Hachette (F). EU publishers have a number of points of strength, like the ownership of a rich and diverse information content base, large and established markets for professional electronic information in key industrial sectors, the growing availability of high speed digital networks like ISDN (Integrated Services Digital Network) resulting from the liberalisation of the telecom sector, and the language diversity. But they also suffer from market fragmentation, oversupply of national host services, perceived overpricing of services, cross border transaction costs, and technical barriers due to the incompatibility of the different national standards. EU information providers are strong in such sectors as chemical, pharmaceutical and financial services.

Most of the companies in the CD-ROM market are small; the entry fee in this area is low, so there is a constant renewal of operators. In spite of the fragmentation of the supply side in this phase of rapid development, it's very likely that the concentration process will be rapid. In fact the market, still domestically-oriented, will become global very fast (as happened in the movie and software industries). Some global companies, like Microsoft (USA), are already emerging in the new content industry.

### Strategies

The EU electronic information service sector is characterised by a small number of large firms and a large amount of small firms. In general, European companies are smaller, less vertically integrated and more nationally oriented than their USA counterparts. The process towards concentration is very strong: databases and information services attract conglomerates in a way that telecoms, television, computer hardware and software do not. Much of the large volume (though relatively of small value) of merger and acquisition concerns the conglomerates buying market share in order either to absorb or eliminate competition (as in the case of the acquisition of Data-Star (CH) by Knight-Ridder (USA), buying entry into new segments of the markets or market expertise. Reuters, for instance, absorbed Vamp Health (UK) in 1993 to penetrate the healthcare market. According to Broadview Associates, in 1993 there were 895 M&A deals in Europe in the information technology area (which includes telecommunications, computer and software services), half of which being accounted for by the information services sector. However, the average size of the transactions related to information services (14.3 million ECU) was below that of hardware and telecom services. The largest single identified transaction was the 541 million ECU that Reed-Elsevier paid to Macmillan in 1993 for the Official Airline Guide.

The formation of Europe Online in mid 1994 is significant not only because of the importance of its founders (Hachette, Burda, Pearson, etc.), but also because it replicates almost exactly the financially successful Astra project (financed by the Luxembourg government) and because it provides a European-owned transmission medium for direct broadcast TV. Europe Online intends to perform the same function for information services of the CompuServe, America Online type.

### Impact of the Single Market

Although the EU is the second largest market for electronic information services in the world after the United States and the market is growing rapidly, its growth is restricted by the fact that the market is not truly integrated. A high proportion of turnover (+/- 70 per cent) is on line across national frontiers.

There are two main problems: the high cost of international communications compared with equivalent distance national calls (and with the cost within the US), and the high cost of making, often small, international payments which discourages particularly small users. The cost of international telephone calls is falling thanks to technological developments and liberalization, but the high cost of making small payments in foreign currencies seems rather intractable. A third problem, which inhibits suppliers of information from putting their data into circulation especially on line, is the lack of a common EU legal framework. In addition to copyright, issues of concern are privacy of data, integrity of information, responsibility for false or misleading information, and how to deal with "compilation" works. A directive which attempts to tackle these problems is being discussed at present.

## REGULATIONS

**Table 10: Electronic information services  
Annual change of value added and employment**

(%)	1994	1994-1997
Employment	9.7	8.0
Value added	14.7	12.8

Source: Databank

The disquiet concerning content piracy is severely affecting the development of the electronic information market. In 1992 the European Commission published a draft directive aimed at avoiding database piracy and at protecting electronic media copyright. By the end of 1994, however, there was no agreement on the draft text at Council level.

Another major concern for electronic information companies and for users is the protection of privacy, especially in the case of trans-border data flows. These problems call for a harmonised solution at EU (and possibly at world) level. A number of EU-supported projects, such as CITED (Copyright in Transmitted Electronic Documents), are already under way for the development of copyright and security mechanisms for network publishing.

Also audiotex and videotex services need an appropriate legal framework in order to avoid abuses such as false or no price indications, or "empty" services, and unwanted cultural and social consequences, especially with regard to adult services. To reach this objective, a number of regulatory models have already been implemented in the EU: the regulating political authorities like in France; the independent (self-regulating) commission, like in the United Kingdom; the contracts for service providers containing restriction, like in Italy and Germany; no restriction at all, like in the Netherlands and Belgium.

## OUTLOOK

The spread of the services will be helped by the liberalisation and the opening to competition of the telecom market and by the expansion of new high performance networks, like EURO-ISDN.

The growth in the CD-ROM and audiotex market will also be very significant. Perspectives of the industry are very good: in 1997 there will be over 78 million of CD-ROM drive installed worldwide. The on-line information will also enjoy a very good rate of growth: between 1993 and 1997 this market will grow annually more than 8 % on average worldwide.

Demand for information services will continue to benefit from the stimulus created by the Single European Market. The EU



electronic information market will potentially rank as the biggest in the world. Internet will represent a big opportunity for the EU information providers. But EU producers are facing the challenge of the USA competition (especially in the CD-ROM segment) on international markets, in particular in the emerging ones of Eastern Europe, Asia and the Pacific Rim.

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# Telecommunications services

## NACE 79

*Of the three large trade regions, the EU has the largest number of telephone lines in the world, with 170 million lines (roughly the same as the NAFTA countries).*

*In 1992 the telecommunications services sector employed slightly more than 860 000 persons, down by 5.8 % from 1991. This downward trend is bound to accelerate with the privatisation of the telephone operators to come, but will be counterbalanced with the development of new telecommunications services (mobile, value added network services, telematic applications, etc).*

*The mobile communications market continues to post fast growth: at the end of 1993, the number of subscribers to cellular telephone services had reached 8.7 million in the EU, an increase by 47 % compared to 1992.*

*In general public carriers still have the monopoly of the basic telecom services, but competition is increasing in the international and domestic arena because of the liberalisation of data services and mobile communications markets. New competitors, particularly American carriers and computer companies, are emerging. Users are getting very sophisticated and differentiated: paradoxically, the more the EU telecom market moves towards integration, the more demand moves towards segmentation.*

*The information highways are put at the heart of Europe's future competitiveness. With regard to the launch of multimedia services, telecom carriers are testing the commercial potential of services such as video on demand. However, the development of new video-services will be gradual, due to the large volume of investment that will be necessary to build the multimedia network.*

### INDUSTRY PROFILE

#### Description of the sector

Telecommunication services permit interactive connection between persons, computers and terminals through many kinds of networks such as telephone, coaxial cables, optic fibres, microwaves and satellite networks. They also permit the diffusion of information from a single point to multiple points such as direct satellite broadcasting for television or data transmission.

Telecommunications services provide basic services like telephone or telex, where the messages are simply transmitted by the networks, or Value Added Services (VAS) like electronic mail, EFT (Electronic Fund Transfer), EDI (Electronic Data Interchange), where the messages are stored, processed and repackaged by a computer system (or service provider) along the route before being received from the addressee.

The transmitted information can be voice, data or images. Until recently, each type of information required the use of a specific network (like telephone, telex, or packet switching networks). However, new networks, like ISDN (Integrated Services Digital Network), allow for integrated distribution of voice, data and fixed or full motion image.

The telecommunications services sector has a long tradition of national monopoly in Europe and elsewhere in the world. Several countries have made a serious attempt at liberalisation, notably in the USA and the UK. The advent over the last decade of cellular mobile telecommunications networks and independent data networking services (e.g. Internet) have introduced new players into this market. Furthermore, the broadcasters, increasingly using cable distribution and tending to increase private networks, promise to become important players too. These events could drastically change the nature of telecommunications services and their economics over the next decade. This article describes the status quo, focusing mainly on the bulk of existing telecommunications services which are offered by traditional national operators. The advent of new players and services is in the air, but is only beginning to show in market share and results.

#### Recent trends

New technologies derived from microelectronics, optics and information technology, such as digitalisation of exchanges and transmission (that give the possibility to transmit either voice, data and image as a flow of bits that can be read and elaborated by computers), fibre optics (that permit broadband transmission) and advanced software, allow the transmission of an increasing variety of intelligent services for the benefit of many different segments of customers. Increasing differentiation of technologies and services permit to satisfy an increasing range of users needs. In particular, thanks to the availability of new networks (such as ISDN, satellite, and optic fibre network) and of data compression technology, the need of bandwidth for new services that require a vast amount of data (like video transmission) promises to no longer be a bottleneck for the customers.

These new technologies are also prompting the prices of the long distance services and those offered to business users, to fall dramatically. For example, the cost of a submarine

**Table 1: Telecommunications services  
Gross investments**

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	426.3	490.4	479.2	462.3	419.9	589.7	657.3	668.7	600.9
Danmark	250.4	323.7	425.0	435.9	517.3	449.7	414.1	355.7	339.6
BR Deutschland	3 956.9	7 060.4	7 548.9	8 022.1	8 174.4	8 554.9	9 382.9	12 970.8	13 858.8
Hellas	184.3	322.8	162.7	169.5	203.6	275.3	296.8	440.9	548.3
España	1 175.4	1 478.0	1 495.7	1 293.6	2 570.7	4 331.8	5 577.7	4 846.9	3 192.5
France	4 028.5	5 237.1	N/A	4 390.6	4 132.8	4 362.3	3 782.1	4 976.1	4 394.9
Ireland	190.7	196.5	185.7	172.2	175.3	208.5	221.9	222.1	202.5
Italia	2 052.4	3 693.1	3 786.5	4 003.0	4 972.7	6 803.2	6 383.3	6 499.9	6 187.1
Luxembourg	17.9	13.7	N/A	26.1	31.3	40.8	48.0	50.4	56.0
Nederland	510.8	643.6	644.8	663.6	836.0	1 296.6	1 169.0	1 312.0	1 250.2
Portugal	106.5	227.8	221.9	229.9	369.4	431.5	561.8	426.6	713.6
United Kingdom	2 030.5	3 349.9	3 137.6	3 350.5	4 435.4	4 626.5	3 681.8	3 659.0	2 921.5
EU	14 930.6	23 037.0	N/A	23 219.3	26 838.8	31 970.8	32 176.7	36 429.1	34 265.9

Source: ITU, national telecom administrations



cable circuit per hour has fallen from almost 0.6 ECU in 1970 to less than 0.02 ECU in 1992 (in 1958 it costed 8.3 ECU); the cost of a satellite circuit followed a similar trend. Prices, especially for the business customers, are also strongly pushed down by the emerging competition. Competition between telephone carriers, mobile services and cable operators is also increasingly affecting the residential market. For instance, radio access to the local households is often cheaper than laying telephone lines; also coaxial cable, used for transmitting television, could also carry telephone signals at a marginal cost.

The EU hosts some 152 million telephone lines, which compares to about 144 million in the USA and almost 58 million in Japan. However, the number of lines per 100 inhabitants was 44 in the EU in 1992, compared to 53 in the USA and 46 in Japan.

EU telecom carriers are generally state-owned carriers, although some are privatised, wholly or in part. Only in the UK, Sweden and Finland has generalised competition been

allowed, including both data and basic telephone services. The geographical distribution of the production of telecom services in the EU depends mostly on the size of the domestic market of the national telephone carrier. Germany, the United Kingdom, France, Italy and Spain are the major markets of the European Union. In spite of the telephone monopolies, many new comers are entering the newly opened EU mobile and data commercial telecom markets. USA carriers and, to a lesser extent, computing companies, are taking advantage of these new opportunities.

In the period 1980 to 1991 gross investments made by telecom carriers in the EU showed a notable increase. In 1992, the economic recession and the weight of previous investments resulted in a 6 % decline in gross investments to about 34.2 billion ECU. In spite of this drop, the revenues generated by EU telephone carriers amounted to about 100 billion ECU in 1992, up 10 % from 1991. Telecom revenue represents about 2 % of the EU gross domestic product.

**Table 2: Telecommunications services  
Public operators - Receipts and expenditure**

(million ECU)	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Receipts</b>									
Belgique/België	928.8	1 394.2	1 546.4	1 699.4	1 806.3	1 943.7	2 112.7	2 268.2	2 475.9
Danmark	564.6	1 179.6	1 298.2	1 514.7	1 609.3	1 767.5	1 771.5	1 923.9	1 995.7
BR Deutschland	10 317.1	15 133.2	16 599.7	17 872.4	18 041.2	18 960.9	19 779.6	23 013.0	26 706.5
Hellas	395.1	714.2	737.0	777.5	884.4	921.5	1 015.7	1 088.6	1 222.3
España	1 894.6	3 291.6	2 673.2	3 802.8	4 588.0	5 559.2	6 336.7	7 926.9	8 803.9
France	7 925.3	14 274.6	15 532.5	16 275.3	13 942.4	14 851.9	16 232.2	16 601.8	17 904.6
Ireland	242.0	623.9	686.5	701.3	778.8	879.7	982.1	1 001.6	1 023.2
Italia	3 660.9	8 345.4	9 546.0	10 264.9	11 158.3	12 627.2	14 017.6	12 687.9	16 051.0
Luxembourg	52.6	73.7	N/A	90.7	118.2	133.3	155.5	164.4	178.8
Nederland	1 665.3	2 540.7	2 879.3	3 102.6	3 341.5	3 760.2	4 100.1	4 476.5	4 889.0
Portugal	332.0	855.4	867.2	727.6	869.1	942.8	1 246.8	1 365.9	1 658.2
United Kingdom	5 946.5	14 239.9	14 033.4	14 453.4	16 662.3	18 290.5	17 561.9	19 025.4	18 010.3
EU	33 924.8	62 666.4	N/A	71 282.6	73 799.8	80 638.4	85 312.4	91 544.1	100 919.4
<b>Expenditure</b>									
Belgique/België	964.5	1 352.5	1 449.6	1 565.0	1 647.4	1 762.4	1 894.2	2 059.4	2 907.0
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2 185.1	2 195.7
BR Deutschland	9 119.6	13 531.5	14 974.6	16 500.0	16 575.9	18 011.7	19 168.4	21 940.2	29 004.4
Hellas	412.7	703.5	615.9	652.4	698.1	770.2	812.5	841.7	901.5
España	1 678.0	2 973.4	2 964.2	3 428.3	4 104.7	5 044.6	5 644.3	7 217.2	8 080.7
France	6 515.1	12 559.3	14 481.4	14 936.8	13 403.1	14 199.9	15 421.7	N/A	N/A
Ireland	272.2	674.4	703.3	687.2	722.0	789.8	884.6	901.7	930.2
Italia	3 857.0	7 982.1	8 972.0	9 684.8	10 705.6	12 093.6	14 122.8	11 467.5	16 334.4
Luxembourg	N/A	34.4	N/A	N/A	65.4	N/A	74.5	94.4	106.5
Nederland	1 568.3	2 207.8	2 407.3	2 572.8	2 840.1	N/A	3 540.9	N/A	N/A
Portugal	304.3	666.8	710.7	556.8	625.0	622.1	829.5	988.7	1 593.3
United Kingdom	5 397.8	12 389.3	12 918.0	12 382.9	14 285.8	16 010.6	13 456.6	16 066.8	N/A
<b>Surplus/deficit (1)</b>									
Belgique/België	-35.7	41.7	96.8	134.4	158.9	181.3	218.5	208.8	-431.1
Danmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-261.2	-200.0
BR Deutschland	1 197.5	1 601.7	1 625.1	1 372.4	1 465.3	949.2	611.2	1 072.8	-2 297.9
Hellas	-17.6	10.7	121.1	125.1	186.3	151.3	203.2	246.9	320.8
España	216.6	318.2	-291.0	374.5	483.3	514.6	692.4	709.7	723.2
France	1 410.2	1 715.3	1 051.1	1 338.5	539.3	652.0	810.5	N/A	N/A
Ireland	-30.2	-50.5	-16.8	14.1	56.8	89.9	97.5	99.9	93.0
Italia	-196.1	363.3	574.0	580.1	452.7	533.6	-105.2	1 220.4	-283.4
Luxembourg	N/A	39.3	N/A	N/A	52.8	N/A	81.0	70.0	72.3
Nederland	97.0	332.9	472.0	529.8	501.4	N/A	559.2	N/A	N/A
Portugal	27.7	188.6	156.5	170.8	244.1	320.7	417.3	377.2	64.9
United Kingdom	548.7	1 850.6	1 115.4	2 070.5	2 376.5	2 279.9	4 105.3	2 958.6	N/A

(1) Receipts less expenditures

Source: ITU, national telecom administrations



**Table 3: Telecommunications services**  
**Distribution of main telephone lines**

	1980	1985	1986	1987	1988	1989	1990	1991	1992
<b>Main lines (millions)</b>									
Belgique/België	2.5	3.1	3.3	3.4	3.6	3.7	4.0	4.1	4.3
Danmark	2.2	2.5	2.7	2.7	2.8	2.8	2.9	3.0	3.0
BR Deutschland	20.5	25.4	26.2	27.0	27.8	28.8	30.0	33.6	35.4
Hellas	2.3	3.1	3.3	3.5	3.6	3.8	3.9	4.2	4.5
España	7.2	9.3	9.8	10.2	11.0	11.8	12.6	13.3	13.8
France	15.9	23.0	23.9	24.8	25.8	26.9	28.1	29.1	29.9
Ireland	0.5	0.7	0.8	0.8	0.8	0.9	1.0	1.0	1.1
Italia	13.0	17.4	18.3	19.1	20.1	21.3	22.4	23.1	23.7
Luxembourg	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nederland	4.9	5.8	6.0	6.2	6.5	6.7	6.9	7.2	7.4
Portugal	1.0	1.4	1.5	1.7	1.8	2.1	2.4	2.7	3.0
United Kingdom	17.7	21.7	22.1	22.8	23.8	24.9	25.4	25.6	26.1
EU	87.8	113.6	118.0	122.3	127.9	134.0	140.0	146.9	152.4
USA	94.2	111.5	115.2	11.9	122.2	125.8	127.2	130.1	N/A
Japan	38.6	45.3	44.8	46.3	48.0	49.9	52.0	55.9	N/A
<b>Lines per 100 inhabitants</b>									
Belgique/België	25.0	31.0	33.0	34.5	35.9	37.7	40.0	41.0	42.5
Danmark	43.5	49.7	52.4	52.9	54.4	55.5	56.6	57.3	58.2
BR Deutschland	33.4	41.6	42.9	44.2	45.3	46.5	47.5	42.1	44.1
Hellas	23.5	31.4	33.0	34.7	36.2	37.7	39.0	41.4	43.9
España	19.3	24.2	25.2	26.4	28.3	30.3	32.3	34.0	35.3
France	29.5	41.7	42.2	44.6	46.2	47.8	49.5	51.1	52.3
Ireland	14.2	19.9	21.2	22.5	23.8	25.7	28.1	29.3	30.9
Italia	23.1	30.4	31.8	33.3	35.0	37.0	38.8	40.0	41.8
Luxembourg	36.2	42.0	42.5	43.5	44.8	45.9	48.1	49.9	53.0
Nederland	34.6	40.2	41.3	42.5	43.8	45.1	46.4	47.8	48.9
Portugal	10.1	13.8	14.7	16.2	18.0	21.0	24.1	27.3	30.6
United Kingdom	31.4	38.2	39.0	40.0	41.8	43.5	44.2	44.5	45.2
EU	27.6	35.3	36.4	37.8	39.4	41.1	42.6	42.6	44.1
USA	41.4	46.6	47.7	4.9	49.6	50.6	50.9	51.5	N/A
Japan	33.0	37.5	36.9	38.0	39.2	40.5	42.1	45.1	N/A

Source: ITU, national telecom administrations

In 1992 total employment averaged slightly more than 860 000, a decrease by 5.8 % from 1991. Considering that the average growth rate of total turnover is about 10 % per year, this drop in employment means that the sector is rapidly gaining productivity.

The mobile communication subsector continues to post strong growth: worldwide the subscriber base reached 32 million users in 1993, averaging an annual growth of 45-50 % between 1986 and 1993. In the EU at the end of 1993, there were 8.7 million subscribers to the cellular telephone services, up 47 % from 1992. The number of the new mobile telephone

**Table 4: Telecommunications services**  
**Number of persons employed**

(units)	1980	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België	28 900	27 609	26 996	26 664	25 782	25 255	26 295	27 700	26 843
Danmark	N/A	17 624	18 492	19 000	19 000	18 000	18 000	17 929	17 701
BR Deutschland	195 000	212 364	214 349	216 020	216 156	216 210	212 205	229 000	231 000
Hellas	30 236	30 570	29 595	29 444	30 327	29 654	28 086	27 593	26 716
España	70 610	72 086	63 021	63 311	66 062	71 155	75 350	75 499	74 437
France	161 000	166 788	165 198	163 682	159 521	157 313	155 814	168 110	155 300
Ireland	19 650	16 165	15 298	14 615	14 269	13 705	13 472	13 440	13 033
Italia	104 000	109 792	110 232	109 680	113 676	116 391	117 986	120 300	120 000
Luxembourg	629	675	679	693	745	724	703	760	771
Nederland	27 902	28 774	29 674	29 833	29 142	31 500	31 770	30 819	32 327
Portugal	22 800	23 208	23 229	22 820	23 053	23 275	23 563	23 068	23 166
United Kingdom	240 700	226 700	223 084	237 200	244 400	245 700	226 900	210 500	170 700
EU	N/A	932 355	919 847	932 962	942 133	948 882	930 144	944 718	891 994
USA	956 600	813 000	N/A	N/A	725 000	696 000	684 000	575 600	N/A
Japan	335 000	321 000	311 000	305 000	300 000	286 000	276 900	266 100	N/A

Source: ITU, national telecom administrations



**Table 5: Telecommunications services**  
**Text communications**

(units)	Number of telex subscribers		Number of fax machines (1)	
	1988	1992	1988	1992
Belgique/België	25 030	11 960	24 000	150 000
Danmark	11 690	5 990	35 000	170 000
BR Deutschland	158 280	81 090	197 250	1 172 700
Hellas	24 330	22 660	3 410	13 270
España	41 190	22 910	53 570	195 030
France	150 010	96 190	185 000	630 000
Ireland	5 370	2 500	10 000	75 000
Italia	72 770	43 730	92 410	211 000
Luxembourg	2 740	1 960	1 500	5 000
Nederland	33 100	15 000	65 000	372 750
Portugal	27 650	15 220	3 300	26 760
United Kingdom	116 200	63 500	370 000	1 005 000
EU	668 360	382 710	1 040 440	4 026 510

(1) Estimates

Source: ITU: Telecommunication Indicators for Western & Southern Europe

connections outstrips new fixed line connections in some countries, such as Scandinavia and the United Kingdom. If current growth levels are maintained, at the end of 1994 there will be 13 million subscribers in the EU, 22 million in the USA and nearly 50 million worldwide.

The level of telephone lines penetration is much higher in the EU than in Eastern Europe and the former Soviet Union. In 1992, there were 11 main lines for 100 inhabitants in Hungary, 9 in Poland and 14 in the former Soviet Union. In addition, the quality of the services offered in Eastern Europe is very low compared to western standards. As a matter of fact, the average waiting time to have a telephone installed often reaches 10 years in Eastern Europe; in addition, long distance and data communication services are very poor. According to the OECD, the weakness of telecommunications services in this region is the most serious infrastructure obstacle to exports. However, even if east European countries show a high potential for growth of their telecom markets, telecommunications investment scenarios are very uncertain because of the economic problems and financial shortages of these countries. A report by the OECD calculates that 167 billion ECU are needed to bring the average line density from 17 % in 1993 to 35 % by 2000. Although most of the funds must inevitably be local - tariffs have increased sharply in every East European country and the rise is likely to continue - Eastern governments want to close the gap basically through privatisation of their domestic telecom carrier.

In the last few years, there has already been a flurry of activity by western companies in Eastern Europe. EU and USA com-

panies have signed many partnership agreements with telecom carriers of East European countries (that still maintain the majority stake in the joint ventures) such as the partnerships made in Poland, Hungary, Romania. The first privatisation in Eastern Europe is set to be that of Matav, the Hungarian state-owned operator.

#### Foreign trade

International telecom services are regulated by a very complex and stable mechanism: the system of international accounting rates and settlements, which is the main cost-and-revenue-sharing mechanism underlying international trade in telecommunications services. The revenue of the carriers depends on the traffic and also on the different tariffs fixed by each country. Large price differences between countries for international calls explain much of the trade surplus or deficit of the countries in this sector. Because of its high tariffs for international telecommunications, the EU has traditionally run a trade surplus with the USA, the main partner for extra-EU communications. It is very likely, however, that this trade surplus will quickly shrink, as a result of the general drop of EU long distance tariffs.

The system of international settlements has come under increasing pressure, particularly as the imbalances between what countries pay out and what receive have grown. There are other factors explaining the breaking of this international agreement, such as the expansion of the international multi-lateral closed-user-group networks, as SITA and Swift, international capacity reselling, the diffusion of new ways of trading

**Table 6: Telecommunications services**  
**USA settlement payments to the rest of the world for international telecommunications services, 1992**

(million ECU)	Revenue	Payout	Deficit	Deficit as share of revenue (%)	Regional share (%)
Africa	237	150	101	42	3.9
Middle East	372	287	156	42	6.0
Americas	3 189	1 904	1 311	41	50.3
Asia-Pacific	1 988	1 082	501	25	19.3
Western Europe	2 024	1 098	448	22	17.2
Central and Eastern Europe	206	132	87	42	3.3
World	8 016	4 653	2 604	32	100.0

Source: Adapted from FCC: Common Carrier Statistics Yearbook

**Table 7: Telecommunications services**  
Number of cellular subscribers (1)

(units)	1985	1986	1987	1988	1989	1990	1991	1992	1993
Belgique/België	0	0	5 700	19 160	31 000	47 170	54 362	59 735	65 800
Danmark	46 098	57 604	78 215	101 215	123 870	149 186	176 933	212 400	316 261
BR Deutschland	1 103	17 973	48 747	99 865	165 000	273 860	541 476	951 890	1 775 584
Hellas	0	0	0	0	0	0	0	0	21 500
España	772	1 693	4 225	11 629	30 000	54 958	108 451	180 707	258 078
France	114	9 482	39 254	98 338	179 500	283 506	373 395	437 000	561 000
Ireland	135	1 000	2 800	5 300	10 500	22 097	31 696	41 152	55 590
Italia	2 320	4 095	13 240	31 860	71 000	265 902	567 498	783 000	1 207 000
Luxembourg	60	160	260	360	450	608	873	984	4 950
Nederland	4 800	12 600	22 000	32 000	50 000	81 510	116 900	166 409	213 047
Portugal	0	0	0	0	2 900	6 386	12 570	27 996	94 700
United Kingdom	44 000	122 000	260 000	507 000	860 000	1 139 500	1 230 100	1 397 200	1 999 900
EU	99 402	226 607	474 441	906 727	1 524 220	2 324 683	3 214 254	4 258 473	6 573 410
Western Europe	269 659	502 828	852 769	1 457 734	2 339 418	3 450 814	4 636 059	5 984 824	8 789 283

(1) All systems including GSM and DCS1800  
Source: Financial Times Business Enterprises

**Table 8: Telecommunications services**  
Call charges in the EU, 1992 (1)

(ECU) Country of origin	Country of destination											
	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Belgique/België	.	2.31	1.85	2.31	2.31	1.85	1.85	2.31	1.31	1.54	2.31	1.85
Danmark	1.54	.	1.31	1.69	1.69	1.54	1.54	1.69	1.54	1.54	1.69	1.54
BR Deutschland	1.62	1.62	.	1.62	1.62	1.62	1.62	1.77	1.62	1.62	1.62	1.62
Hellas	1.77	1.77	1.77	.	1.77	1.77	1.31	3.00	1.77	1.31	2.00	1.77
España	2.70	2.70	2.70	2.70	.	2.70	2.70	2.70	2.70	2.70	2.70	3.24
France	1.62	1.62	1.62	1.62	1.62	.	1.62	1.62	1.62	1.62	1.62	1.62
Ireland	2.54	2.54	2.54	2.54	2.54	2.54	.	2.54	2.54	2.54	2.54	2.00
Italia	2.39	2.39	2.16	2.16	2.39	2.16	2.77	.	2.16	2.39	2.77	2.39
Luxembourg	1.08	1.46	1.46	1.46	1.46	1.46	1.46	1.46	.	1.08	1.46	1.46
Nederland	1.46	1.46	1.46	1.93	2.00	1.46	1.93	1.93	1.46	.	1.93	1.46
Portugal	2.85	2.85	2.85	2.85	2.70	2.85	2.85	2.85	2.85	2.85	.	2.85
United Kingdom	1.31	1.31	1.31	1.31	1.31	1.31	1.23	1.31	1.31	1.31	1.31	.

(1) Cost of 3 minutes direct-dialled standard rate call including taxes in 1992.  
Source: ITU: Telecommunication Indicators for Western & Southern Europe

in international telecommunications systems, such as international freephone numbers and calling cards.

## MARKET FORCES

### Demand

The telecommunications market is increasingly segmented by services and specific categories of users. Both residential and business user needs are rapidly evolving and becoming increasingly sophisticated. As a result, the more the EU telecom market becomes global, the more the market segments itself along the lines of technologies and types of services.

The evolution of telecommunications services is very rapid: for instance from 1988 to 1992 the number of telex lines declined by an average 13 % per annum, while the number of fax lines grew by 40 %. In the next few years, electronic mail through computer networks like Internet, will likely substitute (at least partially) fax services.

Intelligent networks provide services for both the residential users, the price sensitive segment of the telecom market, and

for the business and corporate users, the performance sensitive segment. New intelligent services such as caller identification, follow me, credit card calling, audio conference, free phone, intelligent fax, audiotex and Virtual Private Network (VPN) are bound to spread fast. On average an EU telephone subscriber calls three times less than the average US subscriber; it is therefore not surprising that EU carriers use intelligent services as the most important means to increase traffic and revenue per line. So far, banks, insurance companies, building societies, hotels, airlines and services companies are the major business users of the services offered through intelligent networks.

Although the growth in telephone subscribers is modest in the EU, the demand for telephone services is still growing, as evidenced by the high annual growth rate of both local and long distance traffic (about 10 %). The EU carriers use intelligent services as the most important means to increase traffic and revenue per line.

Mobile communication has been very successful, being accepted by both business users and an elite group of residential



**Table 9: Telecommunications services  
Telephone tariffs, 1992**

(ECU)	Residential Installation	Residential Monthly subscription	Business Installation	Business Monthly subscription
Belgique/België	99.8	9.7	99.8	9.7
Danmark	165.9	12.7	165.9	12.7
BR Deutschland	32.1	12.1	32.1	12.1
Hellas	291.0	4.3	291.0	4.3
España	216.3	9.8	216.3	12.6
France	36.4	5.7	36.4	5.7
Ireland	157.6	13.1	157.6	13.1
Italia	125.0	5.2	125.0	10.8
Luxembourg	59.9	6.0	59.9	6.0
Nederland	92.0	10.8	92.0	10.8
Portugal	73.3	9.4	73.3	9.4
United Kingdom	189.5	8.9	207.8	14.2
EU	130.8	9.0	132.5	9.7

Source: ITU: *Telecommunication Indicators for Western & Southern Europe*

customers. Due to new technologies such as PCN (Personal Communication Network), that have been designed from the outset for the domestic customer and small business markets, prices will decrease over the next few years and a major share of residential users will be able to afford mobile telephone services. Tariffs have also been adjusted by competitors to take into account customers segmentation.

Datacom services are also at the brink of a major leap ahead in technologies. The increasing need to exchange data among the computers of departments within companies, and also among companies linked through business relations, pulls the demand for data networks, like X.25 public and private networks. There is also an increasing demand expected for transmitting large data flows and video signals through ISDN and high speed broadband networks of both private and public origin. Fast transmission of data and video could change the way people work and live and could also favour the growth of less developed regions and countries

The VAS (Value Added Services) market, on the contrary, is still suffering from bottleneck problems. Demand exists, but the lack of diffused and accepted standard still hampers further expansion. Demand is also rising from multinational companies, as management of worldwide networks requires negotiation with many national telecom authorities. Large companies tend to prefer to deal with a single telecom company for worldwide telecommunications provision, and to get a "one stop shopping" service from a single global carrier, or super carrier, with sole responsibility for genuine end-to-end provision. Demand from corporate organisations is also rising for services such as facility management and outsourcing: large companies increasingly focus on their core activities and prefer to delegate the management of their networks to specialised telecom or computing companies.

With regard to the launch of multimedia services, all the carriers are testing the commercial potential of services such as video on demand: however the new services and options presented to consumers raise the question whether there will be enough money to support new media technologies and products without removing the financial support currently provided to traditional media. The investments needed to build the multimedia network will be huge, especially if the fibre or the cable is to replace all the existing telephone lines in individual applications. For example, it is estimated that the investment necessary to install the cable in the United Kingdom will reach 15 billion ECU. For this reason, some analysts doubt that the broadband network for multimedia services will be built within the next decade.

The customer will increasingly determine the trends of the new markets, and telecommunications companies are compelled to make a larger use of sophisticated marketing research techniques to explore the needs of the users, to forecast the customers' reactions before offering and promoting their services.

### Supply and competition

New competition pushes the public carriers to fix the prices of each service according to the cost specifically sustained. Public carriers are bound by strong competition to re-balance tariffs by heavily decreasing their prices for long distance calls and for services directed to business users, while generally a an increase occurs for local calls and for services addressed to residential users. Therefore, the norm of cross-subsidisation between long distance and local calls, and between business and residential users will diminish in importance.

The increasing threat derived from the liberalisation of data and VAS markets, and from the entrance in the market of powerful players like IBM (USA), DEC (USA) and other computer companies and foreign carriers, is tackled by the domestic carriers, through the increasing supply of new intelligent services and high performance digital networks like ISDN.

ISDN, VPN and outsourcing are major challenges for public carriers: their goal is, in fact, to provide private networks for large business users whilst encouraging small and medium business users to make the best use of public networks.

Pushed by changing technology and rising competition. EU carriers are searching for international partnerships. The new alliances target products for large multinational corporations; they generate the largest volume of long distance traffic and have the strongest bargaining power. As a result, new global "supercarriers" are emerging and new partnerships are taking place.

The first partnership has been set up between BT (UK) and MCI, the biggest USA long-distance carrier after AT&T. A second alliance was set up between France Telecom, Deutsche Bundespost Telekom and Sprint (USA). A third was formed between Unisource (the four-way alliance among the Dutch, Spanish Swedish and Swiss telephone companies), AT&T and KDD, the Japanese international carrier.

As the big corporate customers, long distance calls, data and mobile services (where the market is already open to competition) normally account for a big share of the revenues and, overall, of the incomes of the telephone carriers, in the



long term this trend will undoubtedly represent a threat for the biggest carriers that will not adapt themselves to the new competitive environment.

The building up of multimedia information highways will give rise to stiff competition. Unlike the USA, where over 60 % of households subscribe to cable TV, cable is not much diffused in the EU. The only countries having a developed cable network are Germany, Belgium, Luxembourg, the Netherlands, Ireland, Sweden and Finland. By contrast, there are less than one million subscribers to cable pay-TV in France and in the United Kingdom, and none in Italy. However, many operators are striving to enter the cable market. In the United Kingdom cable operators already offer cable TV and local telephone services. In addition, national carriers like BT, France Telecom, Telecom Italia, Telefonica and Portugal Telecom started to build new optical fibre and coaxial cable networks within the next three to four years, in order to be able to offer video on demand, broadcasting and telematic services like home shopping, video games, teleducation or teleworking.

Private and public carriers are engaged in building new digital mobile communications networks on the GSM (Global System for Mobile) standard, the European unified standard established by ETSI (European Telecommunications Standards Institute). Thanks to this unified standard, EU operators are ahead of the USA carriers that are still implementing two different standards for digital mobile communications. GSM permits the use of multiple channels, is secure and provides a large amount of digital services for the customer. However, prices for GSM services and terminals are currently higher than the prices for analogue services and terminals. In such a competitive environment for mobile services, the players have to strive for enlarging their customer base, often through traditional marketing methods, such as advertising and the offering of a range of new services at lower prices.

#### Production process

Thanks to the digitalisation of the network and the introduction of OSS (Operating Support Systems), telecom carriers can heavily cut the expenses for monitoring and maintaining the networks and for supplying new services. Between 1985 and 1990 the annual average growth of productivity of EU telecom operators varies from 1.5 % in the Netherlands to 11.4 % in Portugal, while the United Kingdom, Germany, France, Spain and Italy post annual rates between 3 and 6 %. The diffusion of digital networks like ISDN, GSM and satellite telecommunications, will certainly accelerate this trend. Therefore carriers will be able to cut the prices for the benefit of the customer.

## INDUSTRY STRUCTURE

### Companies

Generally speaking, national telecom operators are very large and profitable companies with a large number of employees. They also sustain big efforts in investments for improving the networks and offering a broad range of services.

The top EU network operators are Deutsche Telecom Bundespost (D), BT (UK), France Telecom (F), Telecom Italia (I), and Telefonica (E). These companies rank among the 15 world leading telecom carriers. Out of these 15 world leaders, 9 are located in the USA, 5 in the EU and one in Japan.

### Strategies

EU public carriers operating in a quasi-monopoly regime are preparing themselves to tackle new competitors in an opening market. EU carriers are engaged in a deep restructuring process and in increasing their productivity. Many carriers are changing their organisation in order to focus on emerging services and markets and be more flexible and nearer to the customer. Some telecom carriers, like BT, STET Telefonica and Portugal Telecom have set up new companies for operating in specialised markets, like mobile communications, multimedia or data network markets.

Telecom carriers' goals are to introduce flexible pricing and sophisticated services (like network management and outsourcing), especially for the benefit of the largest business users, and to increase the traffic generated by the residential customers with products like "intelligent services".

The need to introduce intelligent systems, data bases and software for monitoring the network and offering more services to the customers has a big impact on the telecom carriers' strategies of partnerships with computer and software and computing services companies. For instance, France Telecom has recently signed a partnership with the computer services company Sema (F), while STET (I) has bought Finsiel, an Italian computer services company.

Telecom carriers are also preparing offensive or defensive strategies concerning internationalisation. European Telecom carriers are very interested in the process of privatisation of many national carriers that is underway all over the world. For instance, France Telecom and STET, on one side, and Telefonica on the other side, bought minority shares of the privatised Argentinean telecom carrier. The northern zone was granted to France Telecom and STET and the southern zone to Telefonica. Both new companies are leading the modernisation of the Argentinean telephone network. Telefonica is also managing networks in other countries, such as Chile and

**Table 10: Telecommunications services  
Top EU companies, 1993**

Rank	Company	Country	Turnover (million ECU)	Change 1992/93 (%)	Number of persons employed
1	Deutsche Bundespost Telekom	D	30 057.0	9.3	231 000
2	France Telecom	F	18 895.4	3.6	155 000
3	British Telecom	UK	16 764.9	-0.7	170 700
4	STET	I	15 974.0	9.6	136 184
5	SIP	I	12 553.2	8.6	87 960
6	Telefonica de España	E	8 098.4	5.7	74 340
7	Koninklijke PTT Nederland	NL	7 366.5	4.0	94 314
8	Portugal Telecom	P	6 300.7	N/A	13 000
9	Cable and Wireless	UK	5 949.1	47.9	41 348
10	Belgacom	B	2 704.7	7.3	26 719
11	TeleDanmark	DK	2 116.7	4.5	17 064

Source: Ingerstedt Publishing

**Table 11: Telecommunication services  
Regulatory environment, 1994**

	Main Operators	Regulatory body	Services markets liberalized	Markets for terminal equipment
Belgique/België	Belgacom	Ministry and "Institut Belge des Postes et Télécommunications"	PBX	All wide-diffusion terminals are still a monopoly of Belgacom
Danmark	Tele Denmark, a state-holding, owns 4 regional monopolies and one functional	Telecom Inspection, a public authority, created in 1990, and Ministry	VAS	Liberalized in 1990
BR Deutschland	Deutsche Bundespost Telekom, public service	Specialised department under the Ministry, created in 1989	All, except reserved voice telephony	Liberalized in 1990
Hellas	OTE, public service	Ministry	None	Liberalized in 1993
España	Telefónica, private comp., 33% state-owned	Directorate-General within the Ministry	GSM, VAS	Liberalized in 1987
France	France Telecom, state-owned public enterprise and its holding Cogecom	"Direction Générale des Postes et Télécommunications"	Mobile communications, VAS	Liberalized in 1987
Ireland	Telecom Eireann, state-owned private company	Department of Communications within the Ministry, since 1983	VAS	Liberalized in 1984
Italia	Telecom Italia (58% owned by its holding company STET)	Ministry assisted by Ispettorato delle Poste e Telecomunicazioni"	GSM, VAS	Liberalized in 1993
Luxembourg	"Administration des Postes et Télécommunications", P&T, administration dept.	P&T and Ministry	None	Liberalized in 1993
Nederland	PTT Nederland, 100% state-owned	HDTP, under the Ministry, created in 1988	None	Liberalized in 1989
Portugal	Portugal Telecom and CPRM, under same holding company CN	ICP, under the Ministry, created in 1989	VAS	Liberalized in 1990
United Kingdom	British Telecom Mercury, some other private companies have joined Mercury	OFTEL, independent body, created in 1984	All	Liberalized in 1984

VAS: value added service

Source: European Commission, DG XIII

Peru, while France Telecom is in Mexico. Recently France Telecom set up a joint-venture with Deutsche Telekom and Sprint and bought private data carriers in the United Kingdom, Germany and Italy. BT, allied with MCI, joined with Banco de Santander (E) for offering new data services to the Spanish market.

A new field of alliances and competition is emerging: the one of multimedia services. Most of the EU carriers, as their USA counterparts, strive to set up new partnerships with media companies. Such alliances are necessary for succeeding in the multimedia market as customers are not attracted by new technologies but by new contents and solutions (TV programmes, movies, telematic services). The content is a very scarce and costly resource: for this reason France Telecom, BT, Deutsche Telekom and STET (through Stream) strive to

get the control of this critical factor by setting up national and international partnerships with media companies, such as Canal Plus (F), Bertelsmann (D) or BBC (UK).

### Impact of the Single Market

The Single Market program calls for, on the one hand, the establishment of Europe-wide integrated networks and, on the other hand, the liberalization of the provision of services and infrastructures. Although not a Single Market objective, the liberalization of the market will lead in most cases to the privatization of existing state owned operators. Procedures for public procurement mean that state owned monopolies can no longer maintain privileged relationships with preferred suppliers. Even without the single market program, telecoms monopolies would have been under threat. For example, satellite communications enable private operators to offer inter-

national services and foreign regulatory bodies such as the FCC in the United States demand equal access for their own operators in return for access to the US market. At present, under EU legislation, value added services, private networks, data transmission and mobile communications have been opened up to competition in most EU countries. The basic fixed voice network is to be liberalized on January 1, 1998, at the latest in all countries except Spain, Portugal, Greece, Ireland and Luxembourg, but is already liberalized in the UK and Sweden and is likely to be so in some other countries before that date.

Pan European GSM mobile phone networks have been established and work is going ahead to set up pan-European ISDN and broadband networks. Infrastructures often based on cable TV networks for the local loop and on the networks of electricity companies, railways and motorway operators for long distance are being set up at both national and European level as an alternative to the networks of traditional operators who, despite their obligation to lease lines to their competitors, could retain undue influence.

## ENVIRONMENT

Telecommunication services have a positive impact on the environment, as they reduce the need for physical transport, and consequently pollution. Many services such as satellite remote sensing and telemonitoring, are used for monitoring air, water and soil pollution. Remote sensing services are also used for managing and preventing disastrous events. One minor environmental problem posed by telecommunications is the negative visual impact on the countryside from large transmission stations.

## REGULATIONS

The EU telecom regulation provides a liberalised framework for all categories of services excepted voice telephony and telecom infrastructure. However, the pace and the method of introduction of liberalisation vary according to the laws and regulations in the EU Member States. The United Kingdom liberalisation example of the 1980s (the United Kingdom was the first EU country to privatise its national carrier and to open its telecom market to competition) is likely to be followed by other countries. Already Sweden and Finland have created a liberalised telecom environment.

In the majority of countries, the VAS and the terminals markets are very open to competition. Following an EU directive, at the beginning of 1993, liberalisation came into force for some other telecom services, such as data networks, audiotex, videotex and intelligent fax (free in Sweden). Resale of leased lines and satellite transmission of data through VSAT are usually subject to national regulation but are increasingly allowed. In the field of cellular communications, there is at least a duopoly situation in each Member State. Cable TV is highly regulated at national level in France and Germany, but is very open to competition in the United Kingdom and Sweden. However, a certain degree of deregulation is likely to take place in France and in Germany in particular, as private capital is needed to promote and fund multimedia services.

According to the EU deliberation of June 1993, the liberalisation process will be completed in 1998, when the majority of the EU Member States will also be obliged to open the market for telephone services. The liberalisation of the telecom network infrastructure market should be completed by 1998, following agreement by the Council in November 1994. These factors will have a major impact on the structure and the rate of growth of the sector, which is expected to grow very fast. However, the liberalisation process is not easy: five out of the twelve EU Member States gained exemption from liberalisation of their telephone services: Greece, Spain, Portugal

**Table 12: Telecommunications services**  
**Annual change for value added and employment**

(%)	1992-1994	1994-1997
Employment	-6.2	-6.6
Value added	5.5	5.3

Source: Databank

and Ireland until 2003, and Luxembourg until 2005. However, it might be that earlier implementation of competition occurs in some of these countries.

In most countries with a privatised carrier or PTT, the company is the largest on the local stock exchange. This fact explains why all privatisation plans have been phased, although political factors also weighted heavily. In fact all the EU telecom privatisation plans (in the United Kingdom, Denmark, and the Netherlands) have been, or are being, carried through in stages. In the United Kingdom the process lasted 9 years before completion. A similar course is planned with the largest of the forthcoming flotation, the one of Deutsche Telekom, scheduled for 1996. STET, the Italian state holding for telecommunications, is scheduled to be privatised during 1995, and France Telecom in 1996. In Portugal, the government will sell 25 % to 30 % of Portugal Telecom in the first half of 1995. Greece, Iceland and Belgium are considering strategic partnerships.

The processes of privatisation and of liberalisation of the telecom markets continue to have a major consequence: the creation of public authorities, or regulatory bodies of the telecom sector. In many EU countries regulatory bodies, as OfTel in the United Kingdom, are already being set up. They regulate competition between the domestic carrier and other national and foreign private operators, preventing monopolistic positions and taking into account the needs and interests of end users. In many countries the regulatory body still decides on the basic services tariffs. But, following the United Kingdom example, the price cap mechanism for fixing tariffs has been increasingly adopted by other EU Member States (the price cap mechanism is the automatic increase of a ceiling for the telephone tariffs according to the level of inflation minus a certain level of previously fixed productivity growth).

## OUTLOOK

The telecommunications market will change rapidly because of the introduction of new broadband digital networks, new services and increasing competition. Totally original services are expected in the market, like, for example, video on demand. All the major EU carriers are testing the new multimedia technology and are trying to foresee the major applications and the degree of acceptance by potential users. Video on demand could have a big impact on the diffusion of other technologies and on markets like satellite TV, video recorders and cable TV.

Among other services currently underway, there are the development of high speed networks based on the frame relay protocol (for connecting local area networks), virtual private circuits, broadband services (for transmitting high volumes of data and full motion picture) especially targeted to the business users, intelligent mobile services based on GSM networks; satellite services for data transmission; network management and outsourcing. Also the potential of growth in East European markets is very promising, notwithstanding their current financial troubles.

New players, together with the traditional national operators, will emerge. Worldwide, three or four global companies are likely to stand out: AT&T, BT and Japan's NTT.

In the "Global information society " report carried out by a group of prominent personalities chaired by the Commissioner Bangemann and endorsed by the European Council of June 1990, the building up of information highways is put at the heart of Europe's future competitiveness. To reach this objective, the report calls for a market-driven revolution and recommends that EU governments accelerate the ongoing process of telecom liberalisation. But there is a risk: the creation of the information super-highways could widen the gap between rich and poor, affluent and remote areas. There are no simple solutions to this very complex problem. However, in order to close this gap, governments and EU organisations should support new regulations to give the maximum number of users access to basic multimedia services. And additionally, for poorer regions of the EU, provide financial support to enhance their telecommunications infrastructure.

In order to realise their common vision of the global information society, the governments of the G-7 group recently agreed to collaborate on the basis of the following principles: promote dynamic competition; encourage private investment; define an adaptable regulatory framework; provide open access to networks; ensure universal provision of and access to services; promote equality of opportunity to citizens; promote diversity of content (including cultural and linguistic diversity); recognise the necessity of worldwide cooperation with particular attention to less developed countries.

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# Education

## NACE 94

*In a constantly changing world, education is called upon to play an increasingly important role in preparing young people to enter the business world.*

*Public expenditure on education represents approximately 10 % of total public expenditure in most EU countries, compared with figures of 12 % in Japan, 14 % in the USA, and 15 % in Switzerland. Europe's future will be built essentially on the quality of its human resources and therefore on the past and future ability of EU Member States and economic actors to develop and disseminate training at school level. Through its content, organisation and the quality of its training and formation, education is the most important factor in meeting the demand and the changing conditions on the labour market. In this sense, education is the most important investment in every country.*

### INDUSTRY PROFILE

#### Description of the sector

The sector comprised under NACE 94 includes all structured teaching activities in schools or universities that issue diplomas at any level.

The structure and the evolution of the teaching sector reflect the way in which each country has responded to its demographic and economic characteristics (mainly in terms of activity and jobs), and has anticipated foreseeable developments.

The organisation of education varies across Member States, with different priorities given to technical and professional teaching, varying importance of part-time education, and country-specific systems of degree levels, diploma types and graduation ages, particularly in higher education. Also, the importance of private education varies considerably across Member States.

#### Recent trends

The share of students in the total population has stayed constant in most countries, though population growth is declining. The proportion of the population younger than 15 year old is decreasing in most countries. This means that individuals receive education during a longer period of their life.

Demographic evolution in EU Member States is generally weak. Between 1980 and 1990 population growth has varied from almost zero percent in Belgium, Denmark and Portugal till 0.5 % in France, Luxembourg and the Netherlands.

This lack of demographic vitality has resulted in a relative ageing of the population of the Member States and a decrease of the number of potential school entrants (Table 1 and Figure 1). For example, between 1980 and 1992 the proportion of the population under 15 year old to the population between 15 and 65 year old fell from 27 % to 24 % in West Germany, from 34 % to 23 % in Italy, and from 42 % to 27 % in Spain. In the USA this ratio stood at 33 % in 1992, and in Japan at 28 %. These countries also have a smaller proportion of people in the age group older than 65 year.

This unfavourable trend affects all Europe, the less developed countries (particularly in Southern Europe) reducing their differences with the more developed countries. It is leading to a decrease of the size of the educated population and of their proportion in the total population.

Nevertheless, school attendance has remained almost constant (see Tables 2 and 3). One reason for this are changes in the period of compulsory education. Figure 2 shows the duration of compulsory education, varying from 8 years in Italy till 12 years full-time in Northern Ireland. In the Netherlands, Belgium and Germany education also is compulsory for 12 years, but in the last 1 or 2 years only part-time.

Recent proposals for changes in the education system generally aim at extending the period of compulsory education, either by lowering the starting age (Belgium, Luxembourg) or raising the school-leaving age (Italy). Luxembourg has recently lowered the starting age from 6 years of age to 4 to help immigrant children to integrate better into the education system. Portugal has decided to extend the duration from 6 years to 9 years in order to raise the overall level of education of the population.

**Table 1: Education  
Population - Share of age groups, 1992**

(%)	15 years	15-64 years	65 years
Belgique/België	18.2	66.5	15.3
Danmark	17.0	67.6	15.4
BR Deutschland (1)	16.2	68.8	15.0
Hellas	17.9	67.6	14.4
España	18.4	67.6	14.0
France	20.0	65.6	14.4
Ireland	26.1	62.4	11.4
Italia	15.7	68.9	15.3
Luxembourg	17.8	68.6	13.6
Nederland	18.3	68.7	13.0
Portugal	19.1	66.9	14.0
United Kingdom	19.3	65.0	15.7
EU	17.9	67.3	14.8
USA (2)	21.5	65.8	12.5
Japan (2)	18.2	69.5	12.3

(1) 1991

(2) 1990

Source: Eurostat: Basic Statistics of the Community



**Table 2: Education****Number of students attending school in the EU by level of education (1), (2)**

(thousands)	1980/81	1985/86	1989/90	1990/91	1991/92	1991/92 (4)
Primary	26 097	23 101	22 101	21 896	21 538	22 386
Secondary	34 545	34 217	32 709	32 486	33 134	34 641
Higher	6 005	7 190	8 275	8 801	9 350	9 516
Total (3)	67 475	65 231	63 783	63 873	64 716	67 324

(1) Data on pre-primary education are not included because of comparability problems

(2) Excluding new German Länder unless otherwise indicated

(3) Including special education

(4) Including new German Länder

Source: Eurostat: Working conditions

**Table 3: Education****Share of population attending school as a percentage of the total population (1), (2)**

(%)	1981	1986	1990	1991	1992
Belgique/België	21	21	21	21	20
Danmark	20	20	19	18	18
BR Deutschland (2)	21	18	17	17	17
Hellas	18	19	19	18	18
España	22	24	23	23	22
France	21	20	20	21	21
Ireland	24	24	25	25	25
Italia	19	18	17	17	17
Luxembourg	14	14	13	13	13
Nederland	24	23	21	21	21
Portugal	19	20	20	20	20
United Kingdom	22	21	20	21	21
EU	21	20	19	19	19

(1) Until 1990 figures include only former West Germany.

(2) Data on pre-primary education are not included because of comparability problems.

Source: Eurostat: Working conditions

reduce the very high illiteracy rate, and enable a greater number of young people to enter higher education. Spain wishes to extend the period of compulsory education both to align with the other countries and to guarantee all its citizens a comprehensive basic education.

The increase in the number of people being educated is to a large degree caused by the extension of programmes (secondary technical and professional education, tertiary education) to meet needs in the job market and technical developments. However, this increase is also owing to the longer time periods that students have to spend (compulsory education) or need

to spend in the education system. The trend of longer education periods reflects both an increasing need for higher education, as a protection against unemployment, and the political desire of many countries to offer as many students as possible the opportunity to complete secondary studies.

In Table 4 is shown very clearly the very large increase in the number of students enrolled in tertiary education. Between 1975 and enrolment in tertiary education expanded by 60 %, whereas the number of students receiving primary education decreased by more than 23. The drop in the total school population almost equals the difference between the fall in the

**Table 4: Education****Participation in education (excluding pre-primary)**

(thousands)	75/76	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Population aged 5 - 24	98 597	99 382	99 989	98 271	97 606	96 655	95 747	94 664	93 357	91 976	90 731
Pupils and students	65 843	66 247	65 874	65 381	64 861	64 547	64 158	63 656	63 175	63 029	63 017
Participation rate	67	67	66	67	66	67	67	67	68	69	69
Index 1980/81 = 100											
Population aged 5 - 24	99	100	101	99	98	97	96	95	94	93	91
Pupils and students	99	100	99	99	98	97	97	96	95	95	95
1st level	110	100	97	95	92	90	89	88	87	86	85
2nd level	93	100	100	100	100	99	99	98	97	96	95
3rd level	86	100	103	108	113	117	120	122	126	131	138

Source: Eurostat: Rapid Reports - Population and social conditions no. 1, 1992



**Table 5: Education**  
**Number of students per teacher**

	1980	Primary 1988	1989	1980	Secondary 1988
Belgique/België	18	14	15	10	6
Danmark	12	12	N/A	11	9
BR Deutschland	17	18	18	14	12
Hellas	24	23	N/A	20	16
España	28	25	22	21	21
France	21	19	17	13	14
Ireland	29	27	27	16	16
Italia	16	13	12	11	9
Luxembourg	14	12	13	12	10
Nederland	23	17	17	15	14
Portugal	18	16	N/A	12	12
United Kingdom	20	20	20	15	14
USA	23	26	N/A	25	20
Japan	25	22	21	17	18
Canada	18	17	16	17	18

(1) 1988

(2) 1990

Source: UNESCO 1991: National report on education

number of primary students and the increase in the number of higher education students. In most countries the second of these opposite trends only partly compensates the negative effect of the first trend.

The participation of girls clearly catches up with that of boys, as is illustrated in Figure 3. Important differences between girls and boys remain, however, in the nature of education. In most countries girls are overrepresented in general education and underrepresented in technical/vocational studies.

#### Education as employment

About four million people were employed in the education sector in the EU in 1987-88 according to the OECD (taking into account only primary, secondary and special education and excluding administrative staff). About 1.5 million people worked in primary education schools, about 2.4 million in secondary schools and 0.1 million in special schools.

In 1992 almost 9 million people were employed in the education sector in the EC according to Eurostat (taking into account all types and levels of education). About 37 % of

the people worked in primary education schools, about 60 % in secondary schools and 3 % in special schools.

#### Private education

In Europe, private education, in other words education that is not directly under the authority of the State, exists in varying degrees across countries. Its importance is a function of the level of education provided and on the nature of the relationship with the State, particularly the involvement of the State in financing private education. Thus, the proportion of private education in Belgium and the Netherlands is very high owing to the fact that it is entirely financed by public funds. There are also hybrid formulas in which State participation methods vary. The higher the amount paid to private school financing by the State, the larger the proportion occupied by private schools in the education system. There are many reasons explaining why the private sector exists and the varying support given to it. These include religious and historical factors, along with a possible difference in quality, and the offering of special programmes.

Recently in France an agreement was reached with the Catholic education sector (17 % of all pupils) on the recruitment and

**Table 6: Education**  
**Student population in upper secondary education, 1991/92**

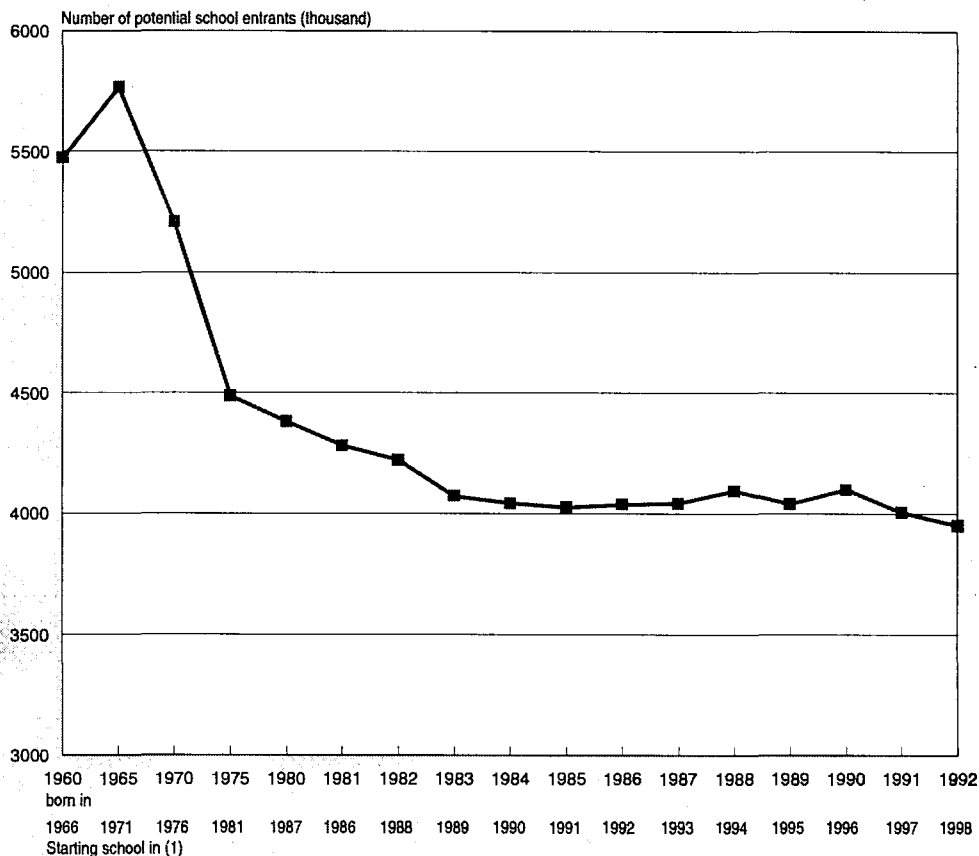
	Total (thousands)	General (thousands)	Share (%)	Vocational/ Technical (thousands)	Share (%)
Belgique/België	617	214	35	403	65
Danmark	221	75	34	146	66
BR Deutschland (1)	2 874	580	20	2 294	80
Hellas	422	278	66	144	34
España	2 786	1 631	59	1 155	41
France	2 515	1 152	46	1 363	54
Ireland	165	126	77	38	23
Italia	2 858	748	26	2 110	74
Luxembourg	11	4	36	7	64
Nederland	773	231	30	542	70
Portugal	396	N/A	N/A	N/A	N/A
United Kingdom	4 177	1 824	44	2 353	56
EU	17 816	N/A	(1) 39	N/A	(1) 61

(1) Estimate, excluding Portugal

Source: Eurostat: Working conditions



**Figure 1: Education**  
**Potential school entrants in the EU**



(1) Approximately  
Source: Eurostat: Population, Migration, Employment and Unemployment

training of teachers, contributing to a greater equality of educational opportunities, irrespective of the type of school. In Denmark during the last ten years, the number of municipal primary and lower secondary schools has undergone a drastic decline of 12%. On the other hand the number of private schools has increased by 22.5%. The greater number of private schools means cost savings to the public authorities.

#### The pedagogic environment

Table 5 shows the trend towards a reduction in the number of students per teacher. This reduction is motivated by the pedagogic reason that teaching efficiency improves when there are fewer students, but also follows from the slow adjustment to demographic changes.

These numbers relate to national averages and hide important regional differences. The number of students per teacher falls

**Table 7: Education**  
**Number of higher education students per 100 000 inhabitants**

	1981	1986	1990	1991	1992
Belgique/België	2 200	2 515	2 724	2 766	2 852
Danmark	2 069	2 267	2 624	2 778	2 909
BR Deutschland (1)	1 984	2 540	2 744	2 569	2 533
Hellas	1 248	1 829	1 933	1 929	1 942
España	1 855	2 423	2 995	3 134	3 332
France	2 177	2 449	2 800	2 986	3 216
Ireland	1 602	1 977	2 429	2 566	2 855
Italia	1 994	2 084	2 385	2 515	2 701
Luxembourg (2)	N/A	N/A	N/A	N/A	N/A
Nederland	2 562	2 794	2 941	3 190	3 262
Portugal	917	1 002	1 326	1 884	1 939
United Kingdom	1 470	1 822	2 055	2 187	2 398
EU	1 884	2 230	2 532	2 624	2 755

(1) From 1991, including new German Länder  
(2) A significant number of students in Luxembourg attend higher education institutions abroad  
Source: Eurostat: Working conditions

**Table 8: Education**  
**Number of higher education graduates**

(thousands)	1988/89	1989/90	1990/91
Belgique/België	51.8	55.9	N/A
Danmark	19.4	20.3	22.5
BR Deutschland (1)	246.4	250.3	256.7
Hellas	26.1	28.5	28.5
España	121	126.8	131.5
France	N/A	N/A	(3) 248.0
Ireland	17.8	20.5	22.7
Italia	103.1	107	106
Luxembourg (2)	0	0	0
Nederland	64.4	62.4	68.9
Portugal	11	N/A	18.3
United Kingdom	322.4	347.2	371.8
EU (3)	1374.3	N/A	1331.0

(1) Excluding new Länder

(2) There are no students graduating in Luxembourg because only the first one or two years of some education courses take place in the country

(3) Estimate

Source: Eurostat: Working conditions

in some regions due to population drops, but at the same time increases substantially in other regions, notably in suburban areas. Urbanisation is almost complete in countries in Northern Europe (97 % urbanisation ratio in Belgium), but is continuing in other countries, particularly in the South (for example the urbanisation ratio is 32 % in Portugal). This will result in further adjustments in the number of students per teacher.

#### primary schools

Apart from Spain, there are no countries where the structure of primary education is being changed. In the curricula most important changes relate to increasing attention to foreign languages, as is the case in Greece, France, Spain, Italy and Scotland.

In some countries health- and environmental education are receiving greater attention.

#### Secondary schools

Secondary education is the sector where the largest differences between teaching in the various countries are found. These differences are related to subject matter (general or polyvalent compared with technical or professional), and also to its or-

ganisation (full-time and part-time or apprenticeships). This is also the sector where most attempts are made to improve effectiveness by changing the organisation of education.

Two types of policy measures are observed. The first relates to the specification of the various education paths that provide access either to university or to advanced vocational training, depending on the path chosen. Such policies are focused on in France, the Netherlands and Spain. In other countries growing attention is paid to low-achieving pupils and the prevention of early school-leaving.

As is shown in Table 6 in the school year 1991/1992, general or polyvalent full-time education represented 39 % of all education at the higher level of secondary education in the EU. This ratio varied from 20 % in Germany to 77 % in Ireland, compared with 72 % in Japan and 100 % in Canada and the USA. This variation reflects differences in national policies, which emphasise in varying degrees technical and professional formation and therefore preparation for entry into the labour market.

As a whole, higher level secondary education in the EU is geared towards professional needs, but approaches vary greatly across countries.

**Table 9: Education**  
**Relative importance of engineering and natural sciences (early 80s)**

(in % of students)	Proportion of engineering courses in universities	Proportion of natural sciences in universities	Total	Proportion of engineers in the total workforce (in %) (1)
Belgique/België	11.4	10.3	21.6	2.0
Danmark	20.1	9.8	29.9	1.4
BR Deutschland	14.1	18.1	32.2	2.2
Hellas	16.1	15.1	31.2	N/A
France	7.1	12.9	18.7	1.2
Ireland	17.1	14.3	31.4	N/A
Italia	18.3	12.9	31.2	0.4
Nederland	16.3	12.0	28.3	1.8
Portugal	18.5	7.0	25.5	N/A
España	10.5	11.5	22.0	N/A
United-Kingdom	16.7	22.8	39.3	1.0
EU 11	15.0	13.0	28.0	1.4
USA	5.9	11.6	17.5	1.4
Japan	21.6	3.2	24.8	2.5

(1) Regardless of the source : universities, schools (University level)

Source : IRDAC: Qualification deficit in Europe



**Table 10: Education**  
**Non-nationals studying in higher education in the EU, 1991/92**

	Number of students (thousands)	Total as a share of all students in higher education (%)	Share coming from within EU (%)
Belgique/België (1)	27.4	10.0	48.0
Danmark	7.0	5.0	16.0
BR Deutschland	121.4	6.0	(5) 23
Hellas (1) (2)	1.5	1.0	7.0
España (3)	12.2	1.0	36.0
France	163.8	9.0	(3) 17
Ireland (4)	3.8	5.0	47.0
Italia (3)	20.5	2.0	41.0
Nederland	10.4	2.0	39.0
Portugal	6.2	3.0	10.0
United Kingdom	99.6	7.0	(4) 34

(1) Data refer to 1990/91

(2) Excludes university students not enrolled for the first time

(3) Excluding non-university students

(4) Excluding part-time students

(5) Excluding new Länder

Source: Eurostat: Working conditions

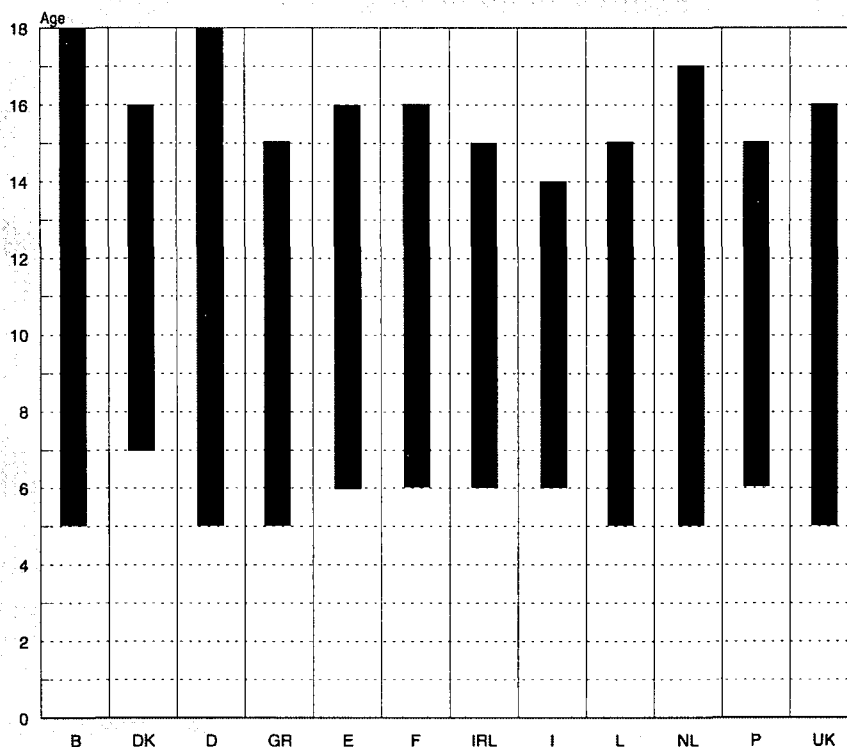
### Higher education

The challenges faced by the EU (relating to trade competition, research and development, demography) have already resulted in a drop in the proportion of unqualified labour. This trend will undoubtedly continue.

Higher education remains an important area of current concern. Issues include conditions of access, the provision of scholarships and bursaries, the autonomy of education and the need for reforms.

In general we see a clear growth in the number of students in higher education and the number of diplomas conferred (see Tables 7 and 8). Participation in higher education varies across Member States. These differences largely follow from the initial situation, characterised in the case of Greece, Portugal and Ireland by a relatively low proportion of students in higher education. These countries are catching up. Higher education is for them an important factor in the political objective of creating the ability to meet the main economic and social challenges.

**Figure 2: Education**  
**Duration of compulsory education in the EU, 1994**



Source: Eurostat: Working conditions

**Table 11: Education  
Expenditure on education**

(%)	Share of GNP				Share of public expenditure			
	1980	1985	1989	1990	1980	1985	1989	1990
Belgique/België	6.1	6.2	5.2	5.1	16.3	15.2	N/A	N/A
Danmark	6.9	7.2	7.4	N/A	9.5	N/A	13.0	N/A
BR Deutschland	4.7	4.5	4.1	4.1	(1) 8.4	9.2	8.8	8.6
Hellas	(1) 2.2	2.9	(3) 2.8	N/A	(1) 16.4	7.5	(3) 5.6	N/A
España	(1) 2.6	3.3	4.8	N/A	N/A	14.1	9.7	N/A
France	5.0	5.8	5.4	5.4	N/A	N/A	N/A	N/A
Ireland	6.6	6.7	(3) 6.6	6.0	N/A	8.9	(3) 8.4	10.2
Italia	6.6	5.0	N/A	(4) 3.1	N/A	8.3	N/A	N/A
Luxembourg	6.1	(2) 4.0	4.4	N/A	14.9	15.7	(3) 17.7	N/A
Nederland	7.9	6.8	6.5	6.3	N/A	N/A	N/A	N/A
Portugal	4.4	4.6	4.9	5.1	N/A	N/A	N/A	N/A
United Kingdom	5.6	4.9	(3) 4.7	4.9	13.9	N/A	N/A	N/A
Schweiz/Suisse	5.0	4.8	4.8	N/A	N/A	18.6	18.7	N/A
USA	6.7	5.0	5.3	N/A	N/A	15.5	12.4	N/A
Japan	5.8	5.0	(3) 4.7	N/A	19.6	17.9	(3) 16.2	N/A
Canada	7.4	7.1	7.1	N/A	N/A	12.7	15.3	N/A

(1) 1979

(2) 1986

(3) 1988

(4) 1991

Source: UNESCO: Statistical Yearbooks

The proportion of women having received higher education has increased from 40.4 % in 1975 to 46.4 % in 1985 (more than 50 % in France and Portugal) therefore approaching the proportion of girls in the 5-24 year old population.

#### Scientific characteristics of the higher education

Given the changes in high level abilities related to new technologies the share of natural sciences and engineering students at universities is of particular interest. Table 9 shows the varying importance of science education in EC countries (the data do not include non-university science education, which exists in some countries - for example Engineering Schools in France). The large differences are determined by two sets of factors:

- historical and cultural factors, which partly explain the share that each country assigns to engineering sciences and natural sciences in university education compared with the total number of subjects, and the share of each of these sciences;
- socio-economic factors, relating to the importance given to engineers in economic activities. If this importance increases, the profession of engineering receives both higher esteem and reward. The case of Japan is an example in this respect.

#### Overseas students

Table 10 shows there are very large differences in the presence of foreign students in higher education, both in absolute and relative terms. There is a very strong correlation between the origin of foreign students and the history of the host country (former colonies, common language, which is obvious in the case of France, Belgium and the Netherlands) The geographical mobility of students is still low, both globally and between countries in the EU. This is explained by:

- the fairly limited knowledge of the characteristics and possibilities of higher education in other countries;
- the non-existence of a genuine common labour market;
- the fear of additional financial costs;
- lack of understanding of the language.

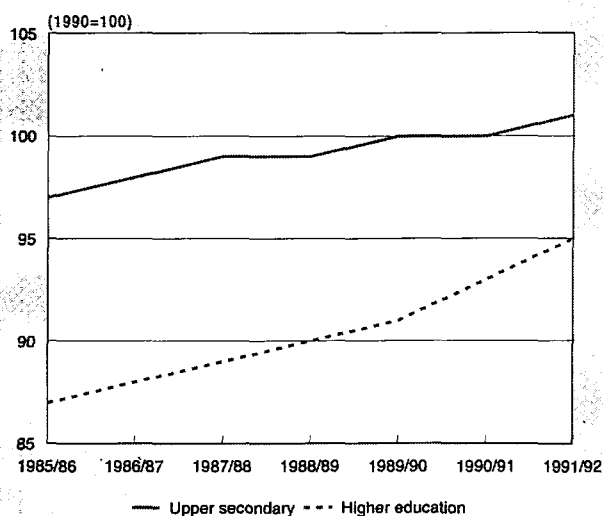
#### Economic factors

Education is generally considered as a public consumption item, with a price close to zero and which, in any case, does not reflect the costs to produce it. However, it also exists as a private consumption item with a price determined freely by the providing schools. In addition, education is an investment item since it affects the future income of the individual and the nation.

The two main indicators of expenditures on education are public expenditures on education as a percentage of the Gross Domestic Product (GDP), and public expenditure on education as a percentage of total public expenditure (Table 11).

The indicator of the ratio of public teaching expenditures to GDP shows a wide dispersion across countries (6.3 % for the Netherlands, 4.9 % for the United Kingdom, 3.1 % for

**Figure 3: Education  
Girls per 100 boys in full-time education**



Source: Eurostat: Working conditions

**Table 12: Education**  
**Distribution of public expenditures on education by education level**

(%)	Primary + secondary		Tertiary	
	1985	1991	1985	1991
Belgique/België	72.0	65.3	16.7	16.4
Danmark	(1) 66.5	(2) 65.2	(1) 30.0	(2) 27.3
BR Deutschland	63.2	N/A	21.9	22.3
Hellas	72.9	(2) 65.2	20.1	(3) 19.7
España	N/A	(2) 70.4	N/A	13.8
France	60.3	57.3	12.9	13.6
Ireland	68.8	N/A	17.7	(3) 20.4
Italia	58.5	73.8	10.2	N/A
Luxembourg	(1) 77.0	86.1	(1) 3.3	(2) 3.3
Nederland	58.5	55.7	26.4	(3) 32.1
Portugal	80.4	79.7	12.7	(3) 16.3
United Kingdom	69.6	74.1	19.8	(3) 19.6
Schweiz/Suisse	N/A	(3) 71.4	18.1	(3) 19.7
USA	75.0	(2) 75.6	25.1	(2) 24.3
Japan	60.1	(1) 79.7	21.4	N/A
Canada	N/A	N/A	28.7	(3) 19.7

(1) 1986

(2) 1989

(3) 1990

Source: OECD Indicators

Italy). This is not surprising considering the difference in the development level of the observed countries. However these major differences are being reduced by the catching-up movement in less developed countries. Another influence to reckon with are the changes in compulsory education. It is interesting to note that in exactly the countries with the highest levels in the early 1970s (the United Kingdom, the United States and Canada) education expenditures dropped most during the period under consideration. The reverse phenomenon is true for countries with the lowest ratios, particularly Greece and Portugal. It is therefore right to conclude that a catching-up movement in the countries lagging behind contributed to convergence of expenditures on education. These countries in-

crease efforts in education as a function of their economic development level.

It is also interesting to consider the differences in expenditures for primary and secondary versus tertiary education in Table 12. The ratio of public expenditures on tertiary education to expenditures on primary and secondary education is lowest in Luxembourg (about 4 %) and highest in the Netherlands (almost 60 %).

#### Comparison by PPP

The complex nature of education creates serious problems for the evaluation of education expenditures and quality, and makes comparisons between countries very difficult. In order

**Table 13: Education**  
**Public expenditures on education per student (1)**

(%)	1980	1985	1986	1987	1988	1991
Belgique/België	N/A	25.0	25.0	24.1	N/A	23.0
Danmark	N/A	N/A	N/A	N/A	N/A	31.2
BR Deutschland	20.4	20.0	20.1	20.2	N/A	N/A
Hellas	16.1	19.5	18.6	18.6	16.8	N/A
España	N/A	N/A	N/A	N/A	N/A	19.6
France	21.0	23.8	23.7	23.5	22.7	21.1
Ireland	24.2	22.1	23.1	22.8	N/A	19.5
Italia	20.2	23.9	24.7	N/A	N/A	N/A
Luxembourg	N/A	N/A	N/A	N/A	N/A	N/A
Nederland	29.2	29.5	31.1	32.8	N/A	N/A
Portugal	18.1	18.4	19.7	19.4	N/A	27.8
United Kingdom	28.3	21.9	22.9	22.6	N/A	28.1
Schweiz/Suisse	N/A	N/A	N/A	N/A	N/A	31.4
USA	20.8	21.2	22.2	22.3	N/A	29.6
Japan	26.0	21.4	21.6	21.1	20.7	22.9
Canada	32.3	30.5	31.1	30.7	30.3	30.6

(1) as a percentage of GDP per capita, taking into account of Purchasing Power Parity

Source: OECD: Education expenditures, cost and financing trench analysis, 1970-1988.

OECD: Education at a glance, Paris 1992/1993



**Table 14: Education**  
**Public expenditures on education as a percentage of total public expenditures**

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Belgique/België	11.4	10.8	10.8	10.4	10.3	10.4	10.1	9.7	9.6
BR Deutschland	9.7	9.6	9.3	9.1	8.6	8.6	8.6	8.4	N/A
Hellas	9.4	8.6	9.0	8.8	9.0	9.2	8.6	8.2	7.4
France	11.0	11.4	11.4	11.2	11.1	11.0	10.9	10.7	10.6
Ireland	12.6	12.9	11.0	11.0	11.1	10.8	11.2	11.8	N/A
Italia	10.5	10.4	10.0	9.8	10.3	9.0	9.7	N/A	N/A
Nederland	13.4	12.8	12.1	11.6	10.9	11.0	11.1	11.4	N/A
Portugal	15.8	9.7	9.8	8.8	9.1	9.2	9.3	N/A	N/A
United Kingdom	12.5	11.7	11.5	11.2	10.9	10.7	11.1	11.6	N/A
USA	14.1	13.6	13.0	12.7	12.7	12.6	12.9	13.0	N/A
Japan	17.7	16.0	5.3	14.9	14.7	14.5	13.9	13.6	13.4
Canada	17.7	17.4	16.3	15.7	15.2	14.7	15.2	15.2	15.3

Source: OECD: Education expenditures, cost and financing trench analysis, 1970-1988

to compare education expenditures between countries, a common measure is needed. The concept of Purchasing Power Parity (PPP) specific to education, recently developed by the OECD, allows to convert different foreign currencies into a same unit by taking into account the relative purchasing power of different currencies. Using this method, the relative effects of education expenditures and their changes may be analysed more precisely.

The first indicator (Table 13) shows the expenditure per student expressed as proportion of GDP per head, evaluated at PPP. The indicator reveals a difference between less developed countries in the EU and the more economically advanced countries, although the difference between these two groups tended to reduce between 1970 and 1988. The two fundamental reasons have already been mentioned: demographic changes and efforts made to reduce the differential by countries such as Portugal, which achieved an increase in expenditure by 100 % between 1973 and 1988. Greece only maintained its level of 50 % relative to the Netherlands. The indicator has been fairly stable in other countries, except the United Kingdom which experienced a major drop, representing the relative disengagement of this country's government from financing education, in particular since the middle of the 1980s. It therefore appears that, measured by the PPP method, a fairly constant relation between public expenditures per student and GDP per capita has been maintained in recent years.

The second indicator (Table 14) shows the share of public education expenditures in total public expenditures, in PPP terms. This constitutes another approach to compare public education expenditures. The trend of the European countries studied is downward in nearly all cases, which would be a concern if part of this trend were the result of a relative reduction in the educated population.

EU countries classified as less developed generally have lower values than the other Member States or than the USA and Canada. This also confirms the fact that education expenditures are a function not only of the development level, but also of priorities and choices defined by governments. The case of West Germany is undoubtedly partly a result of demographic changes and of efforts made in education in the 1960s.

Convergence of the indicator over the observation period (1970-1988) has resulted in lower values recorded for all countries. This decrease is also owing to the less important relative increase in education expenditures relative to other items in national budgets.

Considering demographic changes in European Community countries and the ratio of the 18- to 25-year olds within the total population, it is interesting to note the attitude of the

various governments towards higher education. This comment is particularly important because of the fact that European institutions are strongly encouraging the development of higher education and the mobility of European students by the implementation of EU programmes. Three trends can be observed over the period 1970 - 1988: the trend characterised by Portugal which made a major effort in its higher education and with an average growth over this period of 11.4 %; the trend in Ireland, Greece and Italy where growth has been between 5.5 % and 7.3 %; and finally the one typical of other countries with growth rates between 1.5 % and 2.1 % which appears to characterise an apparent maturity of financial efforts made for this level of education.

While real expenditure on higher education has been increasing in all countries studied, measured in PPP terms, they can not be said to grow continuously. The conclusion is rather one of individual efforts (major infrastructure or education projects) succeeded by periods of stability. Considering the important economic challenges facing Member States, it would be interesting to evaluate the long run economic effects of public expenditures on higher education. Unfortunately, measurements of this effectiveness can often only be made based on economic and social results observed several years after the expenditures were made.

#### *EU policies and Financing*

During the 1980s, the EU has launched a number of actions and programmes in the field of vocational training. Several training programmes were adopted, each having a precise aim: PETRA (initial training); FORCE (continuous training); COMETT (cooperation between firms and universities); EUROTECNET (promotion of qualifications linked to technological innovation).

On December 6, 1994 the European Council has adopted the LEONARDO programme which aims at setting up a global policy for vocational training in the EU. The programme has been endowed with a budget of 620 million ECU for the period 1995-99.

LEONARDO is based on the idea of life-long training. In this respect, initial and continuous training must be seen in the framework of a general conception of vocational training as a permanent process, aiming at ensuring the insertion and the evolution of the individual in the professional life.

In order to promote professional training at EU level, LEONARDO will put into practice three measures:

- the creation of transnational pilot projects for the setting up of common training models, the training of trainers, the anticipation of future needs, etc.;



- the creation of exchange and placing programmes, which will allow young people, students, trainers and human resources managers to follow part of their vocational training in another Member State;
- the development of knowledge in the field of vocational training, through a number of enquiries and analysis to be made at Community level, e.g. on the anticipation of future needs, the transparency of qualifications, new learning processes, etc.

In parallel to the LEONARDO programme, the EU has also developed the SOCRATES programme in the field of education. The programme aims at building on the achievements of previous programmes in the field of education, such as ERASMUS, EURYDICE and LINGUA.

SOCRATES seeks to pursue several objectives:

- to develop the European dimension in education at all levels, so as to strengthen the spirit of European citizenship;
- to promote a quantitative and qualitative improvement of the knowledge of the languages of the EU, in particular those which are less widely used and taught;
- to promote intensive cooperation between institutions in the Member States at all levels of education;
- to encourage mobility of teachers and students;
- to encourage the academic recognition of diplomas, periods of study and other qualifications;
- to encourage open and distance education in the context of the programme;
- and to foster exchanges of information and experience.

Impact of the Single Market

The free movement of persons can be seen as the single most important beneficial effect of the Single Market Programme on the education sector. This is especially applicable to students and teachers in the field of higher education. The exchange is stimulated by programs like ERASMUS and LINGUA, which in turn have resulted in further development and new initiatives.

As beneficial effects can be seen:

- students who visit universities abroad for a certain part of the curriculum;
- more opportunities to do the term of probation in another country;
- contacts between teachers while preparing these exchanges;
- combined efforts to start new studies, which take place in a number of countries;
- teacher training abroad, as refresher courses;
- new curricula like 'European studies', as a separate study or as a specialisation within another programme;
- revival of interest for foreign languages.
- The mutual recognition of diplomas is an important formal barrier which has recently been addressed, thereby increasing the mobility of students. However, students who want to gain experience in one of the other EU countries still encounter a lot of practical obstacles. A considerable number of institutions are not yet prepared to welcome everybody since a number of measures are not yet fully realised.
- Education is an important contributor to better qualified human capital, thereby strengthening the competencies to compete. In future, co-operation between institutions should further increase to realise a better economic position in certain regions and to enhance the clustering of special expertise in spearhead projects.

## OUTLOOK

Education in the EU faces a number of developments, which simultaneously constitute tasks to be addressed.

The first development concerns higher education. In this respect European education systems must:

- increase the proportion assigned to scientific and technical programs in order to satisfy the needs of senior technicians and engineers in the various economic sectors;
- increase relations between economic sectors and education by making more use of engineers and research workers from industry in education, and by engaging in common projects;
- increase harmonisation of curricula and teaching programmes between universities and countries, in order to improve collective vitality while maintaining individuality.

Some progress has already been made in these fields. These efforts must be increased and consolidated, and also made better known. The various EU projects contribute towards this.

The second development concerns improving the overall efficiency of education systems. This efficiency may be measured by the number of diplomas currently conferred, but in reality its effect as investment will be felt throughout the subsequent careers of the students graduated.

To advance in both tasks outlined above new education techniques (remote education, interactive computer assisted education...) should be integrated, to allow teachers to concentrate on their main objective: to learn future workers how to learn, i.e. to instruct them in self-training, which will prepare them for any needed adaptation throughout their professional careers.

The problems faced by the education system in adjusting to the labour market, which have contributed to the 15 million unemployed in 1990 (annual average), require urgent solutions. The young need methods of reinserting them into school activities (giving them the same opportunities as those that have been able to follow standard curricula), or to include them in training programs to acquire operational skills meeting the needs of economic sectors. For job seekers who have already had a professional activity, experience has shown that reconversion problems are better solved when they are anticipated. The example of companies that have implemented reconversion operations (possibly leading to diplomas), sometimes months or years before a reduction in the workforce materialises, demonstrates the benefits such programmes.

Finally, we should emphasise the effects, which will increase in future years, of the arrival into the secondary education systems of the smaller numbers of students currently in primary education. The question of a reorganisation or redeployment of infrastructures and teaching facilities, and in numbers and abilities of teachers, has already arisen in some countries and will arise in the other. The ability of education systems to provide solutions will affect the qualitative and quantitative development of higher education.

In short, the basic tasks of education policies in the EU and in the Member States is to mobilise the needed financial resources and teachers to provide education that can promote competitiveness and social harmony within the EU.

Written by: Bakkenist Management Consultants



# Health care services

## NACE 95B1, 95C1

Health services account for approximately 7.5 % of GDP in the EU, and 5.5 % of EU employment. Although national health systems vary significantly across countries, on average about half of total expenditures on health is accounted for by hospitals. Another 15-20 % is spent on pharmaceutical products, the remainder relating to "other" medical expenditures (including primary care).

Over the past decades, real health spending grew at a rapid rate, increasing its share of overall public expenditure and raising concern about the future financing of health services. About 78 % of total spending on health is, indeed, covered by public insurance systems, the share ranging from close to 70 % in the Netherlands to 85 % or so in the UK. The decade of the 1990s will likely see major changes in health systems aimed at further increasing the overall efficiency of these services (i.e. reducing the cost while maintaining and if possible increasing the quality of the services and the accessibility to all). Important changes in the regulatory environment have either recently been implemented or are in the pipeline. All actors in this sector will have to adapt to these changes. Restructuring is already under way in two key segments of the market (hospitals and pharmacies).

### INDUSTRY PROFILE

#### Description of the sector

Health services encompass all services supplied by:

- medical doctors (generalists and specialists), dentists and veterinarians;
- pharmacists;
- drug stores;
- chemists;
- paramedical centres;
- hospitals, clinics and polyclinics;

- registered nursing homes, psychiatric institutions and other special treatment centres;
- first-aid centres and health centres;
- home medical services supplies;
- nursing services (including leased nursing care services);
- mobile medical equipment services;
- rehabilitation services.

Total spending on health, on the other hand, includes all personal medical services (by hospitals, paramedical service suppliers, doctors etc., including purchases of medical products), as well as all "collective" expenditures such as public health programmes, investment in medical equipment, the administration of the health sector, the financing of regulatory bodies, etc.

In other words, measured on a "turnover" or "expenditure" basis, the activity of this sector includes the purchases of pharmaceutical products and of medical equipment. Although medical equipment only accounts for a small share of total spending on health (about 1-1.5 %), this is, however, not the case of pharmaceutical products. Nevertheless, because the production and sales of pharmaceutical products is covered in a separate monograph (in the Chapter 6), here we focus on the trends in activity by all the actors listed above, leaving the detailed discussion of the trend in demand and prices of pharmaceutical products aside (except where it is specifically relevant to the activities of the above-mentioned agents).

A second introductory remark is that, although statistics on health exist in all EU Member States, caution has to be exerted in making international comparisons. This is the case firstly because of the limited comparability of data, and secondly because of methodological problems arising from comparisons of data from different economic, institutional and demographic structures. Among the many problems that arise are the fact that:

- National accounting systems for health service expenditures mainly reflect domestic accounting needs, as opposed to a desire to appropriately reflect the activity of the sector. In some countries, thus, the administration of the health system is considered to be part of the health sector, but this is not the case everywhere. In France, for instance, the social security employs some 80 000 people, or one twentieth of total health services employment, but this is not reported in the total employment figure for the health sector, as it is part of the social security accounts.
- The distinction between "health" and "social" services is not clear. Different Member States interpret these in different ways. There is, in particular, no universally accepted definition of "hospital", "nursing home" or "special treatment centre". In Sweden, for example, psychiatric aid and aid to mentally retarded is classified as "social" spending, whereas elsewhere it is included in total expenditures on health.
- In certain countries, some health services are provided as charities and are thus not reported in the statistics, or are valued differently from market services. This raises the problem of comparing the "value" of a given service across countries.
- In some Member States, entire segments of the health market are controlled or operated by the government sector, which, again, is not the case in others. This creates distortions in the classification of information and in the valuation of the services.
- Within the health sector itself, definition problems can arise due to differing regulatory environments. It is, for instance, extremely difficult to correctly assess the value added of hospital services, as most accounting systems do not dis-

**Table 1: Health care services**  
**Total expenditure, 1991**

	Expenditure (billion ECU)	Per capita (ECU)
Belgique/België	12.5	1 252
Danmark	6.9	1 333
BR Deutschland	108.3	1 343
Hellas	3.0	289
España	28.4	728
France	87.9	1 536
Ireland	2.6	728
Italia	77.6	1 367
Luxembourg	0.5	1 355
Nederland	19.3	1 277
Portugal	3.8	384
United Kingdom	54.2	939
EU	405.0	1 171
USA	606.7	2 379
Japan	180.1	1 449

Source: OECD "Health Systems"



**Table 2: Health care services**  
**Public share in total expenditure on health**

(%)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	83.4	81.5	85.9	82.3	83.0	81.8	79.4	83.1	89.1	88.9	88.9	88.9
Danmark	85.2	85.0	85.4	84.8	84.5	84.4	85.5	84.3	83.6	83.2	82.8	81.5
BR Deutschland	75.0	75.0	74.7	73.3	73.0	73.6	74.1	73.7	73.9	72.2	71.6	71.8
Hellas	82.2	84.4	91.3	88.0	87.6	81.0	80.7	79.6	82.6	75.0	77.0	N/A
España	79.9	78.7	79.4	84.5	81.7	80.9	79.0	78.3	82.1	80.9	80.5	82.2
France	78.8	79.5	79.0	77.9	77.4	76.9	76.3	76.4	74.7	75.1	74.4	73.9
Ireland	82.2	82.8	81.8	79.7	78.0	77.4	76.4	74.7	72.7	73.0	74.8	75.8
Italia	81.1	79.4	78.6	78.8	78.1	77.1	75.9	77.6	78.0	76.8	77.6	77.5
Luxembourg	92.8	92.9	93.0	89.2	89.1	89.2	89.4	91.6	91.7	91.1	91.4	N/A
Nederland	74.7	75.2	76.0	75.3	75.6	75.3	72.4	73.6	72.6	72.2	71.3	73.1
Portugal	72.4	71.2	62.3	56.2	54.9	56.3	57.8	57.8	57.8	57.8	61.7	N/A
United Kingdom	89.6	89.1	87.8	87.5	86.9	86.3	84.9	84.3	90.4	83.6	83.5	83.3
EU	81.4	81.2	81.3	79.8	79.2	78.4	77.7	77.9	79.1	77.5	78.0	N/A

Source: OECD "Health Systems"

tinguish the external services that are provided by hospitals from regular hospital services. This tends to inflate the expenditure figure attributed to hospitals in those countries where hospitals do have an important part of their revenue which comes from "external" services. Even so, hospital in-patient care is generally much better documented than ambulatory and preventive care.

The statistical information available from national sources is thus neither consistent nor comparable across countries. The data source which is used for international comparisons here is the OECD. For many years indeed, the OECD has undertaken to harmonise health statistics and present them in a more comparable format than what is available from national sources. Another source of data is the pilot survey of European countries carried out by the Working Party for Comparative International Health Statistics.

### Recent trends

Within the EU, total spending on health accounts for approximately 7.5 % of GDP, or more than 8 % of total private and public current expenditures. Since the mid 1980s, there has been a distinct slowdown in the growth of nominal expenditures on health. This trend was reinforced after 1990 as regulatory changes aimed at limiting the public sector deficits curbed both the demand and the supply of health services.

On the demand front, changes in reimbursement systems involving an increase in the share of the cost which is to be paid by the patient, a closer monitoring of medical practices and restrictions on minor ailments being supplied with prescription treatment have negatively impacted both the number of visits to the doctor and the "average value" of the prescriptions. On the supply side, some of the direct implications of the regulatory changes have been reductions in the number of hospitals (often the smaller ones) and in the number of pharmacies (through changes in ownership leading to an increased concentration of this sector also). Finally, controls on the fees charged by the providers of medical services have also been reinforced in order to limit the growth in nominal spending.

All these measure, combined with the general effects of the economic slowdown on consumer spending, have spilled over to nominal and real income growth in the sector, and are now also having an impact on employment levels.

### International comparison

In 1991, total spending on health within the EU amounted to 405 billion ECU, which compares with a figure of 180.1 billion ECU for Japan and 606.7 billion ECU for the US.

Per capita, average spending in the EU amounted to 1 171 ECU, slightly lower than the Japanese figure of 1 449 ECU figure and much lower than the US figure of 2 379 ECU. In fact, although per capita spending in the EU is generally considered to be excessive, the share of total expenditure on health in total private and public expenditure spending is, at about 8 %, well below the US figure of 13.4 %.

Important differences between the EU and the US also exist both in terms of the organisation of the health market and in terms of the source of financing. In the EU, approximately 78 % of total expenditures on health are financed by the public sector, whereas in the US this share is only about 35 %.

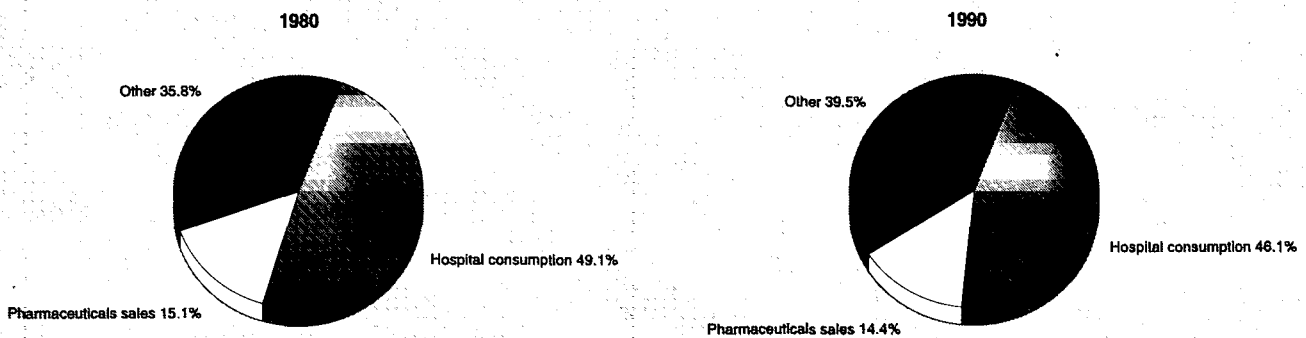
### Foreign trade

Trade in health services covers medical services provided in one country to residents of another country. This can be the case for patients located near the borders or for migrants, and also includes emergency care during international transits and patients being treated in other countries because the required service cannot be provided domestically. There are also some centres of excellence which rely upon patients travelling internationally to maintain continuous specialty services or further develop pioneering work.

Intra-EU trade in health services is comparatively limited when compared to the total value of health services provided within the EU. Such trade is, however, not restricted to neighbouring countries, so that there is both intra-EU and extra-EU trade in this sector. Extra-EU exports of health services consist of all services provided by an EU health service organisations to residents of a non-EU Member State, for instance from an African country or from Latin America. These patients generally seek the services of highly specialised hospitals or clinics that offer superior treatments to those found in their home countries. Similarly, imports of health services are those expenditures on health services made by EU residents in a non-EU country.

It is generally recognised that the EU has a net surplus on its medical trade balance, although the exact magnitude of this surplus is difficult to ascertain. Data on trade in services are indeed somewhat unreliable, given that only a relatively small proportion of these "international" health services are subject to reimbursement by national health organisations. The "true" value of the services often goes undeclared.

**Figure 1: Health care services**  
**Breakdown of total spending on health in Western Europe, 1980-90**



Source: ECO-SANTE OCDE

## MARKET FORCES

### Structural trends

On average in the EU, 1 171 ECU are spent per year on health, on a per capita basis. This compares to annual per capita spending of 1 253 ECU on food, drink and tobacco, and of 191 ECU on clothing, for example.

Until the mid 1980s, total expenditures on health were rising much faster than GDP or domestic demand, both in nominal and in real terms. In western Europe, the share of health spending in total private and public expenditure spending grew from 3.7 % in 1960 to 5.1 % in 1970, 7 % in 1980 and 8.1 % in 1991. Given that in most Member States it is public insurance systems which cover the lion's share of total expenditures on health, this rapid growth in demand has become a major source of concern for national governments.

The main cause of the increase in health spending has been an increase in expenditure in real terms, as opposed to price developments. Within Europe, price increases in the health service sector have, indeed, remained limited, largely as a result of regulatory controls.

The growth in real spending, which amounted to 5.4 % per year on average in western Europe in the 1970s, and to 2.5 % per year on average in the 1980s, can be attributed to:

- the increased share of the population which is covered by the national health system (this factor now ceases to influence spending, as nearly 100 % of the population is covered within the EU);
- demographic developments, in particular increased demand for services from an ageing population, combined with an increased life expectancy of individuals;
- the expansion of the health delivery system;
- changing demands from consumers;
- the increasing sophistication of modern medicine, which increases the unit value of given services and influences the types of services that are provided.

In 1990, the percentage of the total population aged over 65 ranged between 11.4 % (in Ireland) and 15.7 % (in the UK). In total, there were close to 49 million people aged over 65 in 1990 in the EU. With the increase in life expectancy and taking into account the present age structure of the EU popu-

lation, the total number of individuals aged over 65 is currently rising at an average annual rate of about 1.5 %. This clearly boosts total demand for health, particularly for nursing services (both domestic and external).

Another factor of increase in "real demand" for health services is that nowadays health makes routine use of technologies unimaginable only two decades ago. New diseases have also been discovered, new treatments have been developed and new services have been introduced (such as screening programmes) adding to the problem of spiralling costs. Most of these developments have created and will continue to create a need for more specialised service providers. Finally, the cost of equipment increases continuously, which impacts that of medical supplies and treatments in general.

Compared to the growth in volumes, that in prices has been moderate. This is largely due to regulatory controls. On average over the decade of the 1980s, the estimated rate of inflation on health services in western Europe was 0.5 % higher than the overall rate of inflation in the economy, the difference for pharmaceutical products being -0.5 % per year and for hospital and related services +1.1 % per year. This latter figure, however, does not appropriately reflect gains in productivity posted by hospitals, such that the true underlying price increase for health services is probably lower than the overall rate of inflation in the economy. In the US, in contrast, the price index of health services (including pharmaceutical products) grew 2.7 % per year faster than overall inflation, largely due to the rapid increase in pharmaceutical product prices (+3.8 % per year faster than overall inflation in the economy) which have largely remained uncontrolled.

Figure 1 shows the decomposition of total spending on health in the main European countries into hospital consumption, pharmaceutical product sales and other and Figure 2 compares spending on health per capita to the share of total expenditure on health that is financed by the public authorities.

Figure 2 presents average figures for western Europe, based on OECD data. There are, however, important differences in the structure of health spending by country which reflect differences in the regulatory environment and in the incentives systems within each Member State. For instance, the proportion of expenditure in hospitals in total health spending is higher than the west European average in Denmark, Greece and the Netherlands, and is lower than average in Germany, Belgium, Ireland and Luxembourg. In 1990, on average 46 %

**Table 3: Health care services**  
**Health care expenditure at current prices**

(billion ECU)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	5.6	6.2	6.4	6.9	7.2	7.8	8.6	9.3	9.8	10.6	11.6	12.5
Danmark	3.2	3.5	3.9	4.1	4.4	4.8	5.0	5.6	6.0	6.2	6.5	6.9
BR Deutschland	49.1	53.1	57.2	62.5	67.8	71.2	77.4	83.1	89.3	89.3	98.1	108.3
Hellas	1.3	1.5	1.7	1.8	2.0	2.1	2.2	2.1	2.3	2.6	2.8	3.0
España	8.6	9.7	10.9	10.6	11.6	12.4	13.2	14.5	17.5	21.6	25.5	28.4
France	36.2	41.2	44.9	48.2	54.0	58.5	63.2	65.4	69.8	76.1	82.9	87.9
Ireland	1.3	1.4	1.6	1.8	1.9	2.0	2.1	2.0	2.1	2.2	2.4	2.6
Italia	22.4	24.6	28.4	32.9	35.9	39.4	42.7	48.4	53.7	60.4	69.7	77.6
Luxembourg	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
Nederland	9.8	10.4	11.8	12.6	12.9	13.3	14.5	15.3	15.8	16.5	17.9	19.3
Portugal	1.1	1.4	1.5	1.4	1.5	1.9	2.0	2.2	2.5	3.0	3.1	3.8
United Kingdom	22.3	27.9	29.4	31.7	33.5	36.1	34.5	36.1	42.5	45.8	47.7	54.2
EU	161.0	181.2	198.0	214.9	232.8	249.8	265.8	284.4	311.7	334.7	368.6	404.9

Source: OECD "Health Systems"

of total expenditure on health in western Europe was spent in hospitals. This compares with a share of 14.4 % for pharmaceutical products, and the rest for primary care and other.

The fast growth in real health expenditure within the EU during the 1970s was mainly attributable to a rapid expansion of services provided by the hospital sector (incl. specialised medical institutions). Over the same period, the share of pharmaceutical expenditures (which includes the margins on pharmacists) decreased, and so did "other" medical expenses. During the decade of the 1980s, hospital expenditures were brought back under control and the share of expenditure on pharmaceutical products remained broadly stable, while that of primary services grew rapidly. Two exceptions to this general pattern within the EU are Italy and the Netherlands, where expenditures on pharmaceutical products grew faster during the 1980s than other health related expenditures, including primary care.

### Employment

The definition problems in assessing the number of people that are employed in the health services sector are at least as complex as the statistical problems in valuing the services that are provided. The definition of the categories of health service employees has tended to change over time, creating gaps or discontinuities in the time series and making international comparisons extremely hazardous. Even where the number of individuals working in a given market segment is reported (for instance, the number of nurses in hospitals or the number of physicians in activity) some of these (23.5 % on average in the EU) only work on an occasional or part time basis (see Table 5). The share of part-time workers is as high as 52.6 % in the Netherlands and 41.7 % in the UK. Finally, especially amongst the liberal professions, such as doctors, the individuals often continue to be registered after reaching retirement age, even when they are no longer or only occasionally practising.

It is nevertheless estimated that within the EU as a whole the health sector provides employment to 7.9 million people, more than 5.5 % of total employment. Table 6 shows the distribution of employment by function.

On average within the EU, physicians account for 13.5 % of the total workforce in the sector, and dentists for 2.4 %, whereas pharmacists represent 2.9 % of total employment and nurses and midwives 27.8 % of total employment.

The trend in employment by category is discussed in more detail below in the section on Industry Structure. The total trends shown in Table 4 are difficult to interpret, given that no figure was available for Italy until 1992, and the unification

of Germany caused a discontinuity in the total employment trend in that country also. Nevertheless, it is safe to say that the number of people employed in the health sector has increased continually over time, in line with the growth in demand for these services.

### Institutional factors

One of the main features of the health services sector which distinguishes it from other service sectors is the source of revenue. There are four main sources of revenue for the service providers: the public health insurance system, private health insurance, personal incomes and government subsidies. Within the EU, it is public spending on health which accounts for the lion's share of total expenditure on health (Table 2 and 7). Table 2 shows the total share of expenditures on health which is financed by the public sector, whereas Table 7 breaks the source of financing further showing the exact contribution of the government sector versus the social security system, private insurance, personal incomes and other.

Public health funds are collected through sickness fund agencies (such as ziekenfondsen in the Netherlands or the mutuelles in Belgium), through national insurance contributions or from taxation. In contrast, private insurance is paid by people who opt for additional or alternative coverage to national health provision, or who are excluded from coverage by the national health system because of a too high income level (as in Germany) or other reasons.

Other sources of revenue for the health sector are non-reimbursable contributions made by patients directly to the health provider. These payments can be relatively important but are not necessarily correctly assessed in overall health spending statistics. Another problem in terms of statistical reporting arises from the fact that in some countries it may not be necessary to make payments for most health services, whereas in others payments must first be made by the patients or their relatives and then be reclaimed through sickness funds.

On average, however, the share of total health spending which is financed by the public sector within the EU has stabilised around 78 %, the rate of reimbursement being close to 90 % for hospital services and much lower for pharmaceutical products.

Not surprisingly, the organisation of the "supply-side" of the sector partly reflects the organisation of revenue by origin, in that in the countries in which national health systems are most developed, the share of "public-owned" or "public-operated" health services is higher. This is typically the case of the UK and Denmark.

**Table 4: Health care services  
Number of persons employed**

(thousands)	1988	1989	1990	1991	1992
Belgique/België	201	202	204	225	212
Danmark	164	153	166	168	172
BR Deutschland	1 443	1 516	1 638	1 675	2 154
Hellas	113	117	121	124	126
España	372	416	428	467	466
France	1 370	1 361	1 313	1 311	1 357
Ireland	67	71	77	76	74
Italia	N/A	N/A	N/A	N/A	1 151
Luxembourg	7	7	7	6	7
Nederland	451	463	481	509	517
Portugal	109	115	116	129	194
United Kingdom	1 331	1 383	1 353	1 429	1 515
EU (1)	5 628	5 802	5 905	6 118	7 946

(1) For 1988-1991, excluding Italia  
Source: Eurostat: Labour force survey

### Government policies

The objective of government policies in the health sector is not to limit costs but to maximise efficiency gains (i.e. improve the price/quality ratio). The big policy issue for the sector is thus how to increase efficiency while ensuring social equity. Two sub-questions are:

- the public/private debate: is there an optimal allocation of health services between public/private operators, and if so what is it?
- how can one ensure an appropriate level of competition in the sector while ensuring that quality services remain accessible to all at a socially acceptable cost.

There have been more answers to these questions than there are Member States in the EU. In general, however, governments have pursued these objectives by:

- controlling prices;
- controlling demand (in particular by putting limits on prescriptions for small ailments or through the introduction of RMOs in France);
- increasing the permeability between the different segments of the health market, by encouraging shifts in some types of expenditures from one segment of the market to another (reducing the length of stay in hospitals to substitute it by primary care, or increasing the number of drugs that can be purchased without a prescription, or encouraging self-medication)

The long run effect of such measures on health spending is, however, largely unknown. There are, indeed, obvious trade-offs between short and long term health spending. Would a reduction in the length of a hospital stay not increase the re-admission rate? To what extent would an increase of primary care (regular doctor's visits, preventive care) reduce the demand for specialised medical services, in particular hospital care? There are not enough studies available to date to answer these questions unambiguously, the more so since the problem has to be analysed on a case by case basis (i.e. including by type of medical problem, the answer for a caesarean section differing from an open heart operation).

In view of the increased need for controlling spending while at the same time guaranteeing access to all to quality services, new concepts have recently emerged, such as QALYs (or Quality-Adjusted Life Years). Cost-effectiveness studies are also gaining popularity.

Monitoring compliance is also an increasingly important element of these analyses, as it has been demonstrated in a number of cases that the monitoring of compliance plus the expenditure on the drugs were cheaper "over the life-time" than the risks of non-compliance (which can lead to hospitalisation).

Below, we review some of the key segments of the market in more detail, and discuss the implications of recent regulatory measures on the level of activity and on employment by segment.

### INDUSTRY STRUCTURE

#### Personal medical services (doctors, dentists, veterinary)

In all EU Member States, the number of doctors in activity has increased continuously since the early 1970s. In 1991, there were 935 000 physicians in activity within the EU, compared to 635 000 in the US. The average number of doctors per 1 000 inhabitants in the EU hovers around three, although there are wide variations by country. The density of physicians is for instance comparatively high in Greece, Spain and Belgium, and comparatively low in Ireland, Italy and Luxembourg.

In comparison, there were 166 300 dentists in activity in 1991, the average number of dentists per 1 000 inhabitants varying between 0.2 in Italy and Spain and 0.9 in Greece and Denmark, with an EU average of 0.48.

The market for primary care is heavily regulated. The market is segmented by country, but the segmentation differs across countries as some services can be provided by one category of health providers in one country and by another in another country. In Spain, the Netherlands and the UK, for instance, only a generalist can refer patients to a specialist. In Belgium, people can go directly to the specialist without a prior consultation, which implies that there are certain medical acts which can be done by both.

There are no reliable statistics on total incomes earned by physicians and dentists within the EU. In France, total private & public expenditure on medical services outside hospitals accounted for about 13 % of total expenditure on health in 1991. In the Netherlands, the figure was a little lower, at about 11 %. This compares with a figure of 19 % in the US. The rate of reimbursement of these medical expenditures by the public sector was 62 % in France, 53 % in the Netherlands and 35 % in the US.

As indicated above, one of the ways governments are trying to reduce overall spending on health is by increasing com-

petition between sub-segments of the market. This has a mixed effect on the activity of physicians in terms of levels, but definitely changes the nature of the work they perform. On the one hand, new technological developments now make it possible to treat certain problems within the doctor's surgeries instead of in hospitals. On the other hand, policies to encourage self-medication would tend to reduce the number of visits to the doctor, thereby negatively influencing this sector's activity. The net effect on costs, especially on long term costs, is, however, largely unknown.

Another implication of the tightening of the regulatory environment for health is on training. At present, 95 % of on-going training of doctors is financed by the pharmaceutical companies, who organise seminars, conferences and congresses to keep them informed about the latest developments in medical science. The sector fears that measures to reduce "advertising" expenditures by pharmaceutical companies will have a negative impact on overall expenditures by these firms on training in this sector, which could also have long term effects or shift the responsibility for on-going training onto public authorities.

### Hospitals, homes

During the 1980s and early 1990s, the share of hospitals in total expenditure on health decreased slowly. The supply of hospital services, measured by the number of beds available, also decreased progressively. According to the OECD, the share of hospital expenditures in total spending on health in France decreased by 5 points between 1983 and 1989. A similar reduction was observed in Denmark (though over a longer period) while in the UK, where hospital spending accounts for less than 25 % of total expenditures on health compared to more than 30 % elsewhere, it has remained approximately stable. This is sharp contrast with the situation in the 1960s and 1970s when, despite strong macroeconomic pressures aimed at limiting the growth in expenditures, the growth in services provided by hospitals continues to increase faster than private consumption. Recent changes in the regulatory environment, such as the 1987 measures to contain hospital costs in Germany and the measures by the Belgian Ministry of Health and Social Affairs in the same year, have thus succeeded in offsetting the natural trend towards increased hospital spending which results from progress in medical science and technology.

Hospitals, taken in the broad sense, account for the lion's share of total expenditures on health within the EU. There are very different types of hospitals within the EU, some being more or less specialised, some being for longer stays

while others for acute care, some private and some public, some big and some small. In four EU countries (Belgium, France, Italy and Ireland), there were 5 777 hospitals in 1991, with an average number of beds ranging from 132 (in Ireland) to 286 (in Italy) in the public sector, and from 58 (in Greece) to 203 (in Belgium) in the private sector.

The organisation of the hospital sector within the EU largely reflects national regulatory environments and national heritage. In general, private commercial hospitals are newer to the system and reflect developments in health insurance paid to private sickness funds or commercial insurance companies. These complement the public infrastructure by providing additional hospital, clinic, day centre and nursing home facilities. In the UK, for instance, nursing home facilities are almost entirely private. In Italy, private hospitals are part of the general hospital system working under convention (law 833/78) within the national health services.

The home care and primary care sector is also relatively new in its present form. Home-care probably existed before hospitals. In most EU countries, family doctor practices, which provided almost all primary care in the 1960s, were progressively replaced by health centres, until this trend stabilised in the late 1980s. There is now also an important trend of specialised physicians leaving the institutional environment to open practices in the community.

Day hospital care, enabling the patient to be sent home after a minor operation, is slowly spreading in the EU and is encouraged as a cost reduction measure, even though the long term effects on health costs are not fully assessed. Some hospitals have expressed interest in working with hotel groups (this is the case for instance in France). These would provide facilities next to hospital complexes to cater for aftercare of patients who have undergone minimally invasive surgery such as laparoscopic surgery.

Institutions which provide care for chronically ill patients and the elderly have also seen a sharp increase in numbers, as they respond to the needs to an ageing population.

Major changes are thus currently underway within the hospital sector. In addition to the above trends, some Member States (in particular Germany and Belgium) have taken cost containment measures which imply a reduction in the number of hospitals and an increased concentration of existing hospitals into larger units. These measures were based on the observation that the average length of stay (and the total number of days spent in hospitals) increases the more beds were available in the country. The sector is likely to see further

**Table 5: Health care services  
Employment structure, 1992**

(%)	Share of female workers	Share of employees workers	Share of part-time
Belgique/België	72.3	77.2	30.1
Danmark	80.4	91.8	33.9
BR Deutschland	77.0	89.2	23.1
Hellas	56.9	85.8	3.5
España	68.6	94.6	5.0
France	71.7	82.0	17.6
Ireland	76.8	92.7	15.4
Italia	52.3	81.4	4.8
Luxembourg	77.5	87.3	14.1
Nederland	72.9	90.8	52.6
Portugal	73.5	93.8	3.7
United Kingdom	80.0	93.5	41.7
EU	71.8	87.9	23.5

Source: Eurostat: Labour force survey

changes in the 1990s as the rate of occupancy of beds is still low in many areas.

Employment by the hospital sector is difficult to measure, as it includes different categories of personnel, many of whom also exert a professional activity outside the structure of hospitals. The past trend in the number of physicians has already been described above. Available surveys on the trend in and level of employment by nurses and other specialised personnel reveal huge differences across countries, which reflect more the great diversity of structures and categories of personnel than fundamental structural differences. The total number of nurses and specialised personnel in activity by country is nevertheless reported in Table 9.

### Nursing

The rising demand for health and the ageing of the EU population have caused the number of active nurses to increase considerably, and have also led to significant changes in the scope of nurses' practice. This is evolving in two opposite directions. On the one hand, there is a shift towards more basic forms of care (care provided to elderly in residential services and the community). On the other hand, the development in medical technologies and the changes in the case mix of patients creates a demand for highly specialised, more technical forms of care in acute hospitals.

The fact that training and education systems still vary significantly across countries, as does the regulatory environment, means that there is little cross-country mobility of health personnel (although there is a large body of Community directives which aim at facilitating workers' mobility). In the nursing sector, this implies that there are shortages of staff in certain countries, namely in France and Portugal. Elsewhere, shortages did appear at some point in time due to the rapid growth in demand for nurse care, but this has now either been re-absorbed, or demand itself has been curbed through regulatory measures. In Belgium, for example, the shortage of nurses is regulatory induced, in that the legal staffing norms (number of nurses per 30 hospital beds) are very tight (for cost control reasons).

Notwithstanding the fact, contrary to general belief, there is no structural shortage in labour supply in this market segment, there is still in many countries an inadequacy of demand and supply. This problem could be solved without increasing total health costs by using less-qualified caring personnel for a

range of supportive tasks and for logistics aid, organising in effect a redistribution of the workload.

### Pharmacists

In 1994, there were 188 662 pharmacists in activity within the EU. This represents roughly 2.5 % of total health employment. Contrary to the trend in the number of physicians, the number of pharmacists has tended to remain stable in past years.

In 1994, there were 108 135 pharmacies scattered over the EU. On average, each pharmacy covers a population of about 3 200, the number varies significantly across Member States (Table 10).

Similarly to other segments of the health market, the market for pharmacies is still heavily regulated at the national level. There are two EU directives which set minimum standards applicable throughout the EU. Directive 85/432 aims at an increased harmonisation of the legislative, regulatory and administrative framework for the activities of pharmacies, and Directive 84/433 relates to the mutual recognition of diplomas, certificates and other titles and includes measures aimed at facilitating the establishment of pharmacists in the EU. There remain, however, important differences in the national regulatory environment which prevent pharmacists from circulating freely across the EU. These relate to the right of ownership and to the number of businesses that are authorised. In certain Member States, for example, pharmacies have to be owned by a pharmacist. This is the case in the Netherlands, Spain, Italy and Portugal. In France and Denmark, a license is required. In Luxembourg, there is a mixed system with some pharmacies owned by pharmacists coexisting alongside state (or personal) concessions giving the pharmacists a license to practice. In Belgium, more than 40 % of the pharmacies belong to a commercial organisation, and there are others owned by non-pharmacists. Belgium, however, requires a dedicated pharmacist to run the business. In Ireland also, ownership and operation are dissociated. A non-pharmacist can own a pharmacy provided that he/she gives its management to a pharmacist. The same applies to the UK, where only one third of the pharmacies are owned by individual pharmacists.

A second barrier to establishment is the fact that, in most Member States, the number of pharmacies operating is regulated, generally on the basis of population density or geographic criteria. Belgium for instance has the highest number of pharmacies per capita, and the possibilities for creating

**Table 6: Health care services  
Share of manpower, 1991**

(%)	Physicians	Nurses & midwives	Pharmacists	Dentist	Others
Belgique/België	16.7	30.0	6.0	3.4	43.9
Danmark	10.2	25.0	1.1	3.7	60.0
BR Deutschland	13.9	24.3	2.0	2.7	57.0
Hellas	28.9	33.7	7.0	1.5	28.9
España	10.1	22.6	3.7	2.6	60.9
France	31.4	20.0	6.0	6.6	36.0
Ireland	8.7	42.0	1.9	2.1	45.3
Italia	9.5	33.0	2.9	1.8	52.8
Luxembourg	17.8	22.2	6.7	4.4	48.9
Nederland	10.3	28.0	0.6	2.4	58.7
Portugal	24.2	23.3	10.6	0.7	41.3
United Kingdom	10.2	34.7	1.0	1.7	52.3
EU	13.5	27.8	2.9	2.4	53.4
USA	9.4	25.6	2.5	2.3	60.2
Japan	11.8	38.1	4.5	3.9	41.7

Source: OECD estimates



new ones are very limited. A unit must serve at least 2 000 inhabitants in areas with population of less than 7 500 inhabitants; 2 500 inhabitants in cities with population of between 7 500 and 30 000, and 3 000 in cities with population of more than 30 000 inhabitants. Of course, there can be derogations based on population density in the area. Similar criteria apply in Spain and in most southern Member States (including France). In the northern countries, in contrast, in particular in Germany, Ireland, the Netherlands and the UK, the opening of a pharmacy is not subject to such limitations. The pharmacies nevertheless have to be registered, with the registration body often acting as an advisor, although it is not entitled to reject applications on competition grounds.

Other regulations apply, for instance with respect to the preparation of medical products for human or animal consumption, to the delivery of products or to the provision of certain services (advice to customers) or even to the list of products which can be sold in pharmacies.

Finally, mainly in the southern Member States, the profit margins by pharmacists are under regulatory control. This is part of the government control policy on pharmaceutical product prices. The margins to be applied in each country typically depend on the price of products and their nature (prescription pharmaceutical or OTC). Differences in pharmacists' profit margins, in VAT rates and in pharmaceutical product prices across the EU thus explain a large part of the observed dispersion in pharmaceutical product prices to consumers.

The fact that margins are set by category of product, however, creates an incentive for the pharmacist to sell the most expensive drugs. In France, there have even been cases of pharmacists boycotting new products on the basis of the fact that they were cheaper than their substitute (this was the case with a soluble aspirin introduced in competition to Aspégic, at a 20 % lower price a few years ago). Increasingly, thus the system is being revised in order to avoid this type of distortion.

In the UK, the Department of Health does not exert direct price control on medicines, but there are non-statutory agreements negotiated between the government representatives and the pharmaceutical industry. Recently, a "blacklist" of products has been introduced as a threat on those companies which do not respect the terms of the agreements or refuse to cut prices. (In 1993, a 2.5 % price cut was part of an agreement between the department of health and the negotiating committee of the association of the British Pharmaceutical Industry (ABPI)).

In France, measures to curb spending on health have included a surtax on advertising of pharmaceutical products aimed at curbing volume growth: the tax has been increased from 5 % to 9 % over a two year period. Another measure introduced in France at the beginning of 1994 relates to the publication of "Références Médicales Opposables" (RMO), which give guidelines to doctors on the way they should prescribe medicines to their patients under various sets of circumstances. Should these "norms" or recommendations not be followed systematically, the doctors can be fined, or incur other penalties (déconventionnement). The publication of the RMOs in early 1994 did, in fact, lead nearly overnight to a significant reduction in the prescription of certain drugs, in particular antibiotics and anti-ulcer drugs. Other measures under discussion in France at the beginning of 1994 but not implemented in the end included the definition of a given (reimbursed) price per therapeutic family of products. This system is currently applied in Germany. Difficulties arising with this system were the definition of consistent therapeutic families and the fact that the German experience has shown that it can induce a slippage of expenditures on pharmaceutical products that are excluded from the reimbursement system. The net effect could thus be a growth in overall spending on health, as opposed to a decrease. In view of the above difficulties, no single reimbursable price per category of product was implemented but instead the margins on pharmaceutical products have been modified so that they are now inversely proportional to the price of the drug.

In 1993, France had already reduced the rate of reimbursement by 5 points in 1993, which already led to a significant fall in health spending. As a result, in the first four months of 1994, the turnover by pharmacies in France was down by 3 % in nominal terms.

More generally, past measures to control spending on medicines in Europe have typically taken the form of:

- price controls on prescription drugs;
- increased patient co-payment;
- the removal of products from reimbursement;
- restrictions on minor ailments being supplied with prescription treatment.

Given that the income earned by pharmacists depends on the authorised margin and on demand for pharmaceutical products, all the above measures have caused a fall in sales and incomes on prescription dispensing, the traditional activity of pharmacists. Prescription sales indeed still account for about 80 % of the total turnover of pharmacists. These measures have

**Table 7: Health care services**  
**Share of financing by private and public sector, 1990**

(%)	Government insurance	Social insurance	Private schemes	Medical mutual company	Personal	Employee's organisations	Missionary
Belgique/België	9.4	69.5	N/A	0.0	N/A	0.0	0.0
Danmark	68.5	14.6	1.8	0.0	15.1	0.0	0.0
BR Deutschland	11.1	64.3	5.8	0.0	14.1	5.7	0.0
Hellas	40.2	25.8	5.0	0.0	28.0	0.0	1.0
España	Yes	Yes	0.0	0.0	Yes	0.0	0.0
France	3.9	71.5	6.5	16.5	N/A	N/A	N/A
Ireland	77.5	0.0	0.0	0.0	13.8	0.0	8.7
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Luxembourg	38.8	59.1	2.1	0.0	0.0	0.0	0.0
Nederland	7.3	63.0	17.5	0.0	12.1	0.0	0.0
Portugal	100.0	0.0	0.0	0.0	0.0	0.0	0.0
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Pilot survey of European countries, Working party for Comparative International Health Statistics





**Table 8: Health care services**  
**Public investment expenditure on medical facilities**

(million ECU)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	117.9	207.9	80.3	12.5	13.2	27.2	43.5	N/A	N/A	N/A	N/A	N/A
Danmark	145.6	145.0	141.2	144.9	175.3	207.5	212.8	226.0	261.0	N/A	N/A	N/A
BR Deutschland	2 374.6	2 420.9	2 931.4	3 079.1	2 907.8	3 182.4	3 325.3	3 382.9	3 516.7	3 506.9	N/A	N/A
Hellas	35.3	62.6	41.3	77.5	98.4	103.8	108.2	92.2	90.9	80.0	63.3	72.4
España	255.4	292.0	386.1	280.8	305.3	357.4	366.7	424.8	494.1	790.4	925.5	N/A
France	1 272.8	1 356.3	1 304.1	1 262.3	1 294.0	1 351.0	1 467.7	1 616.5	1 783.6	1 895.0	2 029.2	2 119.5
Ireland	76.9	86.8	71.1	74.1	77.1	79.7	87.2	78.7	61.9	54.1	39.1	41.7
Italia	1 271.5	571.6	421.6	565.4	708.0	748.3	963.7	946.0	1 017.4	1 188.2	1 383.8	N/A
Luxembourg	15.3	19.5	19.5	20.2	21.8	26.1	23.4	29.5	N/A	N/A	N/A	N/A
Nederland	628.2	642.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portugal	60.6	104.6	82.9	68.9	53.9	43.1	54.1	48.6	43.0	45.1	60.7	N/A
United Kingdom	1 029.3	1 265.6	1 464.9	1 461.6	1 606.8	1 713.1	1 612.7	1 421.9	1 515.6	2 027.3	2 203.5	2 405.1
EU	7 283.6	7 175.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: OECD "Health Systems"

also created strong incentives for pharmacists to diversify away from prescription pharmaceuticals into OTC drugs, cosmetics and other general health products.

Another development under consideration is to increase the responsibilities of pharmacists in providing medical advice, hopefully reducing in that way the number of primary visits. Surveys conducted within the EU have shown that over 75 % of the patients indeed wish the pharmacist to hand over their prescriptions and engage in some advisory activity.

Such development could, however, have important consequences on the organisation of the sector and on the pricing of services. It is important to note that this trend is partly in conflict with another trend within the pharmacists business, which is to increase the emphasis on sales of OTC products on which margins are not controlled. For pharmacists to undertake an advisory role in an effective way one would expect that the service would have to be remunerated appropriately. This will be difficult to achieve given the ongoing trend towards increased distribution of non-prescription drugs by retail stores, which puts downward pressure on the margins of these products.

### Impact of the Single Market

The health sector is regulated at national level. To date, very few measures have been adopted to further integrate the hospitals markets. Among the measures which did have some (albeit limited) impact on the sector are those related to the freedom of establishment and the free movement of persons. Other relevant measures include the problem of patients protection, which has led to the adoption of the notion of fault presumption, while the problem of environment protection has led to the resolution on hospital wastes. On the other hand, training and education programmes have contributed to improve the qualifications of employees. However, while some other integration measures have been realised, there has been so far been little evidence of positive effects coming from them. Increased cross-border movements have not led to price harmonisation, and the liberalisation of public procurement seems to have had little impact on the sector.

Remaining barriers to trade are important, and mainly reflect the fact that social security systems differ significantly across countries. Further harmonisation of the health market is conditional on some approximation of national health systems.

### REGULATIONS

The health system is organised on a national basis, with still wide variations in the organisation of the supply and the

sources of financing across countries. The broad lines of the various national systems are briefly described below.

### Belgium

In theory, all Belgians have health coverage through social security. Social insurance has two general schemes: for paid workers and for self-employed. Self-employed have the choice of whether they wish to have full or partial coverage. Companies in Belgium are increasingly offering group insurance to their employees, included in employment benefit packages. These cover extra hospital costs, such as private rooms, other comforts and non-reimbursed medical products.

The social security (public insurance) system is itself financed by contributions from employers and employees and by State subsidies.

Primary health is provided by private general practitioners, pharmacists, dentists and nurses. There are health services (private or public) which are delivered at home. The patients have free access to health services, and free choice of the practitioner whatever the financial circumstances.

Primary health is paid for (and reimbursed by the insurance) on a fee-for-service basis. In case of poverty or insolvency, health is provided by social assistance centres.

Most Belgian hospitals are either private (non-profit) organisations, or belong to the public sector (this applies mostly to the social assistance centres run by the communes). Private "for profit" hospitals have been largely forced out of the system by hospital funding regulations which prevent them from benefiting from state subsidies for equipment and construction. In addition, there are various preventive medicine services, such as industrial medicine and school medicine.

### Luxembourg

The public health system in Luxembourg is organised through a national compulsory social security scheme. There are nine different insurance companies.

The insurance system is financed by assessments from employers and employees, and by contributions from the State. Primary health is provided by private general practitioners, pharmacists, dentists and nurses, and, as in Belgium, there are health services (private or public) delivered at home. The patient normally has free access to health services, and free choice regardless of his/her financial situation. For different examinations, however, the patient needs the approval of the medical control.

Primary health is paid directly by the patients, who are then reimbursed by the insurance company. For hospital expendi-



tures, in 1993 a budget system replaced the previous "fee for service" system, though the physicians fees are not included in the hospital bills.

Hospitals belong either to the private sector (mostly congregations) or to the public sector (run by communes). Others are institutions of public utility.

### Denmark

In Denmark, public health schemes cover the entire population and only allow for limited private insurance schemes, in connection with user payment (in the area of medicine and dentistry). General services provided by doctors and hospitals are free of charge. About 85 % of the financing of the Danish national health service comes from general taxation. In addition, the counties and municipalities are entitled to levy their own taxes. The health system itself is organised at two levels: at county level and at district level. The 16 counties are responsible for running and planning the major health services, such as hospital services and primary health services. The 275 districts, on the other hand, are responsible for the running and planning of most of the social care systems and for certain local health services (such as home nurses, school health and dental services).

In 1989, there were 111 hospitals in total, 300 pharmacies and 13 600 physicians, as indicated in Tables 7 and 9. There were only two private fee-charging hospitals representing less than 0.5 % of total hospital beds.

### France

Almost every person in France is covered by health insurance. The financing of the health system is based on the principles of national solidarity and mutualisation. There are, however, different schemes reflecting a persisting degree of corporatism, which makes itself felt in the varying degree of coverage available to different categories of employees. As in Belgium, thus, some workers pay additional health insurance schemes to have full reimbursement for all services.

The major portion of health costs is paid by the Social Security system, the remaining part being covered by the individual or by optional mutual insurance schemes. The system itself is funded by compulsory contribution from the employees and their employers.

Provision of treatment outside the hospitals can be provided either by physicians practising privately, chosen freely and paid by the patient, or by public dispensaries which are staffed by salaried physicians. The general principle concerning medical consultations is that the patient pays on a fee-for-fee basis,

after which the Social Security system reimburses a percentage of the expenses incurred.

The French state's commitment to the national hospital programme is revealed by the fact that there are public hospitals (centres hospitaliers) in every major town in France. About 40 of these are very large complexes with university affiliation. Private hospitals are numerous but small in size. Roughly 54 % of the 200 000 beds in the private hospital sector are owned by commercial enterprises, 2 % of these being psychiatric institutions. Private hospitals concentrate on the more profitable therapies, as illustrated by the low percentage of long stay beds in the private sector. The share of the private sector is nevertheless progressively increasing in this market segment.

### Germany

Approximately 90 % of the population is insured under GKV, the statutory health insurance system which covers all the low and medium income earners. High income earners may join voluntarily. In practice, the rest of the population (approximately 10 % or seven million) are either privately insured or receive supplementary benefits with automatic health insurance coverage. Patients are free to select the doctor and hospital of their choice, and access to health is available to all citizens, regardless of their financial insurance status.

The statutory health insurance schemes are financed by matching contributions from insured employers and employees. Hospitals are financed by a combination of government subsidy and statutory and private health insurance sources.

The provision of health in Germany is thus primarily a public function, but can be carried out by local authorities or independent non-profit and private facilities. Following the October 1990 unification, East Germany took over the guidelines of the West. This has, however, required a difficult adaptation process. Full harmonisation will not be completed for another few years.

The state and local governments account for less than half of the hospitals. Private hospitals compete on an equal footing with the public hospitals, as they obtain funds through a dual financing system. Funds for capital items are provided by the state and local governments, while other income comes from earnings against treatments. The fees are agreed between hospitals and local sickness fund organisations, and are calculated on a fee per day basis. In 1989, Germany (west) had 3 046 hospitals. The number of hospitals is now declining.

**Table 9: Health care services  
In-patient care beds (all medical institutions)**

(units)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	92 436	92 686	92 138	91 638	90 790	89 589	88 554	N/A	93 245	97 844	N/A	N/A
Danmark	42 504	40 182	39 273	37 900	36 405	35 976	35 606	32 325	31 267	30 229	29 104	N/A
BR Deutschland	707 710	695 603	683 624	682 747	678 708	674 742	674 384	673 687	672 834	669 750	660 735	N/A
Hellas	60 067	59 914	58 938	57 496	57 081	54 438	52 864	51 575	51 587	51 448	51 329	N/A
España	201 035	193 895	189 450	181 794	179 192	175 410	171 860	171 155	170 076	168 514	N/A	N/A
France	597 800	604 031	601 436	594 232	588 377	579 750	574 612	569 184	563 100	558 693	552 755	N/A
Ireland	32 624	32 718	32 508	31 960	31 404	29 320	28 435	25 906	22 751	21 217	N/A	N/A
Italia	548 428	535 741	522 314	508 742	495 054	479 638	457 210	441 682	432 302	412 059	N/A	N/A
Luxembourg	4 667	4 778	4 816	4 740	4 688	4 587	4 616	4 661	4 669	4 642	4 483	N/A
Nederland	173 462	174 512	171 775	172 122	172 420	172 390	172 625	172 650	172 684	172 326	172 060	171 884
Portugal	51 254	51 246	51 173	51 274	50 210	45 818	46 066	46 448	46 062	45 883	N/A	N/A
United Kingdom	458 000	454 923	452 600	446 400	430 815	421 195	409 962	388 711	372 900	365 000	N/A	N/A
EU	2 969 982	2 940 229	2 900 048	2 861 042	2 815 142	2 762 852	2 716 794	N/A	2 633 472	2 597 605	N/A	N/A

Source: OECD "Health Systems"

## Greece

Greece's National Health Service came into being in 1983, replacing the previous social security system. The new system puts greater emphasis on prevention and attempts to remove social inequalities in health services provision, as well as curbing the growth of the private sector.

Approximately 95 % of the population is covered by an insurance fund. In total, there are 80 funds providing health coverage, four of them being particularly important. The largest is the IKA (which provides coverage to 2.56 million employees and to 2.62 million of their families, or 26 % of the total population). Second is OGA (which covers 1.91 million agricultural workers and 0.59 million members of their families). TEBE follows with 0.48 million artisans and 0.82 million members of their families, and the government has the fourth largest fund, covering 0.19 million employees directly plus 0.27 million members of their families, as well as retired civil servants). Voluntary hospitals and private clinics are licensed to provide additional health services.

Most of the expenses on health are reimbursed by the State. For hospitals, the share of government financing is 80 %, with another 10 % by insurance companies and the rest from other sources.

All employees in Greece have to be insured with a governmental insurance organisation. Nevertheless, since the quality of services offered by the public sector is not always up to expectations, patients frequently contribute out of pocket expenses for private care or rely on supplementary private insurance.

## Ireland

Ireland's national health system is financed from taxation and from the government's Health Insurance Scheme. One fifth of the population is covered by additional private health insurance. The Department of Health allocates funds to the eight boards which provide health services on a regional basis.

Access to health services is divided into 2 categories of clients: some have access to the full range of services, whereas the remaining are entitled to free in-patient hospital services in public wards, to most specialist out-patient services, a maternity and infant health services and a drugs refund scheme.

In recent years, the Irish national health system has made efforts to contain health costs, which amounted to 9.3 % of GNP in 1991. In particular, a programme of rationalisation of the acute hospital system has been carried out, involving the merger of small hospitals with larger units. The basis of

this rationalisation has been the concentration of expensive equipment, facilities and scarce skilled staff at large units in order to maximise the benefits for patient care.

Because Ireland's population is much younger than the EU average, the structure of demand for health services is very different from that of other Member States. Part of the reorganisation of the sector has thus also taken the form of a decrease in the number of in-patient facilities, and an increase in day care and out-patient facilities reflecting the latest trends in the delivery of hospital services.

## Italy

The Italian National Health Service (NHS) came into being in 1979, replacing a sickness fund service. The health services are financed by government funds other than taxation, and by general taxation. In effect, there are four financing mechanisms: each independent work or employee must pay in a set quote. Each employer, whether public or private, must pay an additional sum for each of his employees. A surtax is paid by independent workers which is called the health tax. Any additional sum needed is covered by the national government.

Many Italians are increasing their health coverage through private insurance. There are approximately 1.5 million private policies providing coverage to approximately 3.7 million people. Generali is the main insurance group involved in the private insurance system in Italy, accounting for roughly 14 % of private insurance contracts. RAS, SAI and Fondiaria have market shares of 9 %, 7 % and 5 % respectively. Access to health services is available regardless of financial of insurance status of the client.

Health is organised on a regional level. Of the private hospitals, 90 % are permitted by the national health system to provide services to national health service patients. They work within a convention made by local health units (USL).

A law of December 1991 requires that for 1 000 inhabitants there must be 6 beds, one of which must be for rehabilitation or long-stay. This standard applies to public and private hospitals alike. Private hospitals are paid on a daily rate basis. Those which are accepted in the plan are reimbursed by local health units for services that they provide to patients insured under the national health service plan.

## The Netherlands

Health in the Netherlands is decentralised and organised to a large extent by sickness funds and local authorities. This reflects the fact that, historically, the system has developed through the efforts of voluntary private organisations. At present, there are more than 70 sickness funds. Not every person has the same rights concerning coverage. Persons with above average incomes for example are not entitled to full reimbursement by the national system. Private insurance is available for those not covered by the general federal programme. Regarding payments, fees and costs of products must be paid by the patients, but most are recoverable from the ziekenfonds retrospectively. Reimbursement rules also vary from one locality to another.

The system itself is financed from personal contributions by employees, by contributions from employers and government subsidies.

Local and regional authorities are responsible for ensuring that the health services they provide comply with national standards.

Public and privately owned hospitals operate under the same conditions. A part of their budget is provided by the Ministry of Health, and the rest comes from reimbursement given by the ziekenfondsen (sickness funds).

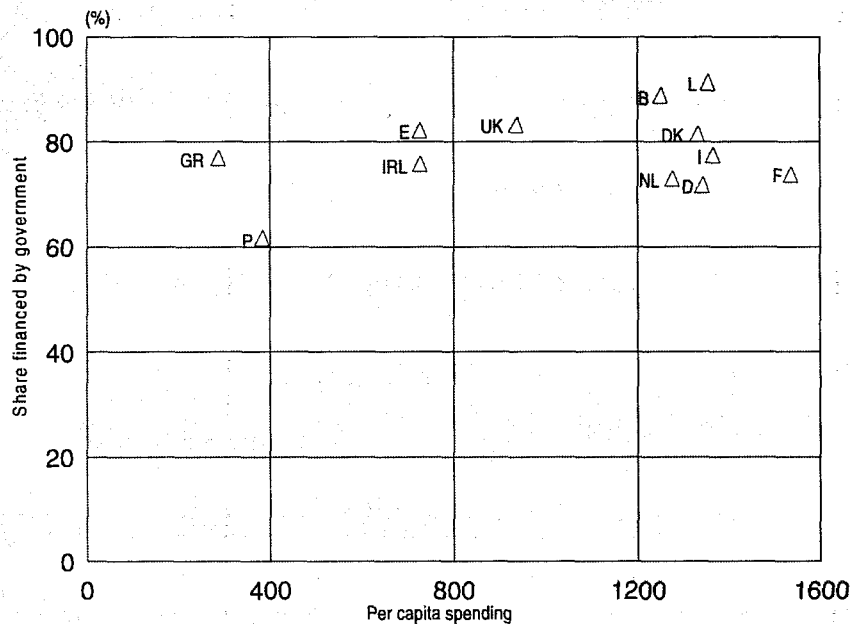
**Table 10: Health care services**  
**Number of pharmacies and pharmacists, 1994**

(units)	Number of pharmacies	Number of Community pharmacists
Belgique/België	5 250	8 500
Danmark	339	1 127
BR Deutschland	20 327	40 480
Hellas	7 700	7 800
España	18 429	39 608
France	23 000	26 700
Ireland	1 140	1 250
Italia	15 875	37 000
Luxembourg	76	349
Nederland	1 480	2 076
Portugal	2 428	2 772
United Kingdom	12 091	21 000
EU	108 135	188 662

Source: Pharmaceutical Group of the European Community

**Figure 2: Health care services**

**Per capita health spending compared to share financed by government, 1991**



Source: OECD Health Systems

The Netherlands has 752 hospitals, most of them private, although most are owned by religious groups or non-profit organisations. Most new major private hospital investments have been made by Dutch universities. Community care is provided mainly by the Cross Associations (private and religious in character), which run many nursing homes. The Netherlands has the most developed nursing home system in the EU. General practitioners provide most primary care. They are nearly all self-employed. Some have grouped to form health centres and obtain subsidies from the central and local governments.

### Portugal

The Portuguese health system is largely run by the public authorities. In 1990, a new health law was voted, which changed access and quality of the services in a major way. The administration of the services is organised at central, regional and local level: central authorities are responsible for planning and evaluating services, for developing norms for the functioning of institutions and services, and for carrying out technical inspections. Regional authorities are to implement health policy, to carry out certain investigations and for training and research in the health sector, among other. It is, however, the local bodies which are responsible for running the health centres.

The National Health System is funded from the State's general budget. The cost of assistance within the public health organisations is to a large extent met by the National Health Service. There is, however, still a private sector which operates alongside the national system and which operates according to different rules.

During the 1980s, significant investments were made by the Portuguese authorities in order to upgrade the hospital sector. Several major new hospitals were thus built, in order to ensure that the population had a health service comparable to the rest of Europe.

At present, private hospitals contribute about 20 % of the total number of beds, or about 54 090 in 1990. Many of these are run by institutions of religious and social character.

Some specialised services such as dialysis centres have been set up by private companies, such as WR Grace.

### Spain

In Spain, there is a mixture of public and private health systems, the public one predominating. The core of the system is the national health insurance scheme which covers approximately 97 % of the population. Participation is compulsory for wage earners. The social security system can contract services of other public and private hospitals as supply is not sufficient to meet demand, such that there is a strong private system which provides secondary coverage to millions of people.

Some 85 % of the financing of the system comes from the Central Administration, and 15 % from the Territorial Administration. Of the 85 % from the central administration, 80 % comes from general taxation and only 20 % from social security (through social contributions).

The major Spanish public-owned hospitals have either regional or municipal status. These are supplemented by private hospitals owned by the Red Cross, universities, religious concerns and private companies. The number of private hospitals is much greater than the number of public ones. However, in terms of number of beds, private hospitals account for only about one third of the total hospital capacity.

Private enterprise hospitals of foreign and local ownership account for about 15 % of all beds. Many have closed since the late 1980s, owing to the Ministry of Public Health and Social Security's policy to make the public hospitals more efficient by increasing bed occupancy rates. However, this has allowed many new investors to establish themselves by buying up financially troubled private hospitals.

Towards the end of 1980s the British private health group, BUPA (a provident society) decided to invest in Spain. It owns Sanitas, one of Spain's major private health groups. Another major group is Agbar-Salud.

### United Kingdom

The United Kingdom's National Health Service (NHS), which replaced a partial mutual insurance system in 1948, provides



core coverage for the British population. The NHS is funded almost entirely by taxation: most treatment is free, and only 20 % of prescriptions attract the small flat rate charge. There is a strong primary care system based on General Practitioner (GP) partnerships contracted to the local Health Authority, funded on a per capita basis. There are moves underway to expand primary care further, with GP partnerships building health centres with a mixed professional staff.

Secondary care in the NHS is purchased by local Health Authorities, although some budgets can be delegated to GPs, allowing them to exercise choice for their patients. An increasing proportion of secondary care is purchased privately: 19 % of the population has private medical insurance. Roughly 20 % of secondary care is privately provided, but in some specialties where NHS services are poor, the share is much higher. Long term residential and nursing care is purchased through a mixture of private and public expenditure, although by far the majority of provision is private.

Recently the government has attempted to introduce competition into the public health sector. This seems to have produced some innovations in service provision but has been controversial. It is unclear whether perceptions of the quality of service provided by the NHS have improved overall.

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## OUTLOOK

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Future demographic developments in the EU will pose and additional challenge to public authorities as they will likely translate into continued rapid growth in demand for health. Demographic trends are indeed dominated by a low birth rate in nearly all EU Member States, increased rates of participation of women to the labour force and the ageing of the population. To this upward influence of demographic changes on demand for health one should add on-going progress in medical science, which also puts upward pressure on expenditures.

The regulatory environment of the sector, although it is in many countries in the mist of change, is still mainly national. It is not clear yet to what extent the changes currently under way at national level will lead to a greater harmonisation of health systems across the EU. In general, in seeking to maximise efficiency gains in their national systems, governments have until now followed very different approaches, not necessarily mutually consistent nor transposable from one Member State to another.

Without pre-judging the future organisation of the sector in the EU, what is nevertheless clear is that future growth in demand for these services will continue at a rate which is close to or slightly higher than the real GDP rate (about 3.5-4 % per year), while the trend in prices will likely remain severely curtailed. This will stabilise the share of total expenditures on health in total private and public expenditure spending at around 7.5 % in the long run, though with a decreased share of public financing. The latter will happen both because of the slowdown in nominal expenditure growth, and because of the efforts to curtail nominal expenditure growth, and because of the progressive reduction in the share of expenditure which is reimbursed to the patients from the public health schemes, thereby continuing the trend observed since the mid to late 1980s.

Written by: DRI Europe

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Pharmacist Group of the European Community (GPCE). Address: Square Ambiorix 13, B-1040 Brussels; tel: (32 2) 736 7281; fax: (32 2) 736 0206.



## Overview

### NACE 971, 972, 973, 974, 345.2

*Over the last decade, demand in the audio-visual sector has enjoyed double digit growth, in spite of adverse effects of economic recession. The Union's music recording business is still dominant world-wide but has suffered from recent economic sluggishness. Extra-EU trade balance with the US is heavily negative in film production. Growth in feature film production is stagnant while the fall in number of cinemas and attendance is further weakening the revival perspectives of this sector. However, overall growth prospects remain very healthy with the technological revolution currently taking place in digital transmission and reception.*

### INDUSTRY PROFILE

#### Description of the sector

The audio-visual sector groups four main sub-sectors: film production (NACE 971); film distribution (NACE 972); cinemas (NACE 973); radio and television broadcasting (NACE 974). The music recording sector, although being part of NACE 345, is also considered within this chapter.

There is a growing interconnection between these activities:

- The development of TV films and videos is at the heart of the difficulties the cinema industry has encountered over the past few years. This phenomenon is accelerated by growing VCR penetration across the Union (56.7 % of TV homes in 1993) and by the explosion of private TV channels, notably satellite and cable, in many countries. 1993 penetration of TV households was 6.6 % and 19.5 % respectively for satellite and cable.
- A more recent "bridge" has appeared through video-discs, a medium that allows the music recording sector (and its key European players) to offer complete audio-visual entertainment to its existing customers. However, development has been slow, with player sales a mere 110 000 units throughout Europe in 1993.

#### Recent trends

Although information abounds about audio-visual sectors, consistent data are rare. The specialised IDATE Institute estimates

that the leading 100 audio-visual companies world-wide have achieved global sales of 122 billion ECU in 1993.

Broadcasting represents the bulk of the market, followed by cinema distribution and integrated companies (in both broadcasting and cinema). Music recording holds only a tiny portion of the global audio-visual market.

An illustration of this global approach is the ongoing concentration of the sector: the Top 50 Companies grew at a 10 % rate between 1992 and 1993, while the Top 100 grew at a 16 % rate, in search of critical mass business or country-wise.

There has been an increasing move towards television film viewing, in the context of diminishing cinema attendance and reducing numbers of cinemas - from 23 300 screens in 1983 to 17 400 in 1993 - as well as increasing TV and VCR penetration. The decline in cinema viewing appears more recently to have stopped in 1993, with the main markets (France, Germany, the UK and Italy) stabilising each at around 115 million spectators. However, a 22 % drop in attendance is reported from 1983 to 1993 in the EU.

Film production has been slow to develop in the Union. 520 feature films were produced in 1993 against 450 in the US, but film production investments were respectively 960 million ECU and 3 600 million ECU. European production continues to be affected by the importance of US films, which have been stable over the past years at 73 % of EU's cinema revenues. Lately, the number of EU co-productions has increased from 32 % to 36 % of films in 1993 and this can be seen as an encouraging move towards a business rejuvenation.

By contrast, a real explosion of TV broadcasting has occurred in Europe, following deregulation in the 1980's. The number of TV channels grew from 40 in 1981 to 165 in 1993 (129 in the EU alone), more than 50 % of which were private.

Although 1993 was a difficult year for the music industry, with a 2.5 % decrease in retail sales, growth is still to be found in markets where CD penetration remains low (Italy, Spain, Portugal, Greece) and significant hopes are placed in the development of new markets, notably in Eastern Europe.

#### International comparison

In 1993, the EU had a 32 % share of the world audio-visual market, behind the USA (37 %) but in front of Japan (25 %).

In the period 1992-93 the USA performed very well, with a 23 % increase in sales. In contrast, growth in the Japanese

**Table 1: Audio-visual services**  
**Evolution of the audio-visual service sector (1)**

	1991	1992	1993
Top 100 turnover (billion ECU)	100.3	105.6	122.1
Year on year growth (%)	N/A	5.0	16.0
Top 50 turnover (billion ECU)	83.4	93.7	103
Year on year growth (%)	11.0	12.0	10.0
Share of: (%)			
- top 5 companies	24	22	22
- top 10 companies	38	32	36
- top 20 companies	62	61	57
- top 50 companies	83	89	84

(1) Based on top 100 audio-visual companies  
Source: IDATE



**Table 2: Audio-visual services**  
**Growth of the audio-visual service sector (1)**

Year on year growth (%)	1989	1990	1991	1992	1993
EU	28	22	16	12	1
USA	7	18	4	2	23
Japan	11	10	25	22	10
World	13	18	11	12	10

(1) Based on top 50 audio-visual enterprises  
Source: IDATE

market slowed to 10 % and came to an halt in Europe (1 %), partly as the result of the crisis of public TV broadcasters.

### Foreign trade

Overall, the European audio-visual industry has a negative trade balance with the United States, which grew from 2 986 million ECU in 1990 to reach 3 102 million ECU in 1994.

In the case of film production, this has partly been the result of a number of structural handicaps affecting the European film industry, notably the reduced intra-EU circulation of audio-visual products. The persistence of such disadvantages continues to make US products more attractive.

For some sectors of the industry, customs figures are less relevant: music record companies, for example, organise manufacturing independently of market location. In addition, individual country situations vary (e.g. in France, Greece and Italy, national recording artists comprise 40-60 % of the market).

Intra-EU trade remains relatively limited, though some countries are more favourably inclined toward European products than others: for example, France and Italy are significant importers of other European films (typically between 30 % and 40 % of their respective markets, based on distributors' share of box office revenue).

## MARKET FORCES

### Demand

The world audio-visual industry has grown by more than 11 % yearly since 1990. In Europe, this growth has been fuelled by a number of factors:

- increasing penetration of equipment (still below US or Japanese levels);

- technology changes bringing in new equipment (e.g., CD's) or new transmission methods (e.g. cable, satellite, HDTV);
- more hours per day dedicated to audio-visual entertainment (though films, TV and music demand has been undermined by the rise of electronic games);
- diversification of income sources, notably the development of the Pay-TV and of subscription-linked revenue;
- the commercial dynamism of producers (particularly the Americans) and the aggressive marketing of distributors such as HMV or Virgin Megastores which have helped push music/video demand.

In addition, consumer demand is characterised by an increasing sophistication in terms of quality of service and levels of choice. This development is, in turn, being encouraged by the revolution in equipment types, transmission and reception methods.

While audio-visual sales have grown overall, there has been a shift in balance of sales which reflects evolving consumer tastes, technology changes and price/quality trade-off:

- Between 1983 and 1993, average cinema admission per head dropped from 2.54 to 1.94 (1.71 in 1992) while VCR penetration jumped from 10 % to 57 %.
- Similarly, music recording sales in value grew by 8 % per annum between 1989 and 1993, driven by a 24 % per annum increase in CD's against a 43 % decrease in LP's.

An attempt to size the audio-visual market - independently of company sales - has been made by IDATE and confirms the overall clout of the US versus the EU in all areas except TV license fees, due to important public broadcasting.

**Table 3: Audio-visual services**  
**Market strength by region, 1993 (1)**

(million ECU)	Audio-visual turnover	Share of total (%)	Number of companies	Average turnover
EU (2)	32 884.9	31.9	19	1 730.8
- Benelux	5 112.3	5.0	2	2 556.1
- BR Deutschland	11 698.2	11.4	6	1 949.7
- France	3 827.4	3.7	4	956.9
- Italia	4 043.5	3.9	2	2 021.7
- United Kingdom	8 203.5	8.0	5	1 640.7
USA	38 201.8	37.1	10	2 387.6
Japan	25 901.7	25.2	10	2 590.2
Other	5 969.2	5.8	5	1 193.8
Total	102 957.6	100.0	50	2 059.2

(1) Based on top 50 audio-visual enterprises

(2) Including the breakdown of the EU countries mentioned below

Source: IDATE



**Table 4: Audio-visual services  
Trade balance, 1993**

(million ECU)	USA to EU exports	EU to USA exports	EU/USA deficit
Cinema	2 139	218	-1 921
Television	1 330	77	-1 253
Total	3 469	295	-3 174

Source: IDATE estimates, based on MPAA, AFMA, CSO (UK)

### Supply and competition

Major changes in the industry environment are leading to a restructuring of supply within the European audio-visual market.

These developments include deregulation (for example, that of television in the 1980s or even more broadly telecommunications), technological innovation (cable TV, Laser disc, DCC as well as HDTV) and the increasing capital intensity of the audio-visual industry (More and more essential to anticipate successfully the development of multi-media).

On the one hand, high growth sectors attract new entrants, often from within other media sectors. A striking example of this has been the explosion of broadcasting channels - in particular private, cable and specialist stations - since deregulation.

In addition, investment requirements and economies of scale are increasingly driving industry consolidation across Europe, despite the continued existence of specialised independent companies (e.g. the private music labels). There is an increasing development of multi-media audio-visual groups emulating the US "majors" (e.g. Bertelsmann-D, PolyGram-NL) and large industrial groups (e.g. Bouygues-F) investing in the sector.

### Production process

The production process and technological development play a key role in the audio-visual industry as major drivers of future demand.

An innovation which is already having a major impact on the different media - and will have a significant influence on developments in the next decade - is the introduction of digitalised pictures and sounds.

In the music industry, Philips's Digital Compact Cassette (DCC), Sony's MiniDisc and digital cable radio transmitted directly are important new technologies being developed to rival the CD.

The development of High Definition Television (HDTV) is expected to lead to a transformation of the whole chain from film production to reception and will have an impact on industries and sectors outside the realm of the audio-visual.

HDTV is closely linked, financially and commercially, with three sectors: telecommunications consumer electronics, professional equipment and the components industry, where the USA, Japan and Europe have different strengths.

Beside HDTV, another fast developing market is 16:9 wide-screen TV. In 1994, 150 000 such TV sets were sold, and 430 000 are forecast to be sold in 1995. Already 22 TV services operate in 16:9 in eight Member States, with 30 000 hours of 16:9 programming to be transmitted up to 1 July 1995.

The introduction of HDTV services is no longer the immediate objective. Instead, there is a consensus among market players that the introduction of the HDTV screen format - 16:9 wide-screen - is more strategically important and achievable. The advantage of 16:9 as a policy focus is that it bypasses the debate on technologies. 16:9 can be delivered using analogue or digital technologies

Innovations in the audio-visual industry also have an impact on large computer groups which, for some time, have been operating digital systems. These groups are investing currently in research and development for a new tool, the multi-media, capable of treating sound, image and text. Apple, for example, has already joined forces with Sony and IBM for research into a product combining video and microcomputer.

The term multi-media should include any means of delivery, whether via a network (e.g. cable, satellite, telephone, over-the-air) or via some form of packaged media (e.g. floppy disk, ROM cartridge, compact disc, smart card/memory card). However, the most likely commercially attractive candidate for immediate consumer market development is the compact disc (CD).

In spite of standardisation issues, strongest sales have been taking place in the market for multi-media computers, i.e. personal computers with CD-ROM drives attached or built-in. Typical applications are the Photo CD, launched in 1990 by

**Table 5: Audio-visual services  
Audio-visual markets, 1993**

(million ECU)	EU	USA	Japan	Total	Share (%)
Advertising/Sponsoring	13 472.2	22 722.5	10 617.4	46 812.1	41.7
TV license fees	8 846.3	288.6	3 375.7	12 510.7	11.1
Basic cable subscription	4 022.2	11 552.5	362.9	15 937.7	14.2
Video cassettes	5 053.8	11 443.2	4 959.0	21 456.0	19.1
Cinemas	2 719.9	4 401.4	1 321.1	8 442.4	7.5
Pay TV	2 345.9	3 956.4	303.2	6 605.5	5.9
Pay per view TV	0.0	474.8	0.0	474.8	0.4
Total	36 460.3	54 839.5	20 939.4	112 239.1	100.0
Share of total (%)	32.5	48.9	18.7	100.0	

Source: IDATE estimates, based on MPAA, AFMA, CSO (UK)



**Table 6: Audio-visual services  
Market shares in world electronics industry, 1991**

(%)	EU	USA	Japan	Other	Total
Consumer electronics	16	6	55	23	100
Electronic components	13	29	52	6	100
Telecommunication (1)	35	26	23	16	100
Computer hardware materials	10	58	25	7	100
Computer software & related services	22	57	12	9	100

(1) includes telecommunication hardware and services  
Source: Screen Digest

Kodak and Philips and the Video CD standard, announced by Philips, Matsushita, JVC and Sony in 1993 as a common format for the storage of 74 minutes of linear full motion digital video.

## INDUSTRY STRUCTURE

### Companies

The EU accounted for 32 % of the top 50 companies in the world in turnover terms. Within the EU, Germany is in the lead position with an 11 % share, followed by the UK, which accounts for 8 % of turnover of the top 50 audio-visual companies.

Within the different European countries, levels of industry consolidation vary. Italy derives a 4 % share from two large groups, Fininvest and RAI, whereas 4 companies in France make up just under 4 %. Germany has 6 companies in the top 50, as against 5 in the UK. Indeed, two German groups, ARD and Bertelsmann, rank amongst the top 15 world audio-visual enterprises.

The increasing importance of European groups - which, as a block, had overtaken the US in 1992 - is in part due to the growing importance of private broadcasting. Nevertheless, no one group in European film/video/TV as yet rivals the global approach of the US "majors", which in part explains the EU trade deficit in this sector.

In the music recording sector, however, European companies have not only been successful in taking a significant share of the world market (40 %) but also account for 3 of the top 5 global companies, with Sony and Time Warner.

### Strategies

Strategies of the major European audio-visual groups have focused around the need to achieve critical mass, the desire to diversify into new growth areas and the aim to secure access to larger international markets. A series of important mergers and acquisitions have taken place, though many have been limited to a national scale (e.g. those of Bertelsmann and Fininvest).

Within each media segment, the specific drivers behind this consolidation have varied. In music recording (e.g. PolyGram or Thorn EMI) and in cinema film distribution (e.g. UFA or Rank Odeon), expansion strategies have derived from the need to secure a strong local and international European network. In TV and film production, a recognition of the need to counter American professionalism and domination has prompted much of the restructuring.

### Impact of the Single Market

The measures related to the audio-visual services sector within the Internal Market programme have not yet been fully implemented. Major problems remain when trying to overcome language barriers, piracy and standardisation. The internal market has also not yet provided the Union with the necessary

instruments to spawn a real common information area. The complete integration of the EU market for audio-visual services relies on the further development of infrastructures, the liberalisation of services (i.e. Member States should have less restricting licensing regimes) and the enforcement of competition, as well as increased competitiveness on the part of the film and TV programmes production industry.

## REGULATIONS

The draft directive on the use of television transmission standards has reached a common position in the Council. Unlike its predecessors (the so-called MAC directives), there is no longer a single objective (HDTV) with a particular technical approach mandated. The intention is to provide a regulatory framework in which the market players can introduce new services of different kinds: for instance, 16:9 widescreen television using either digital or analogue technologies, etc.

## OUTLOOK

While economic recession has undoubtedly had some impact on growth in demand, the audio-visual industry overall has enjoyed double digit growth over the last decade. Rapid technological change and the increasing convergence of the audio-visual market with other sectors such as electronics and information technology make precise forecasts difficult, though prospects continue to look very positive.

The European audio-visual industry is facing a number of key challenges in the countdown to the twenty-first century. These include the need:

- to build a European production industry which can seriously compete with the commercial and technical professionalism of its American counterparts
- in broadcasting and in music recording, to capitalise on a strong position in the home market (broadcasting) and on a world scale (music recording)
- to remain at the forefront of the technological revolution in transmission and reception (including digital systems, HDTV and multi-media tools).

Written by: LEK

# Film and video

## NACE 971, 972

The European film industry is dominated by two long-term trends which deeply influence its current and prospective financial situation: firstly, the supply of feature-length motion pictures as well as fictional TV works is facing ever increasing competition from American producers in terms of both cost and quality of releases and public acceptance; secondly, demand for films is moving steadily away from public consumption in cinemas towards more individual access via TV or VCR.

Over the past few decades, the European film and video industry has faced rapidly evolving developments in the marketplace: decline in global film output, lower short-term returns as a result of diminishing attendance in cinema houses, deferred revenues from TV and video sales, and reduction of production costs to levels offered by competing countries.

In response to these changes, most European players in the industry are currently restructuring their activities: merging to set-up European groups; integrating the process of financing, manufacturing and distributing movies; combining international trade (importing and exporting films or technical skills) into local operations; as well as monitoring the commercial and financial impact of distributing through different channels.

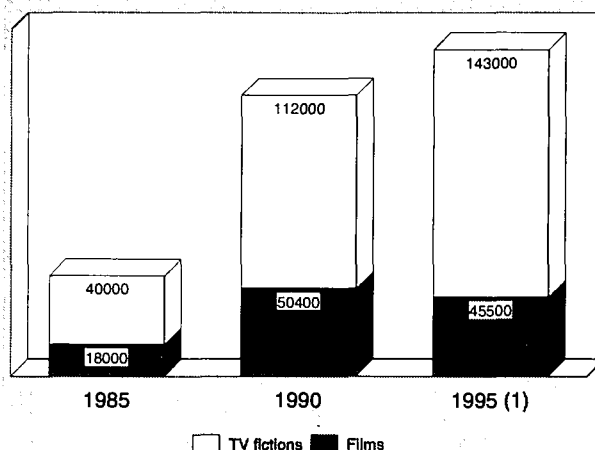
### INDUSTRY PROFILE

#### Description of the sector

The film and video industries involve three types of activity:

- Production: the financial and artistic conception of motion pictures and TV fictions is project-managed by "producers" from inception to release. European producers are concentrating both horizontally (through alliances) and downstream (through integration of operational/commercial activities).
- Manufacturing: the physical making of films is supported by a host of specialised technical contractors: studios, laboratories, equipment manufacturers, and sound specialists.

Figure 1: Film and video  
Total volume broadcasted of TV fictions and films in the EU



(1) Estimate  
Source: CNC, estimated by LEK

- Distribution: the commercial release of films is performed by cinema operators (either networked or independent), by video publishing companies and through portfolio management of stocked works.

These activities are today frequently consolidated through the development of large groups combining production and technical capabilities (Granada, Bavaria, SFP) or production and distribution (Gaumont, MGM). Multi-media conglomerates are also seeking to add value to their distribution assets by entering into production (Bertelsmann, Canal+, Bouygues, Polygram, Fininvest).

Overall, in 1993, the European film industry has estimated total sales of 2.7 billion ECU, second only to the American movie industry (estimated total sales of 4.4 billion ECU).

Table 1: Film and video  
Worldwide cinema industry

(million ECU)	Number of films produced			Number of films broadcasted			Film production investment		
	1985	1990	1993	1985	1990	1992	1985	1990	1993
Belgique/België	7	20	8	136	286	376	14.3	27.7	8.5
Danmark	9	13	14	227	155	134	15.1	15.6	22.0
BR Deutschland	64	48	67	309	310	287	106.9	105.1	N/A
Hellas	27	15	18	N/A	N/A	N/A	4.1	N/A	6.6
España	77	42	53	409	344	356	65.8	53.3	70.0
France	151	146	152	456	370	381	305.0	503.7	469.7
Ireland	2	3	6	N/A	N/A	N/A	N/A	19.2	28.5
Italia	89	119	106	345	457	462	192.0	233.2	194.2
Luxembourg	1	1	4	N/A	N/A	N/A	N/A	N/A	1.6
Nederland	13	13	16	297	187	185	12.2	N/A	N/A
Portugal	9	9	16	226	314	253	4.8	3.0	3.3
United Kingdom	47	47	60	248	282	232	172.2	219.4	171.2
EU	496	476	520	N/A	N/A	N/A	(1) 905.3	N/A (1)	1 107.5
USA	356	477	450	426	355	379	3 266.7	3 586.2	3 612.3
Japan	319	239	238	583	704	616	N/A	N/A	N/A
Australia	42	34	23	212	254	227	N/A	86.3	34.7

(1) Estimate  
Source: Screen Digest, Eurostat

**Table 2: Film and video  
Market share of American films in the EU**

	1985	1989	1990	1992
Belgique/België	61.0	68.9	73.5	78.6
Danmark	58.4	63.6	77.0	77.7
BR Deutschland	58.7	65.7	83.8	82.8
Hellas	N/A	86.0	87.0	92.0
España	58.5	71.4	72.5	75.0
France	39.2	55.5	56.9	58.3
Ireland	N/A	85.0	87.0	91.5
Italia	48.6	63.1	69.4	68.0
Nederland	74.3	75.6	85.5	78.8
Portugal	N/A	67.4	63.5	68.4
United Kingdom	76.7	86.2	88.0	92.5
EU (1)	N/A	67.0	70.0	73.0

(1) Excluding Luxembourg  
Source: CNC, Screen Digest, Eurostat

### Recent trends

The European film and video industries continue to be affected in a number of different ways by two long-term trends: the increase in international competition and the move towards more individual viewing on TV screens:

#### Production

The overall production of feature-length motion pictures in the EU is stagnating around 500 films per year. Diminishing attendance (-36 % between 1982 and 1992) and the related reduction in the number of cinemas (-31 %) undermine prospects for a much larger European offering.

The market share of imported works is huge (83 %) and still increasing (Table 2). Over the last ten years, American films have doubled their market share in France and Italy, while increasing it by more than half in Germany, Belgium and Spain. At the current time, American productions represent 73 % of EU cinema revenues, with more than 80 % of the proceeds in Germany and the UK.

This decline runs parallel to an increase in the production of fictional works for television (e.g. a doubling over the last ten years in France), which in turn has served as a spearhead

for a growing involvement of multi-media groups in movie production.

#### Manufacturing

The manufacture of films is a sector which has remained relatively resistant to the changing market-place. The turnover for contractors to feature films is stagnant at an estimated 350m ECU, of which 70 % derives from French and Italian producers.

An increasing share of revenue emanates from fictional TV. For example, the latter accounts for 55 % of UK producers' expenditure in 1992, an increase of 11 % over 1991. Non TV-oriented contractors have frequently run into financial trouble (e.g. Cinecittà).

Despite the continuing existence of small/medium specialised companies, increasing capital expenditure needs have led to a growing trend towards acquisition of these manufacturing contractors by large financial holdings (Arnold & Richter, Rank, Virgin, Brent Walker, Tectis, VDM) or by production or distribution groups.

**Table 3: Film and video  
VCR market**

	VCR Sales (thousand units)					Total number of video households (thousands)			VCR Penetration rate in TV households (%)			
	1985	1991	1992	1993		1985	1991	1992	1993	1985	1991	1992
Belgique/België	110	300	315	300	463	1 799	1 988	2 149	16	54	59	63
Danmark	104	225	210	195	414	1 175	1 280	1 366	21	53	58	61
BR Deutschland	1 500	3 325	3 230	3 010	6 550	17 117	18 667	20 021	26	49	53	56
Hellas	50	175	120	47	142	971	1 061	1 096	5	30	32	32
España	560	950	950	925	1 436	5 321	5 796	6 183	15	47	51	53
France	820	2 175	2 250	2 150	3 070	11 352	12 477	13 337	16	55	60	63
Ireland	60	80	85	85	256	564	606	644	34	57	60	62
Italia	235	1 800	1 600	1 650	657	6 572	7 692	8 806	4	32	37	40
Luxembourg	7	8	8	8	23	58	61	65	26	62	66	69
Nederland	325	650	560	520	1 311	3 188	3 440	3 641	29	54	58	59
Portugal	80	125	125	140	458	977	1 058	1 146	27	35	36	37
United Kingdom	1 805	2 150	2 340	2 250	8 435	15 113	15 815	16 321	41	71	74	75
EU	5 656	11 963	11 793	11 280	23 215	64 207	69 941	74 775	22	50	54	57

Source: Screen Digest

**Table 4: Film and video**  
**Overview of video cassette market**

(million ECU)	Rental						Purchase					
	1988	1989	1990	1991	1992	1993	1988	1989	1990	1991	1992	1993
Belgique/België	56.6	73.8	64.0	44.7	42.3	39.7	0.0	10.1	21.5	34.0	48.5	74.9
Danmark	61.5	57.7	54.4	46.0	44.3	45.4	0.0	1.9	11.1	19.4	27.3	58.4
BR Deutschland	570.0	556.0	530.5	482.9	472.5	389.2	52.3	78.1	157.7	308.8	304.5	436.5
Hellas	80.3	74.7	31.6	28.9	14.9	10.5	0.0	0.0	0.0	0.0	0.7	1.2
España	347.4	405.4	304.5	173.3	205.7	164.5	11.2	38.6	51.2	69.7	89.4	114.8
France	139.5	164.6	183.8	200.1	240.5	244.2	111.6	290.1	387.2	503.9	682.7	731.1
Irèland	49.0	48.9	58.6	55.2	48.8	44.3	2.6	10.3	13.0	15.4	13.9	16.1
Italia	146.4	309.3	234.9	200.9	208.2	161.2	22.7	142.9	352.3	378.7	485.8	376.2
Luxembourg	0.8	1.7	1.8	1.5	1.5	1.5	0.0	0.3	0.8	1.5	2.1	2.3
Nederland	78.2	77.2	80.9	86.9	88.1	91.8	6.3	11.9	23.2	41.5	62.4	85.2
Portugal	40.4	46.7	54.1	46.1	52.2	26.4	0.0	8.9	12.6	14.0	16.5	15.9
United Kingdom	731.5	814.7	854.1	763.7	758.7	683.2	281.6	502.7	566.4	617.8	751.2	831.9
EU	2 301.7	2 630.8	2 453.2	2 130.2	2 177.8	1 901.9	488.3	1 095.6	1 597.1	2 004.7	2 485.0	2744.5

Source: Screen Digest

### Distribution

The distribution of films reflects the shift towards TV screen viewing as television is overtaking the traditional cinema houses as a channel of access to movies

Europeans are offered ten times more films by TV networks than by cinemas. Italians and Germans are offered an average of 15 to 20 films a day, the French and British an average of 4 or 5. Over ten years (1985-95) the average global EU offering on all networks is believed to have increased from 30 to 85 films per day. A similar growth rate is observed for TV fictions.

Video sales are increasing in line with VCR sales. With a 57 % rate of VCR equipment penetration, European households spend an average ECU 50 per year on video cassettes (86.5 ECU per European video household), i.e. five times the amount devoted to cinema tickets (10 ECU).

Cinema houses have stabilised their decline after a drastic reduction of both average attendance and number of cinemas. In 1992, seat sales per cinema had dropped 30 % relative to the early eighties in France, Germany and the Netherlands. Per capita film consumption at cinemas in this period dropped between 20 and 50 % in all countries but the UK where the decline had taken place earlier. These figures, however, when put in perspective over the last three decades, show a marked slowdown of the decline, in addition to a resumption in attendance in the UK. Each of the major markets (France, Germany, Italy, UK) seems to be converging toward the 100 million spectators per year mark. The recent development of multiplex theatres in certain countries is playing a significant role in the recent recovery.

### International comparison

The European situation is not unlike that observed in Japan and the US with regard to TV screen viewing, despite a dif-

**Table 5: Film and video**  
**International comparisons**

	Cinema screens			Cinema admissions (millions)			Cinema gross box office (million ECU)		
	1982	1992	Evolution (%)	1982	1992	Evolution (%)	1982	1992	Evolution (%)
Belgique/België	472	411	-13	20.5	16.6	-19	49.8	63.3	27
Danmark	463	318	-31	14.3	8.7	-40	32.9	34.5	5
BR Deutschland	3 613	3 630	0	124.5	105.9	-15	363.4	468.0	29
Hellas	1 170	300	-74	35.3	10.0	-72	40.8	27.8	-32
España	3 939	1 807	-54	155.9	83.3	-47	221.5	299.0	35
France	4 669	4 402	-6	201.9	115.9	-43	627.9	611.3	-3
Irèland	160	164	2	7.0	8.2	17	25.5	28.7	12
Italia	7 014	3 650	-48	195.4	83.6	-57	376.1	460.1	22
Luxembourg	20	17	-15	0.8	0.6	-25	1.8	2.8	51
Nederland	557	416	-25	20.5	13.7	-33	73.5	77.0	5
Portugal	423	252	-41	27.3	12.0	-56	24.7	30.4	23
United Kingdom	1 439	1 845	28	64.0	103.7	62	176.1	472.4	168
EU	23 939	17 212	-28	867.4	562.1	-35	2 014.1	2 575.3	28
Canada	1 253	1 742	39	97.3	73.7	-24	292.8	284.6	-3
USA	18 020	25 105	39	1 175.4	1 173.0	0	3 524.2	3 751.7	6
Japan	2 137	1 744	-18	155.3	125.6	-19	659.5	952.9	44
Australia	833	906	9	34.2	45.5	33	142.9	183.7	29
World (1)	140 713	89 367	-37	32 621.1	19 621.9	-40	-	-	-

(1) Estimate including China, India and former USSR

Source: Screen Digest



**Table 6: Film and video  
Cinema and video expenditure in the EU**

(ECU)	Average expenditure per video household			Average cinema expenditure per capita		
	1990	1991	1992	1990	1991	1992
Belgique/België	53.8	43.7	45.8	6.6	6.5	6.4
Danmark	62.9	55.7	56.0	7.1	6.6	6.7
BR Deutschland	45.0	46.2	41.7	7.5	7.9	7.6
Hellas	37.6	29.8	14.8	4.0	5.1	2.7
España	74.9	45.7	51.0	5.8	6.0	7.5
France	56.8	62.0	74.1	10.4	10.1	10.8
Ireland	140.0	125.2	103.8	6.9	7.7	7.8
Italia	114.4	88.2	90.4	7.3	7.3	7.9
Luxembourg	43.9	45.3	52.2	N/A	N/A	N/A
Nederland	36.8	40.3	43.8	5.2	5.2	5.1
Portugal	75.5	61.6	65.1	2.2	2.4	2.9
United Kingdom	98.9	91.4	95.6	6.4	6.7	8.4
EU	70.6	64.4	66.7	(1) 7.1	(1) 7.3	(1) 7.9

(1) Excluding Luxembourg  
Source: Screen Digest

ferent industrial outlook in the US. In both countries, progressive TV and VCR penetration of households has been accompanied by a decline in cinema attendance. However, in the US and Japan, cinema attendance began to stabilise in the early Seventies, a process which did not occur until recently in all European markets except for the UK.

The US film industry has aggressively expanded its export sales during the eighties. Its market share in the EU progressed from 45 % to 73 % in ten years. In 1992, as domestic sales in the US (4.4 billion USD) accounted for less than half of industry revenues, American majors continued to increase their penetration in the EU and elsewhere.

### Foreign trade

Intra-EU trade (estimated at 150m ECU) is limited in comparison with the bulk of film imports from the USA: US films sales to the EU amount to 2.13 billion ECU or ten times EU sales to the US.

Intra-EU trade is unevenly shared between countries: France and Spain are strong importers of other European films (10 % of each market); other countries (e.g. Germany, Italy, UK) devote less than 5 % of their markets to their neighbours' productions. French and British movies are favourites among Europeans, whereas Italian and German movie-makers have lost ground during the last decade. In all countries (except France), demand for European films has collapsed over the past few years.

## MARKET FORCES

### Demand

While the global demand for movies has never been as strong as today, European consumer preferences, in terms of product

**Table 7: Film and video  
EU trade balance with USA, 1992**

(million ECU)	Films
Exports USA to EU	2 139
Exports EU to USA	218
Balance EU/USA	-1921

Source: IDATE estimates from MPAA, AFMA, CSO (UK)

content and viewing mode, do not favour a strengthening of national film and video industries in the EU in their current state of operation. Faced with a need for wider geographical diffusion and higher-budget films to compensate for restricted national audiences, European producers are failing to develop an appropriate product-policy.

The European audio-visual consumer, provided with an unprecedented offering of movies on TV screens, has considerably increased his consumption. It is estimated that the individual spectator watches 50 movies per year on his TV as opposed to 2 in a cinema.

This dominance of the television offering (most of it free of variable charge) is reinforced by the increase in cinema seat prices. Ticket prices have tripled in real terms in most European countries since 1955. While this has softened the impact of attendance decline on cinema revenues, notably in France, it has rendered cinema an expensive access to films, thus perpetuating the vicious circle of declining attendance.

Faced with a limited customer base in households, distributors tend to favour film releases which fit best with customer demand: The high marketing/finance budgets available to US producers (8 million ECU per film or more than 4.5 times the EU average) has helped them to focus on such aspects. Such has been the making of American box office successes and their popularity in Europe. Only in France and Italy, where the public is more attached to films peculiar to their culture, has this success been slightly muted. In both countries, the share of domestic releases is consistent with their share of box office ratings.

### Supply and competition

As the economics of film-making change with the diversification of distribution channels, players in the industry adjust their approach to multimodal viewing and the necessity to reduce financial risk through international distribution. During the seventies, American producers went through a restructuring process and are now reaping the rewards. The Europeans began the same process in the late eighties and are accelerating it in the nineties.

The key challenge to European film-makers is to develop a capacity to engineer films likely to attract a large international audience. Many obstacles have delayed the acquisition of such a skill: language barriers for German, Spanish, Italian or French films which have to be dubbed before international release, limited financing which prevents producers from in-

**Table 8: Film and video**  
**Public subsidies by type for the production of films in the EU**

	Systematic subsidies	Writing	Selective subsidies Development	Production	Credit facilities	Tax-shelter
Belgique/België	(3) X	(2) X	(2) X	(2) X		
Danmark		(2) X	(2) X	(2) X		
BR Deutschland	(1) X	(3) X		(2) X		
Hellas	(3) X	(2) X		(2) (3) X		X
España	(3) X	(3) X			X	
France	(1) X	(3) X	(3) X	(2) (3) X	X	X
Italia	(3) X				X	X
Nederland		(3) X		(2) X		X
United Kingdom		(2) (3) X	(3) X	(2) X		X

(1) *Obligation to reinvest.*  
(2) *Repayable.*  
(3) *Not repayable.*  
Source: IDATE, CNC

tegrating some ingredients of a commercial approach (expensive casting, special effects, market testing), dependence on government support (especially in France, Germany and Spain) favouring films with a more artistic and cultural content.

However, industry outlook is rapidly evolving in the nineties and the formation of large, integrated and often multi-media groups as key players is likely to increase European producers' ability to offer works with wider potential. Such groups, which integrate the various production to distribution stages, can plan their return on investment over the period of modern film development: While ticket sales are the major constituent of cash flow during the first year of a box office release, there is a gradual diversification as the film is increasingly shown via different channels (Video, Pay-TV, Pay per view, international sales).

In summary, it would seem likely that European film supply will be focused in the future on two types of production:

- low-budget, low-revenues movies reflecting the personal talent of a director (such movies also co-exist with blockbusters in American production) or a particular element of national culture; or,
- commercially conceived works which are adequately financed to sustain both the cost of commercial ingredients and a long life-cycle with a wide and international audience. The financing, casting, directing, technical making and marketing of such products are likely to lose much of their national roots and become European or European/American ventures.

### Production process

New technologies (video, digitalisation, HDTV) are being progressively integrated into the production process (e.g. synthetic imaging). This development is leading to a reduction in the technical difference between cinema and TV work. Their final impact is therefore likely to strengthen the move towards private viewing on TV screens.

The reduction in production costs is a matter of concern for producers and is a prime cause for the delocalisation of some contracted activities. The latter, when labour intensive (e.g. studio work) is sensitive to the differential in wage levels in Southern and Eastern Europe. Productivity gains in the classical sense are not expected outside limited technical operations (computer-assisted special effects, final cut and video sequences).

Rationalisation is also being forced upon distribution. Operating costs are better spread in multiplex theatres, while advertising and marketing expenses are syndicated by the large

networks. A possible future transfer to digitalized copies will also reduce the celluloid duplication cost inherent to a large and simultaneous distribution.

## INDUSTRY STRUCTURE

### Companies

In reaction to their loss of market share, European producers are increasingly organising into larger groups with some degree of control on distribution or production facilities: Although it is premature to speak of European entities, significant national groups are being created through mergers and acquisitions integrating production and technical contracting. Examples are Granada in the UK, Bavaria in Germany, SFP in France. A far cry from the American "majors" such as Time Warner, MGM or Viacom Paramount, they are nevertheless close to the stage where they can offer the financial and technical backing to truly international products.

Other large production groups have developed from the growing interest of industrial, financial or audio-visual companies in cinema investment: Canal+, Bouygues and Chargeurs in France, Kirch, Bertelsmann, Scriba & Deyhle, Neue Constantin in Germany, Polygram in the UK, Penta and RCS in Italy.

Distribution is also an area of important concentration: MGM-Pathé-Nordisk-Canon (536 screens), UFA cinema (445 screens), UGC (374 screens), Pathé Cinema (331 screens), UCI/Cinesa (319 screens), Rank Odeon (309 screens). Many of these chains are offspring of American producers who seek to secure access to the European spectator. This concentration is having the beneficial effect of modernising and upgrading the theatres, the dereliction of which had been an effect, as well as a cause, of the attendance decline.

### Strategies

The strategies of the key players and the resulting consolidation process are still very much limited to a national scale:

- In Italy, Fininvest (the largest communication group in Europe) has fostered Penta which can be considered as the first European "major" with a strategy of expanding into production and distribution throughout Europe and North America.
- In the UK, TV companies diversified early into film production. BBC Films, Channel 4, Zenith, Granada, Euston and LWT concentrate, with the music giant Polygram, much of the capacity to produce international movies, in some cases in close association with American interests (e.g. Island's World).



- In France, Canal+ (with Studio Canal+) and Bouygues (with Ciby 2000) follow the same strategy of vertical integration with a view to producing a larger share of the films and TV fictions needed to fill their programmes and thus increasing production and distribution margins. Their ultimate target is also the North American market where Canal+ is already producing movies.
- In Germany, large groups such as Kirch and Bertelsmann are following a more prudent strategy than Penta and Canal+, keeping a lower profile on the international scene. Independent producers (e.g. Neue Constantin, Scriba und Deyhle) participate financially in international (American) works without yet producing directly at that level. The latter are also reinforcing their integration of a distribution network in Germany.

Overall, the strategies aimed at expanding the network of modern, multiplex cinemas are likely to boost growth in cinema attendance, as was the case in the UK. In this respect, Pathé Cinema and Gaumont (Seydoux family), UFA Theatre, Warner Bros., MGM/Pathé and many independents are voicing the most ambitious strategies: their planned investment implies a growth of 37 % in European multiplex theatres in the next two years.

### Impact of the Single Market

The "Television without frontiers" directive has put in place a framework that seeks to allow for the development of transborder broadcasting. Likewise, the Commission work in the field of copyright protection ensures that works can be effectively protected when distributed across the Union. Both measures enhance the opportunities for the European film and video industry to benefit from the scale of the Internal Market.

In the field of cinema, the Commission is applying competition law to try and ensure that the distribution industry becomes more open.

### REGULATIONS

Public financing was introduced as early as the Sixties (the Golden Age of European film industry) in several countries to help cinema resist the new competition from TV and later its competitive disadvantage against the US "majors".

Goals assigned to public funding vary between countries: Germany, Luxembourg, Greece seek primarily to support the technical industries associated with film-making; Italy, Belgium, The Netherlands and Portugal try to foster artistic creation; Spain and France aim at both the industrial and creative goals.

Three European bodies enact the EU's policies vis-à-vis the film industry: the Commission's Media Plan (200 million ECU over three years to help national producers and technicians adopt a European scope); Eurimage, which depends from the Council of Europe (co-funding of European productions); and Eureka, an inter-governmental institution in which the European Commission is represented (incentives to use new technologies, education and cooperation with eastern Europe).

The Media program, adopted in December 1990 by the European Commission, has dedicated ECU 200 million over 5 years to the European audio-visual industry:

- Support for distribution up to 85 million ECU;
- Support for production up to 65 million ECU;
- Support for developers of new technologies in audio-visual production of 20 million ECU;
- 10 million ECU for professional development;
- 15 million ECU for development in countries with limited production capacity.

In 1994, the European Commission has carried out a vast consultation process within the European audio-visual sector. The exercise was based on the conclusions of the Green Book "Strategic options for the strengthening of the film industry in the framework of the EU audio-visual policy" (COM(94) 96 final of 06/04/1994).

### OUTLOOK

The issues that the European film and video industries will be facing in 1995 and beyond are already clearly perceptible:

- There is a need for pan-European alliances between the key players to enable production risks for films with international potential to be better supported.
- Producers, authors and technicians must create a new team approach and jointly strive to achieve a balance between the commercial approach sought by producers, while retaining the quality and personality of European films.
- The motivation behind state incentives needs to move from a defensive to a more offensive stance on the international scene, albeit continuing to support the expression of national cultures.
- Cinema distribution must continue to upgrade its service, offering a competitive alternative to TV viewing.
- Distributors need to adjust to a longer product life-cycle by better monitoring the long-term marketing of a film through its various channels.

Written by: LEK



# Television

## NACE 974

The television market encompasses three main activities: production, methods of transmission and reception and finally, broadcasting. Program production, undermined by the competitiveness of American imports, is a poorly developed sector in Europe despite support at both the EU and national level. Transmission and reception systems are constantly evolving through technological development in areas such as cable or satellite and High Definition Television (HDTV). The broadcasting industry is extremely competitive following deregulation in the 1980s and the rapid growth in the number of private channels. In 1993, total television revenues in EU reached 23 billion ECU.

### INDUSTRY PROFILE

#### Description of the sector

##### Production

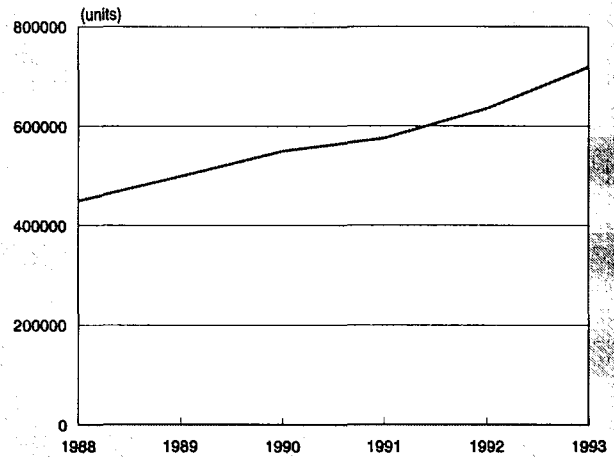
Films, game shows, documentaries, series, cartoons - the television programmes which count for more than three and a half hours of European viewing time daily - are produced by independent companies and multimedia groups. The smaller independents rely extensively on service providers and specialists in audio-visual equipment to which they subcontract the technical aspects of production.

##### Transmission and reception

Televisions nowadays operate on analog transmission systems, using three different norms (NTSC e.g. in North America, PAL in most of Europe, SECAM e.g. in France and French speaking countries). Hertz transmission is the most widely used in Europe but poor reception and problems of frequency capacity have led to the development of cable and satellite.

Digital transmission services - possibly starting in Europe in 1995 - will permit many more services to be transmitted thanks to digital compression which enables radio spectrum to be exploited more efficiently for TV broadcasting. Of course, the complete transition from digital to analogue will take place over a long period, probably 20 years. It is easier in terms of technology and of spectrum availability to introduce satellite and cable digital services than terrestrial digital services. The European Digital Video Broadcasting Group has defined speci-

Figure 1: Television  
Number of hours broadcasted in EU



Source: Screen Digest

fications for digital satellite and cable which have become ETSI norms and ITU recommendations.

##### Broadcasting

Broadcasting is the responsibility of broadcasters which may operate one or more television channels. In the 1980s, technological developments and deregulation led to the increasing emergence of private channels in Europe. The number of national broadcasting stations grew from 40 in 1981 to more than 165 in 1993, of which over 50 % were private. These include pay channels, specialised channels, as well as private generalist channels competing directly with their public counterparts.

##### Recent trends

##### Production

The production industry in Europe has suffered from structural weaknesses (few mostly undercapitalised large companies) which have prevented it from keeping up with the rapid growth in broadcasting demand. Between 1985 and 1993, the volume

Table 1: Television  
Worldwide televisual habits, 1992

	Number of TV receivers in use (per 1 000 inhabitants)			Films broadcasted on national TV			Number of VCR (million)		
	1985	1989	1992	1985	1989	1992	1985	1989	1992
BR Deutschland	483	506	(2) 558	1 716	2 179	3 253	5.5	11.2	(5) 13.0
España	270	389	402	405	902	(4) 7 241	1.5	3.5	5.1
France	390	400	408	500	1 289	1 290	2.9	7.9	13.6
Italia	413	423	429	6 600	5 193	10 996	0.5	4.0	7.0
United Kingdom	433	434	435	1 560	2 059	(4) 1 969	8.0	15.2	15.6
EU (1)	344	434	458	10 781	11 622	24 749	18.4	41.8	54.3
USA	797	814	814	N/A	N/A	N/A	23.0	62.2	70.0
Japan	579	610	613	(3) 970	1 538	1 189	12.6	24.1	30.1

(1) Including the above mentioned countries only

(2) Total GDR + FRG

(3) Figure for 1984

(4) Figure for 1991

(5) Estimate

Source: CNC, Eurostat



**Table 2: Television**  
**Total television revenues in the EEA**

(million ECU)	1990	1991	1992	1993
Belgique/België	464	491	495	562
Danmark	167	195	193	227
BR Deutschland	3 142	3 742	4 368	5 247
Hellas	112	153	205	313
España	1 500	1 598	1 661	1 907
France	3 237	3 620	3 764	4 411
Ireland	88	92	93	110
Italia	2 748	3 187	3 442	4 249
Nederland	205	266	334	437
Portugal	151	197	247	330
United Kingdom	3 558	3 861	4 119	5 227
EU (1)	15 372	17 402	18 921	23 020
Österreich	379	393	418	475
Suomi/Finland	254	267	274	319
Norge	79	95	119	152
Sverige	272	342	384	604
EEA (2)	16 356	18 499	20 116	24 570
Schweiz/Suisse	326	358	350	420

(1) Excluding Luxembourg

(2) Excluding Luxembourg and Island

Source: European market and mediafact 1993

of programs broadcast passed from 205 000 hours to 720 000 hours.

In contrast, available European supply increased by a mere 60 %. The limited resources of small national players has reduced the possibility that catalogues will get built-up. This explains the important share of repeat showings (estimated at 27 % in 1993) and the significant development of purchases of TV programs outside the European Union (about 40 % in 1993).

Despite funding on a European and national scale, broadcasting and production obligations and Community programmes such as MEDIA, the level of European production is still insufficient, especially in some programme areas such as cartoons, drama and fictional programming (series), or creative documentary.

#### Transmission and reception

There are 127 million households in Europe of which 122 million have a television set. 20 % of TV households receive television by cable and 7 % by satellite. Major differences exist between Southern Europe where cable penetration is low (only 23 % of Greek households in cabled areas are connected, while in Spain, Italy and Portugal, cabling is practically non-existent) and more northerly member states (Belgium: 99 % penetration in cabled areas; Holland: 95 %). Satellite penetration follows a similar geographical pattern.

Finally, High Definition Television (HDTV), the new standard of television reception, promises to be the major development of the twenty-first century. Widescreen (16:9 format) and improved definition television receivers have recently entered the market: in 1994, total European sales of 16:9 widescreen TV sets reached 150 000 units (100 000 in France only, as 16:9 broadcasting started there first).

**Table 3: Television**  
**Penetration of cable and satellite in Europe, 1993**

	Households with TV (thousands)	Households with satellite dish (thousands)	Penetration rate (%)	Cable connections (thousands)	Penetration rate (%)
Belgique/België	4 025	13	0.3	3 400	84.5
Danmark	2 308	205	8.9	1 250	54.2
BR Deutschland	31 930	5 200	16.3	13 495	42.3
Hellas	3 092	1	0.0	1	0.0
España	11 350	140	1.2	150	1.3
France	20 448	156	0.8	871	4.3
Ireland	1 024	30	2.9	429	41.9
Italia	20 304	73	0.4	0	0.0
Nederland	6 170	181	2.9	5 393	87.4
Portugal	3 080	54	1.8	5	0.2
United Kingdom	22 088	2 685	12.2	611	2.8
EU (1)	125 819	8 738	5.7	25 605	16.8

(1) Excluding Luxembourg

Source: Screen digest, European market and mediafact, 1993

**Table 4: Television**  
**Number of TV channels in the EEA**

	1988	1989	1990	1991	1992	1993
Belgique/België	5	6	6	7	7	7
Danmark	2	3	3	4	5	5
BR Deutschland	10	11	12	12	13	15
Hellas	3	6	6	6	5	5
España	3	3	7	7	7	9
France (1)	13	14	15	15	17	19
Ireland	2	2	2	2	2	2
Italia	12	12	12	12	12	12
Luxembourg (2)	3	3	3	3	3	3
Nederland	5	6	6	6	7	8
Portugal	2	2	2	2	2	4
United Kingdom	17	17	18	21	31	40
EU	77	85	92	97	111	129
Österreich	2	2	2	2	2	2
Suomi/Finland	4	4	4	3	3	3
Island	2	2	2	2	2	2
Norge	2	2	3	3	3	3
Sverige	2	2	2	6	6	6
EEA	89	97	105	113	127	145
Schweiz/Suisse	5	6	5	5	5	5

(1) Not included all the local television channels

(2) Not included all the channels accessible on cable

Source: Screen Digest

### Broadcasting

Since the end of the 1980s, increased competition has led to growing financial problems for the broadcasting channels, which have been faced with a reduction in their shares of advertising revenue. This in turn has led to the development of new services such as pay channels as well as specialised channels.

### International comparison

The Americans have the highest rate of penetration of televisual equipment in the world: 2.4 television sets per household and a penetration rate of 80 % for videorecorders. Close behind are the Japanese, with 1.5 television sets per household and

a penetration rate of 81 % for videorecorders. By contrast, the European Community averages just over 1 television per household. Videorecorder penetration is only 57 %, though there are significant country variations (Italy with 40 % and the UK with 75 %).

### Foreign trade

The EU trade deficit for program production was 1.25 billion ECU in 1992. On average, European countries import around two-thirds of fictional broadcasts. In the case of some channels, this figure is even higher (90 % for the French station M6 and 100 % for A3, the Spanish broadcaster).

**Table 5: Television**  
**Top 18 channels, turnover**

(million ECU)		1987	1988	1989	1990	1991	1992
ARD	D	2 405	2 509	2 547	2 840	3 193	4 320
BBC	UK	1 891	2 174	2 307	2 366	2 614	2 716
RAI	I	1 380	1 584	1 722	1 968	2 211	2 286
Publitalia	I	1 218	1 330	1 417	1 526	1 707	1 962
ZDF	D	730	746	775	871	892	1 135
TF1	F	533	685	756	843	938	1 069
Canal +	F	491	616	763	898	883	937
RTVE	E	743	1 003	1 211	1 070	836	931
RTL TV Germany	D	23	60	142	337	493	727
France 3	F	432	449	472	541	571	657
NOS	N	-	-	-	-	539	573
Thames TV	UK	369	467	547	564	538	532
BSkyB	UK	-	-	69	297	517	N/A
Sat-1	D	18	56	149	267	391	505
France 2	F	402	403	410	441	490	N/A
Central TV	UK	358	377	485	470	426	453
LWT	UK	333	344	376	412	362	385
Granada TV	UK	331	338	434	428	402	351
Channel 4	UK	244	260	330	348	354	342

Source: Screen Digest



**Table 6: Television  
TV advertising expenditure in the EEA**

(million ECU)	1990	1991	1992	1993
Belgique/België	262.3	270.0	273.9	308.3
Danmark	65.2	87.6	92.6	112.7
BR Deutschland	1 420.8	1 901.5	2 113.3	2 631.9
Hellas	63.6	102.2	152.8	249.4
España	1 487.6	1 553.7	1 549.3	1 710.5
France	1 871.6	2 049.1	2 067.0	2 421.0
Irland	55.8	59.2	60.2	72.6
Italia	2 221.9	2 552.7	2 732.8	3 327.1
Nederland	55.8	103.8	166.7	243.4
Portugal	150.8	197.9	247.7	329.6
United Kingdom	2 342.1	2 437.5	2 437.3	2 898.4
EU (1)	9 997.5	11 315.1	11 893.5	14 304.9
Österreich	215.2	225.4	256.2	286.9
Suomi/Finland	113.9	116.0	118.8	140.9
Norge	15.7	29.2	47.1	69.2
Sverige	32.2	67.3	120.4	177.6
EEA (2)	10 374.5	11 753.0	12 435.9	14 979.5
Schweiz/Suisse	115.5	118.4	113.4	131.5

(1) Excluding Luxembourg

(2) Excluding Luxembourg and Island

Source: European market and mediacraft 1993

American producers control some segments of television programming in Europe (notably fictional programming), though the presence of the Japanese is increasingly felt, particularly in cartoons. According to IDATE estimates, in 1992 the Americans exported 1.33 billion ECU of programs of which about 60 % was destined for the European Union. By contrast, American imports from the EU represented a mere 770 million ECU.

The trade deficit in production revolves around European producers' dependence on program demand from the national broadcasting channels, a function of their insufficient size and inability to risk investing in more speculative projects. Broadcasters, in turn, are hostage to the needs of audience maximisation, limiting the possibilities for development of programs with international appeal. European producers have therefore been unable to build up a sufficient stock of programmes to promote the export market as well as to meet growing internal demand.

## MARKET FORCES

### Demand

Despite the fact that penetration of television sets already exceeds 100 % in European households, there remains potential for growth in the installed base owing to the advent of video games and the decrease in equipment prices. This phenomenon is already manifesting itself in countries such as the UK and Spain where 50 % and 39 % of households, respectively, possess a second television.

In more recent times, the videorecorder has shown rapid growth (between 1989 and 1992, penetration moved from 43 to 57 % in Germany, from 20 to 40 % in Italy and from 35 to 56 % in France).

The effect of this development in the installed base of audiovisual equipment on demand for television may in part be counterbalanced by other factors. For example, the Institute Médiamat noted a 20 % reduction in viewing time between 1990 and 1993 by young Europeans in the 14 to 20 age range. This may be the result of the development of the electronic games market and, to a lesser extent, that of multi-media.

Television viewers are increasingly sensitive to the choice and diversity of programs (hence, the success of pay TV and specialist channels such as MTV and Eurosport) and the possibility of customising their viewing (e.g. through development of interactive systems).

### Supply and competition

The deregulation of the 1980s has led to a wide diversity of channels (four times more channels in 1993 than in 1981) and to a number of pan-European broadcasters, resulting from the development of cable and satellite TV. Channels can be grouped into the following categories:

- "Generalist" channels (e.g. ARD (DK); BBC (UK); RA1, Canale 5 (I); TF1, FR2 (F); TVE2 (E)): Principally public channels in competition with the private stations, aiming for a balance between public service (information, education, culture) and commercial appeal for the sake of audience maximisation.
- "Thematic" channels (e.g. BSKyB (UK), La 7 (F), RTL (L), Nederland 3 (NL), Eurosport, etc.): these channels tend to specialise in one specific subject such as sport, films, information.

The new areas of research and development in the supply of televisual products centre around three main axes:

- the search for increased viewing comfort and perfection, with high definition television, 16:9 broadcasting and the introduction of digital sound;
- the increase in supply of programs through the multiplication of channels as a result of digital methods;
- development of interactive methods, a veritable combination of micro-computer and CD technology.

### Production process

Despite financial and technical obstacles, the race for high definition television has started. This revolution owes much to the development of digital technology, a process of compression and transmission of binary elements.

The digital system has numerous advantages:

**Table 7: Television**  
**EU trade balance with USA, 1993**

(million ECU)

Exports USA to EU	1 330
Exports EU to USA	77
Balance EU/USA	-1 253

Source: IDATE estimates from MPAA, AFMA, GSO (UK)

- It is possible to compress up to one hundred times more information on a channel, i.e. between three to eight programs. The immediate result is a reduction in the cost of transmission of these programs.
- The information is evenly recorded (unlike with analog systems) and interference between channels presents less of a problem. This creates the possibility of broadcasting the same program on the same frequency from different points.
- Digital production, transmission and reception offer a better and more constant quality of image.
- With digital TV, it is possible to transmit programs on mobile and portable TV sets via cable and satellite, with terrestrial transmission to follow.

## INDUSTRY STRUCTURE

### Companies

#### Production

Television in UK is among the most involved in domestic productions: about 70 % of programs broadcasted for BBC and ITV are British productions. English broadcasters finance 100 % of their orders and pay a production fee of 10/12 % to producers.

In France, TV production financing is supported by producer investments, channels and CNC (Centre National de la Cinématographie). The eldest production company, SFP, is currently undergoing a restructuring process, whereas independents such as Hamster and AB Production have recently produced profitable TV fictions for French TV.

TV production in Germany is very integrated because, on the one hand, producers are often subsidiaries of broadcasting channels and, on the other hand, public channels have acquired huge studios to ensure themselves their productions.

In Italy, virtually the entire production volume is represented by Fininvest or by RAI. Independent producers difficulty in imposing their know how, with the exception of those who have previous cinema experience.

In other European countries, there are only few small operators in this field.

#### Transmission and reception

Two main types of company are involved in the development of new technologies of transmission and reception:

- Electronic groups such as Philips (12 billion ECU of turnover in consumer electronics), Thomson (4.4 billion ECU), Nokia (1.1 billion ECU) in the area of HDTV equipment.
- Cable operators developing future techniques of transmission (France Telecom, TeleWest, NYNEX).

#### Broadcasting

In Europe a hundred or so broadcasting stations figure amongst the 6 diversified communications groups:

- Bertelsmann (3.2 billion ECU of turnover in 1993) with three channels (RTL Plus, Premier and Vox), focused on the German market.
- The group Kirch (1.16 billion ECU in 1993, which holds stakes in Sat 1, Premiere, DSF, Pro 7 and Kanal Kanal also focused on the German market.
- Fininvest (2.4 billion ECU of audio-visual turnover in 1993) controls three channels in Italy (100 % of Canale 5 and Rete 4, 55 % of Italia 1). It also has involvement in the German market (21 % of Tele 5) and the Spanish market (25 % of Tele Cinco).
- The CLT (L) (1.99 billion ECU of audio-visual turnover in 1993) remains the group with the most extensive presence in Europe: 66 % of the Belgian channel RTL TV1, 25 % of RTL 4 (NL), 25 % of M6 (F), 46 % of RTL Plus (D) and 29 % of RTL Luxembourg.

Two groups are present in the pay television market: Canal Plus (F) with 1.53 billion ECU of turnover in 1993, which owns 25 % of Canal Plus Espagne, 42.7 % of Canal Plus Belgique and 37.5 % of Premiere in Germany; the Murdoch group (News Corp.) (2.8 billion ECU of audio-visual turnover in 1993) which with BSkyB has a quasi-monopoly in the UK.

Major public and private channels have generally shown substantial growth during the 1980s even if the multiplication of channels generated by new transmission modes (cable and satellite) led the sharing of advertising revenues.

### Strategies

#### Production

European producers have increasingly aligned themselves with groups in the United States. Since 1989, the number of joint ventures has developed steadily. TV channels are more and more involved in TV productions both for an operational and financial viewpoint.

**Table 8: Television**  
**Origin of TV programmes in the EU**

(%)	1990		(1) 1995	
	Hourly volume	Broadcaster budget	Hourly volume	Broadcaster budget
Internal productions	30	54	29	49
Repeat showings	27	0	28	0
Purchases	38	30	37	29
Co-productions	5	16	6	22
Total	100	100	100	100

(1) Estimated

Source: J.N. Dibie "L'Europe de l'audiovisuelle"



**Table 9: Television**  
**Europeans TV programmes exported**

(million ECU)			Total	Source
BR Deutschland	ZDF	1991	19.2	ZDF
España	RTVE	1990	4.4	RTVE
France	Prod. cinéma	1991	70.2	CNC
Italia	Ens. Producteurs	1988	59.0	ANICA
United Kingdom	Soc TV	1992	215.0	CSO
	Soc Cinéma	1992	505.0	CSO

Source: IDATE

**Table 10: Television**  
**Television taxes and licences in the EEA, 1992**

	Annual fees in ECU		Type of receivers and uses
	TV licences	Radio and television licences	
Belgique/België	111		Black and white receiver, private use
	160		Color receiver, private use
Danmark		125	Black and white receiver, private use
		194	Color receiver, private use
BR Deutschland			
Old Länder		140	Black and white or color receiver, private or public use
New Länder		112	
Hellas			All users pay a fee calculated on the basis of their electricity bill
España			No television licences or taxes
France	54		Black and white receiver, private use
	85		Color receiver, private use
Ireland	58		Black and white receiver, private or public use
	82		Color receiver, private or public use
Italia		98	Black and white or color receiver, private use
Luxembourg			No television licences or taxes
Nederland		76	Black and white or color receiver, private use
Portugal			No television licences or taxes
United Kingdom	37		Black and white receiver, private use
	113		Color receiver, private use
			Additional licence for car television receiver
Österreich	162	171	Black and white or color receiver, private or public use
Suomi/Finland	86		Black and white receiver, private use
	152		Color receiver, private use
Island	251		Black and white receiver, private use
	279		Color receiver, private use
Norge	76		Black and white receiver, private use
	155		Color receiver, private use
Sverige	180		Black and white or color receiver, private or public use
Schweiz/Suisse	129		Black and white or color receiver, private use

Source: EBU

### *Transmission and reception*

France Telecom, having launched the satellite Telecom 2 for broadcasting programs in D2 MAC, is currently developing transmission systems adapted to the future norms of digital broadcasting.

In the equipment market, smaller European players such as the Finnish group Nokia are hard pressed to compete with the Japanese electronics giants ( Matsushita, Hitachi, Sony). Philips has made a major commitment to the interactive compact disk. Thomson was the sole supplier of digital decoders for US DirecTV 150 channel service which started in 1994: its audiences are growing fast and other manufacturers are participating now.

### *Broadcasting*

Already present in newspapers and publishing, the Bertelsmann group has taken advantage of the opportunities presented by the appearance of the private television channels in Europe.

Kirch, which supplies most of the public German channels with films and series has also followed a strategy of moving into broadcasting via the private channels.

The lead position of the group Fininvest in private Italian television allowed Silvio Berlusconi to invest rapidly in related activities - private channels elsewhere in Europe, international film production, advertising - and to diversify into other media forms such as newspapers and publishing.

The CLT, with its eight channels in five European countries, has a clearly stated strategy: to develop its presence abroad through the generalist channel segment.

Canal Plus is the only operator to have concentrated principally on its original core business: pay television. Today, its strategy is one of vertical integration into cinema production and a search for partners in the development of new technologies.

The other pay TV group, Murdoch's BSkyB, bases its strategy on the emulation of the great American success stories (MTV, CNN, ESPN), and is very active in the field of new technologies (in cooperations with Canal+)

### **Impact of the Single Market**

The impact of the Single Market has not caused major changes in the Television industry. Even though there has been a boost in demand for TV Programs, supply of truly European products has been puny due to national markets' fragmentation: the main focus has been placed on satisfying national audiences rather than increasing circulation of European films. The EU internal market program has certainly helped to harmonise rules concerning the broadcasting of TV Programs produced by independent sources, whose recommended quota is 10% of European channels hourly volume (TV without frontier Directive). Nevertheless, diffusion of cable and satellite television enabled European viewers to have direct access to stations from other EU countries, thus hampering agreements between European broadcasters. In addition, the various transmission systems have not yet been harmonised. So far, due to national rivalries, the internal market has not altered this situation because producers are not yet willing to push for standardisation; in this area, the role of governments is essential

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## **REGULATIONS**

### **Production obligations**

Broadcasting is regulated by the Television directive, which allows for Member States to impose restrictions on the broadcasters established in their territories.

Obligations vary according to Member States. For example, British channels are obliged to obtain 25 % of their hourly volume from independent producers.

At the same time, the European Commission Directive "Television beyond borders" recommends a minimum of 10 % of channel hourly volume to be sourced from independent producers.

### **Broadcasting obligations**

The Directive 89/552, the so-called "Television without frontiers" directive, sets up rules for TV programming in the EU. Various national obligations fix European broadcasting volume at between 25 % and 60 % of total volume depending on the Member State. The European Council has recommended that European productions represent "the majority of volume of hours broadcast."

Concerning independent production, broadcasters have the choice between devoting 10 % of the budget for programming to European audio-visual programs or 10 % of broadcasting time.

The Media program, adopted in December 1990 by the European Commission, has dedicated ECU 200 million over 5 years to the European audio-visual industry:

- Support for distribution up to 85 million ECU;
- Support for writing and development of programs up to 65 million ECU;
- Support for developers of new technologies in audio-visual production of 20 million ECU;
- 10 million ECU for professional development;
- 15 million ECU for development in countries with limited production capacity.

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## **OUTLOOK**

Continued European efforts to make headway in the program production industry may begin to reap rewards in the coming decade, though the battle is by no means won. It is likely that increasing cooperation with American groups will assist in this process, as would the development of a system of centralised production, favouring the emergence of a major European production group.

Digital technology seems to have found its place as the transmission system for the future, owing to its numerous advantages. Cable operators, electronics groups and computer giants are set for the race for multi-media. In addition, computer groups are developing multi-media tools integrating voice, text and image.

As for the broadcasters, the market will continue to be competitive, with public channels increasingly unable to survive on licence fees and TV stations generally suffering from a drop in advertising revenues. In parallel, the trend towards pay stations and particularly, specialist stations (with narrower targets and smaller market shares), is expected to continue.

Written by: LEK



# Music recording

## NACE 345.2

*Difficult economic conditions adversely affected sales in the EU for the recorded music sector again in 1993. Retail sales decreased by 2.5 % (in nominal terms) compared with 1992, owing to difficult conditions in several countries, e.g. France, UK and, to a lesser extent, the Netherlands, Spain and Italy. In contrast, Japanese and American sales showed strong growth with 17.4 % and 10.9 % increases respectively. However, the few corporations that lead the European industry can build significantly on the development of new markets in Eastern Europe in the future.*

### INDUSTRY PROFILE

#### Description of the sector

The recording industry ranges from the selection, management and production of artists to the manufacturing, marketing and distribution of "Long Play" or "Singles" recorded on media such as Compact Discs, Vinyl Discs and Compact Cassettes. This sector represented 7.6 billion ECU in 1993 for the European Union as a whole. Three European groups (PolyGram, Thorn EMI and BMG) capture close to 40 % of the world market while Germany, the UK and France represent 73 % of EU consumption and 21 % of the world market.

#### Recent trends

This sector follows a long-term cycle, which is closely correlated to the introduction of new technologies. Vinyl LPs peaked (with 1.2 billion units sold worldwide) in 1981; cassettes reached a plateau in 1989 (1.5 billion units), and further growth is still expected from CDs (1.4 billion units in 1993). Philips's DCC and Sony's MiniDisc so far have failed to compensate for the momentum gradually lost in the cassette market.

Another underlying trend is industry consolidation in a market where production economies of scale are critical. The acquisition of Virgin Records (production and distribution) by Thorn EMI in 1992 was a clear illustration of this trend. Indeed, a large number of independent EU record companies have been

acquired by the "majors" over the past years (Erato, Vogue, Avrep, etc.).

#### International comparison

In 1993, the EU represented 29 % of world sales, ahead of Japan (17 %) but behind the US (32 %). Consumption patterns remain quite different in these markets: the importance of record rental in Japan (where there are as many rental shops as record retail outlets) is combined with the highest CD hardware penetration in the world (133 %). In the US, CD penetration is much lower (75 %) but portability has proved a key growth factor (the success of the "Walkman" pushed cassette player penetration in American homes to a peak of 3.2 units vs. 2.3 in the EU).

EU countries offer a very contrasted picture: in 1993, Dutch consumers spent an average 35 ECU per capita on music recording, benefiting from a very high CD penetration at a record 113 %; in contrast, Greek consumers only parted with some 8 ECU per head with a mere 12 % CD penetration. The three leading EU markets, Germany (2.3 billion ECU), the UK (1.7 billion ECU) and France (1.6 billion ECU) today rank among the top five in the world.

#### Foreign trade

Because of their transnational market positions and the low cost of transport, record companies tend to organise manufacturing independently of market locations: customs statistics are therefore not meaningful. However, two patterns are worth noting.

First, most European markets are heavily penetrated by the "international pop" repertoire. This category typically represents 60 % of national sales, with domestic artists contributing around 30 % and classical recordings filling the remaining 10 %. Notable exceptions are Greece, Italy and France, where national artists make up 40-60 % of the markets.

Additionally, beyond the visible trade of records and tapes, the impact of invisible exports is extremely significant for exporting countries. The Policy Studies Institute in the UK estimated that in 1988 the ratio of invisible to visible exports for the UK was seven, thereby generating over one billion Pounds, i.e. twice as much as films, video and broadcasting put together.

**Table 1: Music recording  
Consumption, 1993**

(million ECU)		Share in EU total (%)	Share in world total (%)
EU (1)	7 622.2	100.0	29.3
Belgique/België	322.8	4.2	1.2
Danmark	162.3	2.1	0.6
BR Deutschland	2 297.8	30.1	8.8
Hellas	79.9	1.0	0.3
España	421.6	5.5	1.6
France	1 578.7	20.7	6.1
Ireland	54.0	0.7	0.2
Italia	385.7	5.1	1.5
Nederland	528.4	6.9	2.0
Portugal	103.6	1.4	0.4
United Kingdom	1 687.4	22.1	6.5
Japan	4 340.2	N/A	16.7
USA	8 397.2	N/A	32.3
World	25 971.9	N/A	100.0

(1) Excluding Luxembourg  
Source: IFPI



**Table 2: Music recording  
Evolution of breakdown in volume by media**

(%)	1980	1985	1990	1993
Singles	33.9	35.5	17.4	16.3
LPs	45.7	35.1	16.1	2.2
MCs	20.4	27.0	33.4	23.8
CDs	0.0	2.4	33.1	57.7
Total	100.0	100.0	100.0	100.0

Source: IFPI

## MARKET FORCES

### Demand

In value terms, music recording is one of the few economic sectors that has enjoyed high compound growth across Europe since 1989. A number of factors have an impact on this level of demand.

General economic conditions obviously prevail. Hoare and Govett Investment Research recently illustrated the close correlation between GDP growth and "music value growth" in Europe over the past ten years. Also, it is often believed that younger age groups represent key buyers for this sector. It appears that this was indeed true when older generations had not had the opportunity to buy records in their youth. Recent US data suggests that music buying habits are carried up by the age profile (the share of US music sales made to persons aged 15-19 years has already fallen from 24 % to 17 % in the four years to 1991, while the amount accounted for by 30-39 year olds increased from 19 % to 23 % over the same period). Europe's ageing population is expected to follow a similar pattern and, therefore, should not have too negative an impact on the sector's future growth.

Changes in technology are obviously critical. The "technological cycle" described earlier would appear to link demand to new hardware development. This is certainly true in the case of CDs, but probably less so for DCCs and MiniDiscs.

The move towards CDs has radically altered the balance of volume sales by media: CDs have grown in the EU by 24 % (compounded annually) since 1989 while LPs decreased by 43 % each year. The value impact of the switch has led to an annual value growth of 8 % over the same period. Indeed, the CD segment is still growing very fast in countries where CD hardware penetration is low (Greece, Portugal, Spain, Italy), but strong growth has been recorded over the past four years in the more "penetrated" countries such as Belgium, Denmark and Germany as well.

Another positive effect of new media is that they allow enhanced profits for record manufacturers. Increased value-added has led to much higher price points thus helping to increase market values in spite of sluggish volume growth.

Finally, commercial dynamism cannot be underestimated. Record marketing has become more professional in the EU, owing in part to television advertising, which provided a welcome boost to the French market in 1988. More recently, distribution has played a significant role in pushing market growth, adding competition on prices. Virgin Megastores or HMV outlets have opened in most EU countries, and mass retailers such as supermarkets (which represent 50 % of retail market in France) have helped push demand.

### Supply and competition

Over 60 CD production plants exist within the EU today. Most of them are owned by major record companies, although some independent companies remain, e.g. MPO (F) and Nimbus (UK). The music recording industry obviously has become a very capital-intensive business, where competitiveness is a direct function of economies of scale, thus driving industry consolidation across Europe.

With retailers gaining influence over buying decisions, price positioning becomes more critical to the marketing mix. Beyond exchange rate fluctuations (particularly with the USD), the 1993 retail price of a Pop Music CD, indexed 100 in the US, was 45 % higher in France, 35 % in the UK and 17 % in Germany. Yet, by early 1993, member countries had largely succeeded in realigning VAT rates so that their range has become much narrower. Italy has the lowest rate (12 %) and Denmark the highest (25 %). France experienced a very favourable boost when the rate was brought down from 33.3 % to 18.6 %, in 1987.

### Production process

Technological development is a key driver for this industry. The impact of CDs has considerably rejuvenated the market, quickly offsetting the LPs rapid decline. It is generally believed

**Table 3: Music recording  
Breakdown by product group and country, 1993**

(million units)	B	DK	D	GR	E	F	IRL	I	NL	P	UK	EU (1)	Japan	USA
Singles	3.4	0.7	36.9	0.0	0.8	20.8	0.7	1.5	5.8	0.0	56.2	126.7	145.3	108.4
LPs	0.0	0.7	1.6	3.2	5.3	0.2	0.0	0.4	0.3	0.3	5.0	17.1	0.7	1.2
MCs	1.8	1.4	47.2	1.5	19.6	31.2	2.3	15.2	1.6	7.9	55.7	185.4	14.0	339.5
CDs	16.6	8.6	152.8	2.5	25.0	86.6	1.7	23.7	34.6	5.1	92.6	449.8	191.8	495.4
Total	21.8	11.4	238.5	7.2	50.7	138.8	4.7	40.8	42.3	13.3	209.5	778.9	351.8	944.5
Retail sales (million ECU)	322.8	162.3	2 297.8	79.9	421.6	1 578.7	54.0	385.7	528.4	103.6	1 687.4	7 622.2	4 340.2	8 397.2

(1) Excluding Luxembourg  
Source: IFPI



**Table 4: Music recording**  
**Value breakdown of EU markets by musical repertoire, 1993**

(%)	B	DK	D	GR (1)	E	F	I	NL	P	UK
International Pop	78.0	69.0	65.0	42.0	60.3	48.2	52.3	69.0	77.6	48.0
Classical	9.0	5.0	10.0	N/A	7.9	8.9	8.4	12.0	6.9	7.0
Domestic	13.0	26.0	25.0	58.0	31.8	42.9	39.3	19.0	15.5	45.0

(1) International pop includes classical.  
 Source: IFPI

that there is no danger of CD growth ceasing in Europe anytime soon. This is true even for highly penetrated markets such as the Netherlands. For example, estimates expect CD hardware penetration in Japan to grow from a current 133 % (the highest in the world) to over 140 %.

In 1988, the cassette became an astonishing worldwide success, attaining world volumes 50 % greater than those of LPs and CDs combined. In Western Europe alone, cassette recorders reached 230 % penetration. Industrialists are hoping to emulate this with the take-off of two new technologies described below.

DCC (Digital Compact Cassette) has been developed to offer digital quality using a medium very close to the traditional analogue cassette. Its real portability (superior to CD) is key, as is its "back-compatibility" (traditional cassettes can be played on DCC hardware).

Multiple copies are prevented by an internal "deteriorating" device. The Dutch group Philips, allied to Matsushita, is the contender for this system. It is estimated that some 26 000 DCC were sold worldwide in 1992, but no official data has been released as of late. However, DCC has failed to breakthrough in the US and Japan and is performing poorly in most European countries except the Netherlands. In the UK, for example, Our Price, the largest music retailer, ceased stocking DCCs in April 1994, followed by US-owned Tower Records.

The MiniDisc (developed by Sony) also offers recording facility (and multiple copying prevention) but is not back-compatible. Sales of MiniDisc players reached 400 000 units in 1993, of which European markets accounted for one-third. While it has been successful in Japan, sales have been dis-

appointing in the rest of the world. Currently, it seems that neither the software industry nor the retail trade have a clear need for a new digital recording medium.

Another technology worth mentioning is direct transmission of recorded music along cables, telephone lines or via satellites. Such systems (e.g. DMX/BSkyB or Digital Cable Radio Associates/Warner/Sony) are already operative in the US.

## INDUSTRY STRUCTURE

### Companies

The recorded music industry is highly concentrated, with six multinational groups sharing about 75 % of the world market. However, beyond the few independent companies that have managed to survive, e.g. Harmonia Mundi (F) or Nimbus (UK), the majors expand cautiously when establishing a local presence. As an example, Thorn EMI owns 64 record companies and 22 music publishing companies in 38 countries. Local labels generally enjoy a large degree of freedom in their management. Overall, the IFPI comprises some 600 members in the EU, 250 of which are in Germany alone.

The six leading groups in the industry are usually vertically integrated in hardware and/or retail. They are PolyGram (75 % controlled by Philips, NL), Sony Music Entertainment (JPN, with CBS label), Time Warner (WEA, US), Thorn EMI (UK), Bertelsmann Music Group (BMG, D) and MCA (JPN). European dominance is striking: three of the five world leaders are EU companies, representing close to 40 % of the world market.

**Table 5: Music recording**  
**CD hardware penetration by household and production facilities, 1993**

(units)	Production facilities	Record companies	CD hardware (%)
Belgique/België	2	100	67.4
Danmark	3	37	62.2
BR Deutschland	17	231	78.8
Hellas	2	14	12.0
España	5	68	30.0
France	8	160	61.8
Ireland	2	30	17.3
Italia	7	128	21.8
Nederland	7	115	112.7
Portugal	1	12	19.0
United Kingdom	9	618	59.1
EU (1)	63	1513	N/A
Japan	N/A	N/A	132.5
USA	N/A	N/A	74.6

(1) Excluding Luxembourg  
 Source: IFPI

**Table 6: Music recording  
CD prices and Value Added Taxes (VAT) by country, 1993**

(USA = 100)	Pop CD price index	Classical CD price index	VAT rates (%)
Belgique/België	128	134	19.5
Danmark	N/A	N/A	25.0
BR Deutschland	117	125	15.0
Hellas	N/A	N/A	18.0
España	N/A	N/A	15.0
France	145	154	18.6
Ireland	N/A	N/A	21.0
Italia	134	147	12.0
Nederland	132	141	17.5
Portugal	N/A	N/A	16.0
United Kingdom	135	147	17.5
Japan	N/A	N/A	N/A
USA	100	100	N/A

Source: L'Expansion, IFPI

## Strategies

The combination of capital intensity with market internationalisation (the majority of European markets are dominated by international pop and classical), means that economies of scale are critical and, fortunately, achievable. Most players, therefore, have sought to secure a wider international position, as well as to enrich their repertoire. Vertical integration upstream brings substantial marketing power and flexibility (e.g. Virgin/EMI). Technologically, synergies between CBS and Sony's MiniDisc or PolyGram and Philips' DCC are no less significant.

### PolyGram

Probably the "purest" of all competitors, it has 81 % of its 1993 7.4 billion Dutch Guilders of sales in music and is the European leader (22 % market share, up to 32 % in France). PolyGram has been building up its international network, through the recent acquisition of several US companies (A&M, Island Records, and Motown) and the opening of new subsidiaries in Eastern Europe. PolyGram is leader in the classical department (40 % market share) with international labels such as Decca, Philips Classic, Verve Jazz or Deutsche Grammophon.

It is also one of the largest operators in the European music mail order business through Britannia Music (UK), Dial (F), Sound Plus (D) and PolyMond (I). The group has started building a position in music publishing and, more importantly, in the movie production and distribution business (9 % of sales in 1993, planned to grow to 25 % by 2000). The com-

pany's current strategy is to transform itself into a global entertainment company to take advantage of the opportunities in multi-media that most informed sources and forecasters agree will snowball through the 1990s.

### Thorn EMI

The much publicised Virgin acquisition in June 1992 boosted EMI Music's global market share to almost 14 %, thus giving it the fourth position in front of BMG. Thorn EMI is more diversified than PolyGram and only derived 41 % of its 4.3 billion Pounds of revenues from music and music publishing in 1994 (up from 15 % in 1986). EMI Music employs over 8 000 people.

The group benefits from a strong presence in the very profitable activity of music publishing (EMI Music is a world leader with over 25 % market share). It is also diversified in: music retailing, through the HMV Group (179 stores, half of which are in five markets outside the UK), TV, VCR and other electronic hardware rental. Recent divestments include lighting fittings and majority interests in Thames Television and GB Glass. Discussions about further divestments in the security and electronics businesses are continuing.

One of Thorn EMI's objectives is to balance its international portfolio, which led to its acquisition of the US jazz & rock specialist Chrysalis in 1990. In 1993, a majority stake was taken in Monitor. In 1994, Thorn EMI acquired Intercord, a strong German independent label.

Strategic collaborative investments also were made in Europe and the US in both music television channels (VIVA, in Germany) and digital cable radio (Music Choice US), two areas of potential growth. The company is exploring additional investments and partnerships in new digital, interactive and multimedia technologies in order to remain at the forefront of the music business.

### Bertelsmann Music Group (BMG)

With 14 % of the world market, BMG ranks fourth in the world and is the third European music record company. 47 % of its 5.2 billion DM sales (25 % of consolidated sales) were achieved in Europe in 1993 against 33 % in North America. International expansion over recent years has remained a key objective, owing to acquisitions of small and medium-sized labels such as Vogue, Avrep (F), Deutsche Harmonia Mundi (D) or joint ventures with Pressing (I), Stageway and Norsk (Norway); and Jive Records and LaFace Records (US). In 1994, BMG acquired the Italian record company Ricordi, the second biggest acquisition since RCA.

**Table 7: Music recording  
Share of the world market**

(%)	1991	1992	1993
PolyGram	18.7	15.9	15.6
Sony (CBS)	18.0	17.9	15.0
Warner	16.4	16.3	14.4
Thorn-EMI	13.9	13.5	13.9
BMG	13.1	14.4	10.0
MCA	11.1	10.2	6.1
Others	8.9	11.8	25.0
Total	100.0	100.0	100.0

Source: Idate (1991 and 1992), Music & Copyright (1993)



**Table 8: Music recording**

**Share of pirate sales of audio CDs and tapes in total sales, 1993**

(%)	Piracy rate
Belgique/België	4
Danmark	2
BR Deutschland	7
Hellas	23
España	2
France	3
Ireland	3
Italia	28
Nederland	5
Portugal	4
United Kingdom	3

Source: IFPI

BMG is now active in 45 countries and is the third player in the biggest world market - the US - with a 13 % market share. However, Europe remains its most profitable market.

BMG as a global music company is trying to strengthen its position in new markets and is now present in most East European countries. The strategy pursued is twofold: growth through careful development of local artists and further acquisition of creative labels.

Finally, BMG has taken the strategic decision to enter the interactive entertainment market by selling CD-ROM products mainly in the videogames and "educational entertainment" markets.

### Impact of the Single Market

The music recording sector association, IFPI, views the impact of the Single Market as relatively ineffective. In the view of the association, piracy and Intellectual Property Rights (IPR) are issues that have not been properly dealt with by the internal market programme. In fact, although a well established network of legislative instruments has been created to foster industry's competitiveness, its effective implementation constitutes the sector's major concern. In this sense, the association wishes that the role of the European institutions be that of catalyser of regulations and of Member States' capacity to enforce legislation. The industry is all the more worried when it comes to consider the implications of IPRs theft in the contest of the new Information Society: here, protection of product content and implementation of its juridical aspects should move along parallel lines. Also, clear-cut legislation deems necessary for gradual elimination of margins of subjective interpretation. Now that internal barriers are progressively disappearing, focus is on difficulties that EU companies encounter when entering third country markets (i.e. quotas, market access, censorship and IPRs protection).

### ENVIRONMENT

It is worth noting that the main environmentally-related issue in the music recording industry only surfaced in the US where the conventional "longbox" CD packaging, unknown in Europe, was dropped in April 1993, following an initiative from the Recording Industry Association of America (RIAA). This will reduce consumption of packaging material considerably.

### REGULATIONS

Piracy is the major problem for the industry. It is estimated that, over the last decade, some 10.2 billion ECU were lost in the world as a direct result of piracy, mostly through cassettes but increasingly with CDs.

Although this issue is more relevant in countries such as Poland, Kenya, Norway or Switzerland, the problem has affected the EU also. A major battle was fought and won in Greece where a 1983 Supreme Court decision enabled its reduction of piracy from 75 % to 23 % in 1993. Piracy rates are generally much lower in other EU countries (except for Italy, with a surge from 15 % in 1992 to 28 % in 1993), but its annual cost to the German industry was still estimated at close to 68.4 million ECU in 1990. Indeed, in recent years some retailers in Germany and France have been guilty of importing records at reduced costs from countries where the duration of copyright protection is comparatively short (e.g. 25 instead of 50 years). With this in mind, a new law on neighbouring rights was passed in the Netherlands in March 1993.

Recently, the GATT Agreement on Trade-Related Intellectual Property Rights (TRIPS) has been a landmark in the development of international intellectual property protection. Now, substantive norms for protection and enforcement provisions represent a significant body of laws with which to shape the exercise of intellectual property rights and their defence throughout the world. However, further negotiations will be needed to address private copying, public communication rights and protection of copyright management technologies, which are some of the elements of the record industry's future.

In addition, the question of protection of privacy as regards the processing of personal data will have to be addressed in the context of new distribution systems which rely on the processing of personal data for ordering or billing purposes.

### OUTLOOK

Economic recovery, technological development and the take-off of the sector in new countries should offer very positive prospects for the music recording industry in the coming years. European firms anticipate competitive technological developments and are likely to benefit as well from the opening of new markets in Eastern Europe or Asia.

Written by: LEK

The industry is represented at the EU level by: International Federation of the Phonographic Industry (IFPI). Address: Square de Meeus 19/20, B-1040 Brussels; tel: (32 2) 511 9208; fax: (32 2) 502 3077.

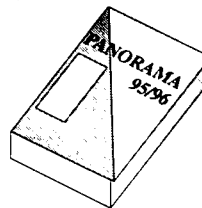
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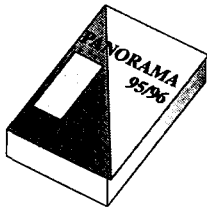


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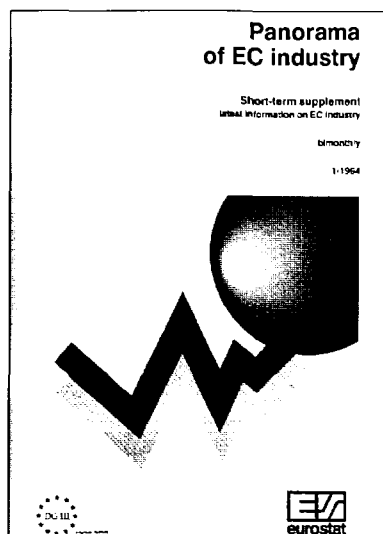
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