METHODOLOGY OF CONCENTRATION ANALYSIS APPLIED TO THE STUDY OF INDUSTRIES AND MARKETS

by Remo LINDA

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Since 1972 the Commission has published approximately sixty reports and series of tables on the results of its research on concentration trends in a number of industry and market structures in member countries.

This volume, by Mr Remo LINDA, Head of the Market Structure Division, describes the background and methodologies of these studies and also illustrates the salient features and numerous objectives of the research.

The volume contains two Appendices: one gives concentration indices for various sub-industries and product markets (Appendix 1) and the other briefly outlines a provisional plan for research to be followed in the new surveys on retail prices and mark-ups which the Commission has recently started in a number of member countries (Appendix 2).

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APPENDICES

COMMUNITY PROGRAMME OF RESEARCH

ANNEXES

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I. THE RESEARCH PROGRAMME OF THE COMMISSION OF THE EUROPEAN COMMUNITIES

1. Objectives of Community research on the development of concentration

In 1970, the Commission of the European Communities, at the initiative of its Directorate-General for Competition, put in hand a comprehensive research programme to study the development of concentration in a number of industries in the various member countries of the Community. There were two reasons for launching this programme:

- business concentration is becoming increasingly important - going beyond the frontiers of individual countries and radically changing traditional structures - this being partly due to the establishment of a common market in which goods, services, capital and persons move freely;
- the official organizations and departments responsible for statistics do not possess uniform, meaningful information which can be used to compare the structures of industries and markets in the different member countries, from the point of view of concentration and competition.

The Commission research programme is designed to meet these requirements for information and comparison at international level, by establishing systematic, uniform methods which all research institutes in the different countries of the Community will follow and practice in their studies.

The Treaties establishing the European Communities specify the Commission's aims, functions and activities.

Competition policy (mainly Articles 85 and 86 of the EEC Treaty) represent an important part of these activities.

Examination of these clauses, fundamental to the creation and administration of a common market, would be out of context here. However, it is worth recalling the statement made in 1970 by Mr. Albert Borschette, Member of the Commission responsible for competition policy, when presenting the research programme on the development of concentration, giving details of its objectives and scope:

a) The "sectoral" and comparative studies on the development of concentration contribute towards the monitoring of productive structures, so that all measures and intervention in this field can be based on thorough knowledge of these structures.

b) In this way, facts and figures can be mustered enabling a rational competition policy to be pursued, based on an examination and constant review of the situation, with a view to the general objective of encouraging the establishment of strong and efficient firms while forestalling the development of monopoly situations.

2. General research criteria: subject

In order to measure concentration and analyse its effects and relationships - above all with a view to competition and industrial efficiency - the following must be defined:

- the subject of the analysis,
- the relevant variables and data,
- the measures or indices to be used.

As far as the subject is concerned, the Commission has chosen:

- the industry and national approach,

- the dynamic or comparative statics approach,

so as to provide as wide a range as possible of comparisons and references.

The same industries were analysed:

a) in the different member countries, in order to produce a basis for comparison between the structure and development of each one in relation to the other member countries;

b) over a fairly long period (in most cases from 1962 to date for the older member countries, and from 1969 onwards for the United Kingdom, Denmark and Ireland) so as to obtain an overall impression of the facets, trends and significance of the various processes of concentration within a suitably representative space of time.

Whenever possible, the most important sub-industries and product markets within each industry have been analysed from the viewpoint of structure and development (for example, with regard to the manufacture of electrical goods, the domestic electrical appliance sub-industry was examined separately from that covering radios and TVs. Then again, within each of these sub-industries the sectors covering refrigerators, dishwashers, etc. were examined separately).

It is planned to update the industrial surveys from time to time, in most cases every four or five years, and to intensify the analyses, particularly on product markets, financial links, mergers and acquisitions, prices and the manufacturers' and distributors' margins.

3. The industries selected

The industries selected for investigation are listed in Table 1, which shows the situation at 31st December 1975 with regard to all the studies already carried out or under way. Most of these have already been published in full by the Commission. However, the various research institutes and groups which carried out the different surveys are entirely responsible for the information included and the opinions expressed.

This year (1976), however, and above all in coming years, investigations will have to be extended to new industries and markets in order to provide a fairly representative picture of the situation regarding economic structures and their comparative development within the Community.

The criteria used in selecting the industries are comparatively empirical in view of the Commission's requirements and aims, and of the resources available for allocation to this work. There are necessarily a number of prior conditions, i.e.:

a) excessively concentrated industries and those on which there is sufficiently detailed information available were excluded, for in this case the measuring of the concentration and the analysis of its effects do not require the complex, elaborate methods devised, neither do they justify the cost of such research;

b) atomistic industries, in which there is little or no concentration, were excluded because it was not worth organizing research;

c) industries which were too complicated or awkward for various reasons were excluded (for example, in the case of many different or specialized products, or highly integrated, diversified groups with interests in a very large number of markets and products), for the collection of the basic data would have been either too costly or simply not feasible.

However, these principles with regard to industries to be excluded merely represent a tentative guide to present work. During the course of the surveys industries which are now excluded could still be brought in if this was felt appropriate.

TABLE 1

List of studies on industries completed or under way at 31 december 1975

NICE	INDUSTRIES	COUNTRY							
		D	F	I	NL	B	GB	Ei	DK
23 232	Manufacture of textiles Wool	+	+	+		+	+		
233	Cotton	+	+	+		+	+		
237	Knitted and crocheted goods	+	+	+		+	+		
27 271	Paper industry and manufacture of paper products Manufacture of pulp paper and paperboard	+	+	+	+		+		
272	Processing of paper and paperboard	+	+	+	+		+		
31 313.1	Chemical industry Manufacture of pharmaceutical products	+	+	+	+	+	+		+
313.2	Manufacture of photographic products	+	+	+	+	+	+		
313.5	Manufacture of cleaning and maintenance products			+	+	+			
38 385.1	Manufacture of transport equipment Manufacture of motorcycles, cycles and power-assisted cycles	+	+	+	+				
36 361	Manufacture of machinery other than electric machines Agricultural machinery and tractors	+	+	+			+		
362	Office machinery	+	+	+			+		
364.1	Textile machinery	+	+	+			+		
366.3 366.4	Equipment for civil engineering and the mechanical working of building materials	+	+				+		
366.5	Hoisting and handling equipment	+	+	+			+		
37 375	Electrical engineering Electronic equipment, audio equipment, radio and television receivers	+	+	+		+			+
376	Electrical appliances for domestic use	+	+	+		+			+
20-B	Food manuf. industries	+	+	+	+	+	+	+	+

4. Definition of the unit

If the results obtained are to be sufficiently homogeneous and comparable, the delimitation and definition of the subject must be as strict and uniform as possible among all research institutes.

This is a twofold problem:
- delimitation of the industries,
- definition of the unit.

As far as the delimitation of the industries is concerned, statistical nomenclature varies from country to country. The Nomenclature of Industries in the European Communities (NICE) established by the Community Statistical Office in Luxembourg has therefore been used; industries at the three or four digit level were therefore referred to (see NICE number and description of industries in Table 1).

NICE has recently been replaced, with modifications in the numbering rather than in the groupings and delimitation of industries, by NACE (General Industrial Classification of Economic Activities within the European Communities).

With regard to the definition of the unit used for the econometric analysis of each industry, the following definitions established by the Statistical Office of the European Communities in Luxembourg should be recalled:

" - The enterprise is a legally-defined organization which (a) has its own balance sheet, (b) is subject to a directing authority (which may be either a natural or a legal person) and (c) has been formed to carry on in one or more places one or more activities for the production of goods or services.

- A group of enterprises is an association of enterprises held together by legal and/or financial arrangements, such as holding companies, cartels, consortia, etc. The group may comprise more than one source of decision-making - particularly as regards policy on production, sales, profits, etc. It can bring together certain aspects of financial management and taxation matters.

- The local unit (in the strict sense); a production unit (e.g. a workshop, factory, shop, office, mine or warehouse) which is situated in a geographically separate place and in which one or more persons work for a single enterprise.

- The local unit in the wider sense consists of a local unit and satellite units dependent on it and situated in its immediate vicinity.

- The kind-of-activity units (KAU) are those enterprises or parts thereof (whether spatially separated or not) that carry on a single activity which is characterized by the nature of the goods or services produced or by the essential identity of the production process employed, this activity being defined in terms of a standard classification of economic activities.
The KAU may of course also include parts of an enterprise located in different places, provided they exercise the same activity, as previously defined.

- The local KAU: part of a local unit carrying on a particular production activity. It is a kind-of-activity unit at the level of the local unit."

Generally speaking, one firm may be considered either from the "enterprise" viewpoint or the "KAU" one. For the purposes and within the scope of the studies on concentration sponsored by the Commission of the European Communities, the units considered were enterprises. For each industry examined, only those firms where at least 50% of turnover was derived from operations in the industry were considered as belonging to it ("enterprise" approach).

In addition, calculations were made in some cases on the basis of the definition of the kind-of-activity unit (KAU) when one or more companies deriving less than 50% of total turnover from the industry concerned nevertheless occupied an important position in that industry. A good example is FIAT, the bulk of whose turnover is accounted for by motor manufacturing. However, FIAT also builds tractors; indeed, it is by far the most important manufacturer in the tractor industry. When analysing this industry FIAT's share cannot be ignored; it cannot be considered as an "enterprise" (since the bulk of its production comes under another industry), but must be considered as a kind-of-activity unit.

In this case, therefore, two distinct econometric calculations must be carried out for each study:

- one based on the "enterprise" and the whole activity value in the case in question (sales, employment, etc.) is taken into consideration and not merely the part of its operations falling within the industry under consideration;

- one based on the kind-of-activity unit, where for each firm only that part of its operations (expressed in terms of the sales and employment variables, etc.) entering into the industry under consideration is taken into account.

The difference is clearly fundamental. Fortunately, in most of the industry studies it has proved feasible to confine the analysis to the "enterprise" approach.

5. The stages in the concentration survey

There are three stages in carrying out the studies.

Stage I

Collection of basic data at industry level and at individual product markets level, according to their importance and on the basis of existing possibilities.

In this first stage all available sources are used (official publications, periodicals, material supplied by national statistical offices, etc.), but direct contact above all is important and decisive for the success of the survey — first of all, by means of questionnaires and then through personal interviews — with the most important firms in each industry and market, and with the trade associations.

The outcome of the survey depends above all on the success of this first stage.

Stage II

This consists in the econometric calculations of all the basic data collected so as to show:

- the development of concentration in the industries and markets under consideration;

- the quantitative relationships between concentration of the structure, its development and the firms' performances.

Stage III

This aims to provide an overall complete picture of the industry and markets and their technological and commercial features by using the results of the previous stages, emphasizing the relationships between concentration and competition and in particular, the extent and impact of modern forms of competition (international, substitution, innovation), mergers and trade investments, and the strategies of big companies (without neglecting foreign investments).

In the third stage, the research institutes are authorized to add any information and analyses likely to contribute to fuller understanding of the industries and their development.

Nevertheless, the corner-stone of the survey is the methodology applied in the second stage ; for one thing it determines and guides the way data are mustered in the first stage and, secondly, it provides the means and material for carrying through, and adding depth to, the third stage, in line with the objectives or operational goals pursued in this research.

The success of the studies and the scope for making syntheses and comparisons at Community level mainly depend on the effectiveness of this methodology.

II. THE MEASURES OF CONCENTRATION

6. Methodology

In order to prepare and apply a given methodology, as already seen at I.2., the subject, the variables and the measures must be defined.

This problem must now be analysed in depth, bearing in mind the functional link between the object, variables and measures. Let us start by examining the latter, for they essentially represent the research's methodological orientation.

In this respect, the Commission has assumed a neutral position, espousing no particular dogma, for it considers:

1) that no quantitative measure is complete and independent in itself and by itself and therefore the "synthesis in figures" that it provides must be incomplete and inaccurate;

2) that all measures can be useful for understanding a given facet of an industry and that none should be rejected out of hand;

3) that consequently, all the main measures should be used. This does not entail higher costs, for the computer can be used to calculate all measures under consideration at the same time.

Each research institute then chooses and interprets the econometric results of the measures it has considered most suitable, meaningful and useful for achieving the objectives of the research.

The Commission's position with regard to econometric methodology has therefore been extremely liberal, in order to leave all possibilities open to the research institutes to achieve as much as possible, and at the same time, through the full publication of the information and measures in question, to allow all scholars to learn of and assess all quantitative results, without limitations or restrictions of any kind.

7. The measures of concentration: n, $\underset{n}{X}$, CR

Point 1) at II.6. requires a word of explanation: there is, as stated, no single perfect measure which objectively expresses the degree of concentration of an industry.

This is because concentration has so many aspects and because so many definitions and approaches to it can validly be adopted.

The degree of concentration of a structure or of an interrelated set of units depends on the number of units and their distribution — even, uneven, very uneven.

a) An initial measure of concentration is provided by any change in the number (n) of the units which go to make up the industry. If, for example, in a given industry the number of firms (n) has increased between 1962 and 1969, it may be assumed that the degree of concentration has declined, and that the converse is also true.

b) A second measure of concentration is provided by the average size of all firms in each industry, which is obtained by dividing the total employees of the industry (X) by n (or the number of firms). If, then, in a given year or industry, the average size of firms (i.e. X/n) is 655 employees, concentration is lower than if, in the same year or industry, the average size is 10,500 employees.

c) A third measure of concentration may be represented by the "concentration ratio", given by the share (expressed as a percentage) of the total (of sales or of the number of employees) accounted for by the first 4, 8, or 10 firms in the industry or structure under consideration. Thus, if the first four firms account for 75% of sales (CR = C_4 = 75% or, using another symbol A_4 = 75%) concentration is greater than in the case where C_4 (or A_4) = 60%.

8. Comments on the above measures

There is a great deal to be said about these ways of measuring concentration, and they raise a host of problems. As none of them cover all of the problems, they are incomplete and therefore far from perfect.

The first measure is based exclusively on the number of units and tells us nothing about the degree of unevenness of the distribution, although this is an essential aspect of the definition of concentration.

Both the first measure (absolute number of firms) and the second measure (average size) are absolute measures, though the "absolute" size of an industry or a market is bound to be a relative concept. These measures do not meet one fundamental requirement: the possibility of comparing two or more different industries or one same industry at two different times, in order to ascertain when there is a greater (or lesser) degree of concentration.

The third measure, the concentration ratio, may also prove misleading in inter-industry comparisons or in comparative statics.

Take a given industry or market A, in which the first four firms control 75% of the total (the first firm holding 72% and the other three only 1% each) and an industry or market B in which the first four firms control 80% of the total, all the same size (20% each).

The reading of the C_4 (or A_4) by itself suggests that the industry or market A is less concentrated than B, while the opposite is in fact the case.

9. Concentration indices

To overcome the above difficulties, numerous concentration indices are used, mostly named after experts who have devised them. Let us recall the indices with their formulae as used in the industrial research on concentration carried out for the Commission. The Linda system of indices will receive particular attention (see II.12 et req.).

The formulae are given for simple statistical series. It is assumed therefore, that the value of the variable is known for each unit in the set.

The symbols used are as follows:

n   = number of units in an industry;

X=x   = total value of the variable in an industry;

i   = unit i;

x_i = value of the variable for unit i;

Fx_i = total value of the variable up to unit i.

	Limits	
	Lower	Upper

V = coefficient of variation

$$V = \frac{\sqrt{\dfrac{\displaystyle\sum_{i=1}^{n}(x_i - M)^2}{n}}}{M}$$

G = Gini coefficient

$$G = \frac{1}{n \cdot x} \sum_{i=1}^{n}\left[(i - 1).Fx_i - i.Fx_{i-1}\right]$$

H = Herfindahl-Hirschman index

$$H = 1000\,\frac{V^2 + 1}{n} = \frac{1000}{x^2}\sum_{i=1}^{n} x_i^2$$

E = entropy index

$$E = 100\sum_{i=1}^{n}\frac{x_i}{x}\,\log\frac{x_i}{x}$$

Index	Lower	Upper
V	0	$\sqrt{(n-1)}$
G	0	$\dfrac{n-1}{n}$
H	$\dfrac{1000}{n}$	1000
E	$100(-\log n)$	0

10. Comments on the concentration indices

The above indices are undoubtedly very useful, each one having its own peculiar features. Nevertheless one essential point must be made: they assume that data are available for the whole industry, that is the total of a given variable considered (turnover, etc.) for the whole of the industry under examination. The value of the index depends also on the value of this total.

In practice, this is a very serious limitation, as will be seen.

a) In order to study an industry, we must possess information on it. This is obvious, as is the fact that when we already have full information on it, we may well no longer be interested in further study. Now, to have full information on an entire industry — covering, for example, sales or employment — means that we must have individual sets of data (though these will often be grouped into size categories, a favourite device of the statisticians) on all the n firms in the industry, even the smallest ones employing only two or three people. Now it is well known that statistical surveys on very small family firms or businesses are always in fact inaccurate and incomplete. It is therefore inadvisable to calculate concentration indices on bases including such firms, if we want objective results which can provide reliable guidance.

To come back to the obvious, an econometric calculation is scientifically useful and worthwhile when it considerably increases the information available on a given industry. In other words, when either everything or nothing is known about a given industry, econometric instruments may just as well be filed under lock and key.

b) When studying an industry, it is not sufficient to refer to one or two variables; all facets must be taken into consideration, i.e. all meaningful variables representing the concentration in the industry. We must therefore not confine ourselves to sales or employment, but also measure and analyse wages and salaries, own capital, investments and above all performance variables, i.e. net profit and cash flow.

Experience shows that even in the countries where statistical services are most sophisticated and best organized (like the United Kingdom), it is impossible to gather information on all the variables in the case of small and very small firms — of which even the exact number is unknown — and therefore for the whole of the industry to which they belong.

c) A practical example from the Italian food industry will illustrate this even more clearly. The industry in question is made up of about 40,000 firms. It is estimated that there are about 2,000 firms with more than twenty employees, and in 1971 these accounted for about 55% of the industry's total sales. Yet very different calculations will be obtained according to whether the indices are based on 2,000 firms or on the total 40,000 firms.

This is a highly problematical situation: the first hypothesis is perhaps too incomplete, the second is simply "unreal", for an econometric calculation based on all 40,000 firms (information on the majority of which is in fact slight) is a pure mental abstraction.

If we then consider the measures represented by the concentration ratio, i.e. the share of the first four (or eight) firms in the industry as a whole, the result will be almost double, exactly 1.8 times in the first hypothesis (based on firms with more than 20 employees) with respect to the second hypothesis (all firms, including those with less than 20 employees).

Which of these two measures is more reliable? Perhaps the only way out of the dilemma is to leave the choice to coming generations.

11. The dualism of concentration

The preceding remarks bring us to what is in my view a fundamental conclusion with regard to methods: all systems of quantitative analysis based on concentration indices must be devised in such a way that the values of the indices are not decisively influenced by the fact that smaller firms are taken into consideration (or left out, or included with inaccurate and unchecked information), for their influence on the process of concentration and on the play of competition is considered, by definition, negligible.

If the value of an index is linked to the total structure (or industry) under consideration by including the fringes represented by very small firms, this will disguise and blur the oligopolistic picture, with its changes and trends.

Yet it is this very aspect which must be brought into focus and analysed if we are to discover and quantify the relationship between concentration, competition and corporate performance, not merely from a statistical and descriptive point of view, but from that of logic and interrelated economic causality.

Traditionally, studies on concentration are mainly based on statistics; their ideology is static and (perhaps) unconsciously imbued with the classic conception of one-dimensional, atomistic competition, where it is assumed that the industry has a large number of units or firms and that they can all be listed, identified and exactly measured.

We do not wish to reject this tradition (and conception), nor is the Commission, in view of its role and function, in a position to do so, for its scientific and methodological approach must be absolutely neutral and unbiased.

But if the research on concentration is to remain in the domain of reality and to be meaningful, the dualism of concentration must also at least be borne in mind:

a) with respect to the industry, considered as a whole,

b) with respect to the big firms (n*), seen in the setting formed by their system of oligopolistic interdependence.

In this study, the emphasis will be mainly on the second aspect of concentration - and thus it is correct to refer to a quantitative theory of oligopolistic concentration - for three reasons: because it is a relatively new and little investigated aspect, because it seems topical and because, for the first two reasons, I personally prefer this oligopolistic aspect.

The differences between the two aspects a) and b) and the relative approaches are clear and fundamental:

1) In the first case (a) the whole industry (made up of n units or firms) is measured according to existing indices and measures, while in the second case (b) only a sample of the largest firms (n*) is studied;

2) In the first case (a) the econometric analysis is typically one-dimensional, and the reference to the concept of one-dimensional competition is not fortuitous, for only one variable (employees) or two (by adding sales) are taken into consideration for the calculation of the indices, which precludes any real analytical penetration of the structure of the industry, while in the second case (b), since the subject is limited to a sample of large firms, a multidimensional econometric analysis can be developed, by taking into consideration all meaningful variables (i.e. sales, employment, wages and salaries, net profit, cash flow, gross investments, own capital and, where possible, added value, net assets, shares in other firms, exports, etc.) so as to include all different aspects, relationships and trends in the structure within the framework of the oligopolistic interdependency linking these large firms;

3) In the first case (a) traditional methods are used, while in the second case (b) the analysis is based on a new system of indices and on a series of matrices showing oligopolistic interdependence.

The following pages describe this new methodology.

12. The Linda system of indices (1)

The subject of this system of indices is oligopolistic concentration (or unevenness of distribution) and in view of the many complex aspects of the phenomenon:

- I did not consider it advisable to use one single index, but prefer to develop a system of indices;

- The system is not applied to the entire industry under consideration, but only to a sample of large firms (n*).

Obviously it is not possible to apply completely rigorous theoretical criteria in selecting the sample, but an attempt is made to overcome and eliminate any approximation by using absolutely quantitative and objective methods and criteria in calculating the system's various indices.

In general, the sample must include all major firms, cover at least two thirds of the sales or employees in the industry studied and exclude the units or firms which account for less than 1% of the total of the given variable, for they could scarcely be considered oligopolistic (i.e. in a position to influence the demand curve and prices). More generally, n* may include a minimum of six to eight units or firms and a maximum of sixty to seventy, according to the size and "oligopolistic density" of the industry.

One factor must be borne in mind in the following description: the units or firms are ranked in decreasing order of size, starting from the largest (i = 1) and going down to the smallest in the sample (i = n*).

The following are the symbols and formulae used in the indices system:

n = total number of units (firms or kind-of-activity units) making up the industry.

n* = number of units studied:

- both for each hypothesis: 2, 3, 4, 8, 10, 12, 15, 20, etc.

- or constituting the sample analysed.

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(1) The first formulation of the L index is to be found in R. Linda, " Le système des indices d'équilibre et leur application concrète à la sidérurgie des Etats Unis ", in "Rivista di politica economica", 1967. I later further developed this econometric approach in "Concurrence oligopolistique et planification concurrentielle internationale"(Part II), ("Economie Appliquée, Archives de l'ISEA", 1972, Nos 2 and 3), in "Problems of Economic Concentration and Competition: Methodological Approach for Analysing Relationships between Large Enterprises" (Fondazione Agnelli, Working Document No 2 - "Analisi dualistica: approcci metodologici" - Turin, November 1974) and in "Static And Dynamic Methods for Analysing Industrial Concentration: The Italian Case", in "Markets, Corporate Behaviour and the State - International Aspects of Industrial Concentration" edited by A.P. Jacquemin and H.W. de Jong, 1976, Stenfert Kroese, Leiden (Netherlands).
With regard to non-Italian literature on the indices system, reference may be made in particular to the works, in chronological order, of Jacques de Bandt: "Mesures de la dimension des unités de production - Problèmes de méthodes" Editions Cujas, Paris, May 1970, pages 44 to 46; of Yves Morvan "La concentration de l'industrie en France", Librairie Armand Colin, Paris, 1972, pages 188 to 192; of Christian Marfels "A New Look at the Structure of Oligopoly" in "Zeitschrift für die Gesamte Staatswissenschaft", J.C.B. Mohr (Paul Siebeck), Tübingen, April 1974, pages 249 to 270.

The Linda index is as follows:

$$L = \frac{\displaystyle\sum_{i=1}^{n*-1} \frac{EO_i}{n*}}{n*-1}$$

where:

$$EO_i = \frac{\dfrac{A_i}{i}}{\dfrac{A_{n*}-A_i}{n*-i}} = \frac{n*-i}{i} \cdot \frac{A_i}{A_{n*}-A_i} = \frac{n*-i}{i} \cdot \frac{A_i}{1-A_i}$$

A_i = aggregate share of the total sample accounted for by the top i firms;

A_{n*} = 100% = 1

In other words:

- the L or L_{n*} index is the arithmetic mean of the $(n*-1)$ ratios of oligopolistic equilibrium (EO), each being previously divided by $n*$.

- Each EO ratio is expressed by the average size of the first i firms and those of the $(n*-i)$ remaining firms where i successively assumes values from 1 (which expresses the relationship between the size of the first firm and the average size of all the other firms in the sample of the industry studied) up to $n*-1$; for this reason the number of EO relationships in question is $n*-1$.

The upper and lower limits of the L index are respectively $\frac{1}{n*}$ and ∞.

Let:

$n*_m$ = number of units corresponding to the minimum value of the L index in the sample analysed. (1)

$n*_{h<}$ = number of units corresponding to the maximum value of the L index, in the interval between $n* = 2$ and $n*_m$.

The $\underline{n*_m}$ indicate the number of firms corresponding to the minimum value of the L index in the sample (n*) studied, while L_{n*_m} is the value of the appropriate L index.

The arithmetic mean of the L index, from L_2 up to and including L_{n*_m}, gives the L_s index, which expresses the degree of equilibrium and of concentration among the $n*_m$ top firms in the industry.

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(1) An exact definition must be provided of the minimum of the Linda index ($n*_m$ and L_{n*_m}) as follows: the minimum exactly corresponds to the "first point" $n*_m$ (n*) in the sample which we meet when starting from the left (i.e. n* = 2) for which the value of the Linda index is lower both than the value (of this index) preceding it and the one following it = $L_{n*_{m-1}} > L_{n*_m} < L_{n*_{m+1}}$. The minimum therefore signifies the "first minimum".

The formula will therefore be:

$$L_s = \frac{\sum\limits_{n^* = 2}^{n^*_m} L_{n^*}}{n^*_m - 1}$$

13. The structural curves of the L indices – The concept of the oligopolistic arena

A number of authors have analysed the structure and features of this indices system from the strictly methodological point of view (J. De Bandt, Yves Morvan, C. Marfels, etc., see note to II.12).

I will here briefly illustrate the various practical applications.

The starting point will be the graph of the system.

By indicating on the axis of the abscisses the various hypotheses from 2 to n^* (i.e. the entire sample of big firms under consideration), the series of the various indices (L_2, L_3, ...L_{n^*}) will be obtained on the ordinates axis. In this way, a structural (or Linda) curve can be established. The lowest point n_m will indicate the division, in purely quantitative terms, between the bigger firms – which in many cases, one might say, form a kind of "oligopolistic arena" – and all the other firms in the industry and sample.

Table 2 shows an example of a structural curve, and indicates:

– the sample n^* under consideration, in this case 15;

– the minimum point (n^*_m), in this case 9;

– the maximum point ($n^*_{h<}$), in this case 3;

– the curve expressing the perfect equilibrium of forces (which Morvan in his excellent work called "Le Modèle Concurrentiel" (MC)) which for each hypothesis of n^* corresponds to $1/n^*$ (all the firms under consideration in the hypothesis are of the same size or account for the same share of the variable) (1).

I feel that some comments on this concept of "oligopolistic arena" will be useful. The key to the definition of an oligopoly is represented by the interdependence of power or even, one might say, by "interdependent power". The other features (and, in particular, the small number of firms) are either the presupposition or a corollary of this definition. However, it is difficult to translate this definition into quantitative terms. In my system of indices the criterion of "minimization" (n^*_m) is used, the minimum preceding, by definition, an upward movement of the following L index, caused by the fact that the next firm is much smaller – i.e. follows a "size gap" – in relation to the preceding firm and indicates the "minimum point" of the L index.

(1) See: R. LINDA, "Le système des indices d'équilibre et son application concrète à la sidérurgie des Etats-Unis", in "Rivista di Politica Economica", Rome, 1967; Y. MORVAN, "La concentration de l'industrie en France", Paris, 1972, page 190.

TABLE 2

An example of the LINDA curve structure
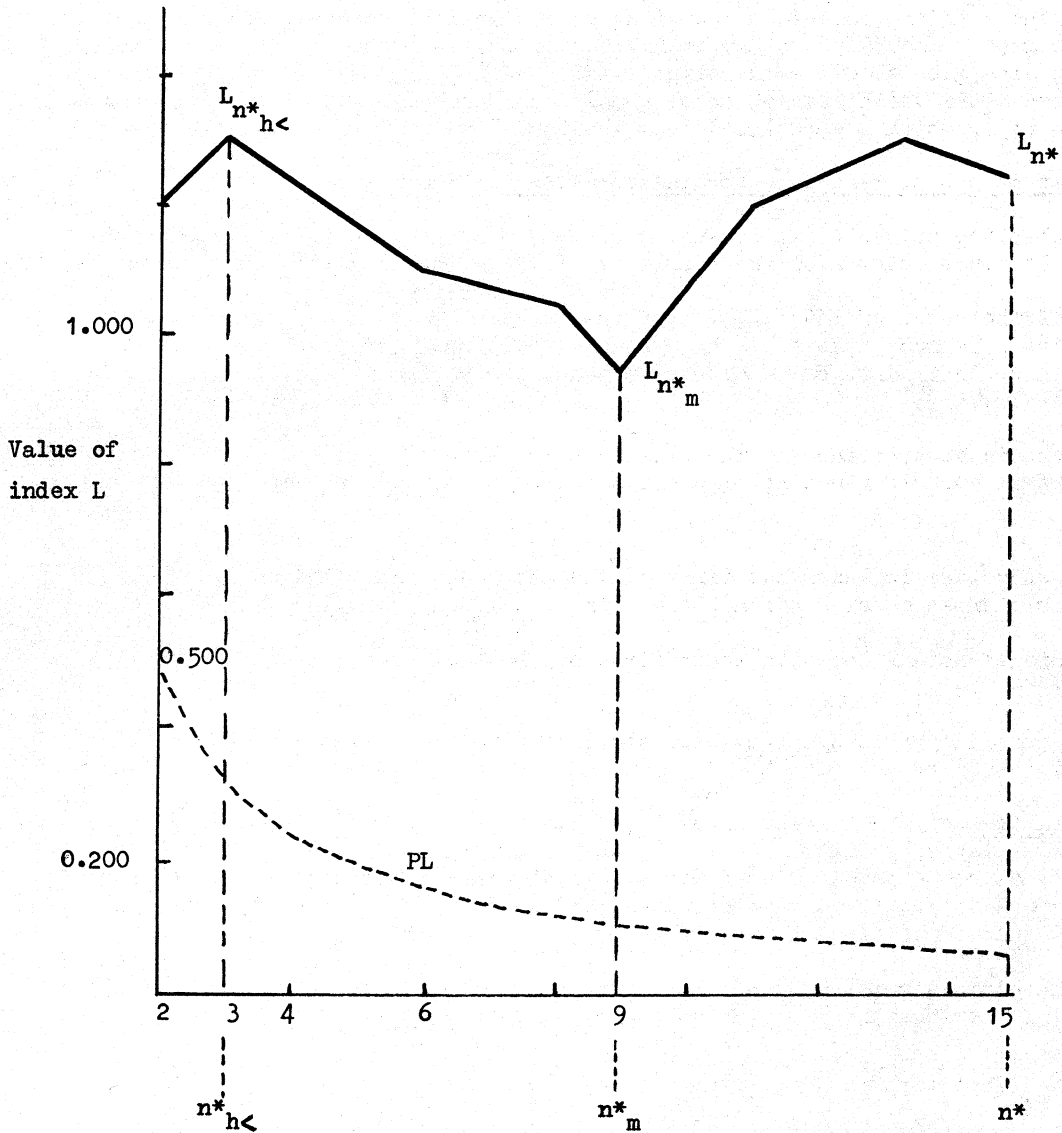
Sample hypothesis: $n^* = 15$

Maximum point: $n^*_{h<} = 3$ Minimum point: $n^*_m = 9$

PL = Balance of forces = $\frac{1}{n^*}$

$n^* = 2, 3, \ldots\ldots\ldots 15$

In this respect, the mechanism of the index must be borne in mind, where perfect
equilibrium (PL) or the competitive model (MC) is represented by $1/n*$ (all firms
are of equal size). As a result, the value of $1/n*$ necessarily tends to decrease
as the number $n*$ of firms increases (as is also shown by the PL = MC function
indicated in the graph of Table 2).

Consequently, if in a specific given case, at a certain point in the structural
curve, the L index, instead of continuing to decrease, suddenly rises, there is
a "size gap". According to a criterion which is, I think, an objective one, I
use the size gap to define the oligopolistic firms ($n*_m$) which more or less fall
under the above definition of an oligopoly, as opposed to the other firms ($n - n*_m$
or $n* - n*_m$), which are excluded from the so-called "oligopolistic arena".

14. Some points of reference for interpreting the indices

Using absolute values of these indices provides exhaustive information on the
degree of concentration of the structure of the large firms ($n*$) under consideration.

Thus, if the value of index $L_{n*_{h<}}$ (in the frequent case of $n*_{h<} = 2$) exceeds 1, then
the first firm must have considerable power, for its share of the
variable would tend to be in excess of twice the share of the following (i.e. the
second) firm.

The economic significance of the L indices is obvious if we recall their functioning
and take as our reference point the assumption of _equal size_ (or "Modèle Concurrentiel").

Thus:

- if a structure includes two firms of the same size (i.e. the same share in the
  variable under consideration), the L index will be $\frac{1}{2}$ = 0.500;

- if this structure includes three firms of the same size, the L index will
  be $1/3$ = 0.333;

- more generally, the hypothesis of absolute equality in the case of $n*$ firms
  is expressed by an index $L = \dfrac{1}{n*}$;

- the _maximum_ of the L index (i.e. $L_{n*_{h<}}$), as a result of numerous empirical
  considerations, usually corresponds to the hypothesis of $n* = 2$
  (a structure comprising two firms). It very rarely corresponds to the hypothesis
  of $n* = 3$ (approximately 5% of cases) and hardly ever to the hypothesis of $n* = 4$
  (less than 1% of cases);

- the economic significance of the index is comprehensible if we know the key to
  reading the index in question on the hypothesis $\underline{n* = 2}$;

- _if_ the first firm is double the second, the index = 1 or 1.000;

- _if_ the first one is four times the second, the index = 2.000;

- _if_ the first one is eight times the second, the index = 4.000;

- _if_ the first one is $n*$ times the second one, the index = $\dfrac{n*}{2}$.

By definition, the index L_s represents values lower than the index $L_{n*_{h<}}$, apart,
however, from the exceptional hypothesis in which
$L_{n*_{h<}} = L_{n_m} = L_2 = L_s$, denoting a _mono-duopolistic_ structure in which all firms,

apart from the first two, are too small to be considered.

The value of the index L_s depends not only on the firms' uneven sizes, but also on the number n^*_m of firms constituting what is called the "oligopolistic arena". In a case where there was absolute equality in the <u>sizes</u> of the firms considered, the results for each hypothesis of n^* (or n^*_m) would be the following L_s values:

n^*	L_s	n^*	L_s	n^*	L_s	n^*	L_s
3	0.417	8	0.245	15	0.166	25	0.117
4	0.361	10	0.214	16	0.159	30	0.103
5	0.321	11	0.202	20	0.137	31	0.101
6	0.290	12	0.191	21	0.132	40	0.084

In practice, however, the numerous empirical analyses already carried out have shown that the index $L_s = 0.200$ shows the existence of a relatively large and balanced oligopolistic arena in which competition is working satisfactorily, while an index L_s greater than the value of 0.500 shows that there is excessive "<u>oligopolistic density</u>" which could act as an obstacle to competition. An L_s value of more than 1.000 would point to the existence of a high degree of dominance.

15. <u>Partial monopoly and duopoly</u>

In some cases the oligopolistic arena is so clearly defined that the "minimization criterion" and its application are quite simple and clear. In other cases, the structures can be so complex that interpretation and application becomes more difficult.

In order to better illustrate the functioning of our econometric mechanism, we will examine two important cases.

These are two extreme and opposite cases and, as often occurs, the extremes come to meet: they both indicate the absence or the "questionableness" of the very concept of the "oligopolistic arena".

Each of these cases could be defined by the following equation:

Case I = $n^*_{h<} = n^*_m = 2$ (the structural curve steadily rising)

Case II = $n^*_m = n^*$ (the structural curve steadily falling).

In the first case, the lowest value of all the L indices is right at the beginning of the structural (or Linda) curve. Since the L index is the inverse function of the number of subjects (units or firms) under consideration (n^*) and a direct function of the degree of unevenness, the fact that the index itself constantly increases as the n^* hypothesis increases, signifies that the degree of unevenness proportionally increases more than the increase in the number (n^*) of the subjects, units or firms under consideration. This can only occur when the "difference" or "size gap" between the first two firms is constantly and considerably lower than any other "size gap" occurring elsewhere in the distribution (for $n^* > 2$).

Therefore, should the problem arise, the oligopolistic arena should in this case be made up of just the first two units or firms in the distribution. This is absolutely exact and objective – considered as a purely quantitative result – only when $L_{n^*_{h<}} = 0.500$ (for the hypothesis that $n^*_{h<} = 2$), for on this hypothesis the first two firms are by definition of the same size. This is therefore a case of "partial balanced duopoly", the fringes being represented by all the other units or firms (for $i > 2$), since it was assumed that $n^* > 2$. In this case, the oligopolistic arena would be the "duopolistic arena".

Then in a case where n = n* = 2, there would obviously be a "perfect duopoly" hypothesis, which could also be defined as "balanced" if the value of L was 0.500 (i.e. $\frac{1}{n*} = \frac{1}{2} = 0.500$), since the two oligopolists would then be of the same size.

The problem becomes more delicate when $L_{n*_{h<}} > 0.500$, (for $n*_{h<} = n*_m = 2$) for then there is no objective and quantitative criterion of "minimization" for marking off the oligopolistic arena. Is it then made up of one (the first) firm or both the first two firms? Is there therefore respectively a "partial monopoly" or a "partial duopoly", given that, in any case, since $L_{n*_{h<}} > 0.500$, the second firm is smaller than the first one?

In this respect, there is an additional quantitative reference value, known as the LIRE (Linda index of regular unevenness), which develops as follows (see graph table 3) (1):

Hypothesis of

n*	i	a_i	L Index
-	1	50.- %	-
2	2	25.- %	1.000
3	3	12.5 %	0.944
4	4	6.25 %	1.008
5	5	3.125%	1.157
6	6	1.5625%	1.399
7	7	0.78125%	1.766
8	8	0.390625%	2.318

This is the well-known series $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}$, etc., the sum of which tends to 1, and for $n* \infty$: $a_{n*} = 0$ and the L index ∞. We may therefore deduce that there are two firms (A and B); the second is half the size of the first. The value of the L index is exactly 1; but it decreases slightly (to 0.944) if three firms (A, B and C) are considered instead of two, the third one being exactly half the size of the second one and a quarter of the first.

We may deduce that if the minimum, on the other hand, is at $n*_{h<} = 2$, the third firm (C) is still smaller than half the size of the second one. Indeed, if this was not so, the L index would be 0.944 (for $n*_m = 3$), corresponding to the hypothesis of a firm C equal to half the firm B as shown in the above LIRE table. Table 3 and the graph show the development of the L index in certain extreme hypotheses.

By combining the quantitative reference points and criteria indicated above, a series of practical and operative deductions may be made:

a) if $n*_{h<} = 2 = n*_m$

b) if $L_{n*_{h<}} > 1.000$

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(1) See previously mentioned study "Concurrence oligopolistique et planification concurrentielle", page 376.

TABLE 3

THE STRUCTURAL CURVES UNDER CERTAIN HYPOTHESES

L INDEX
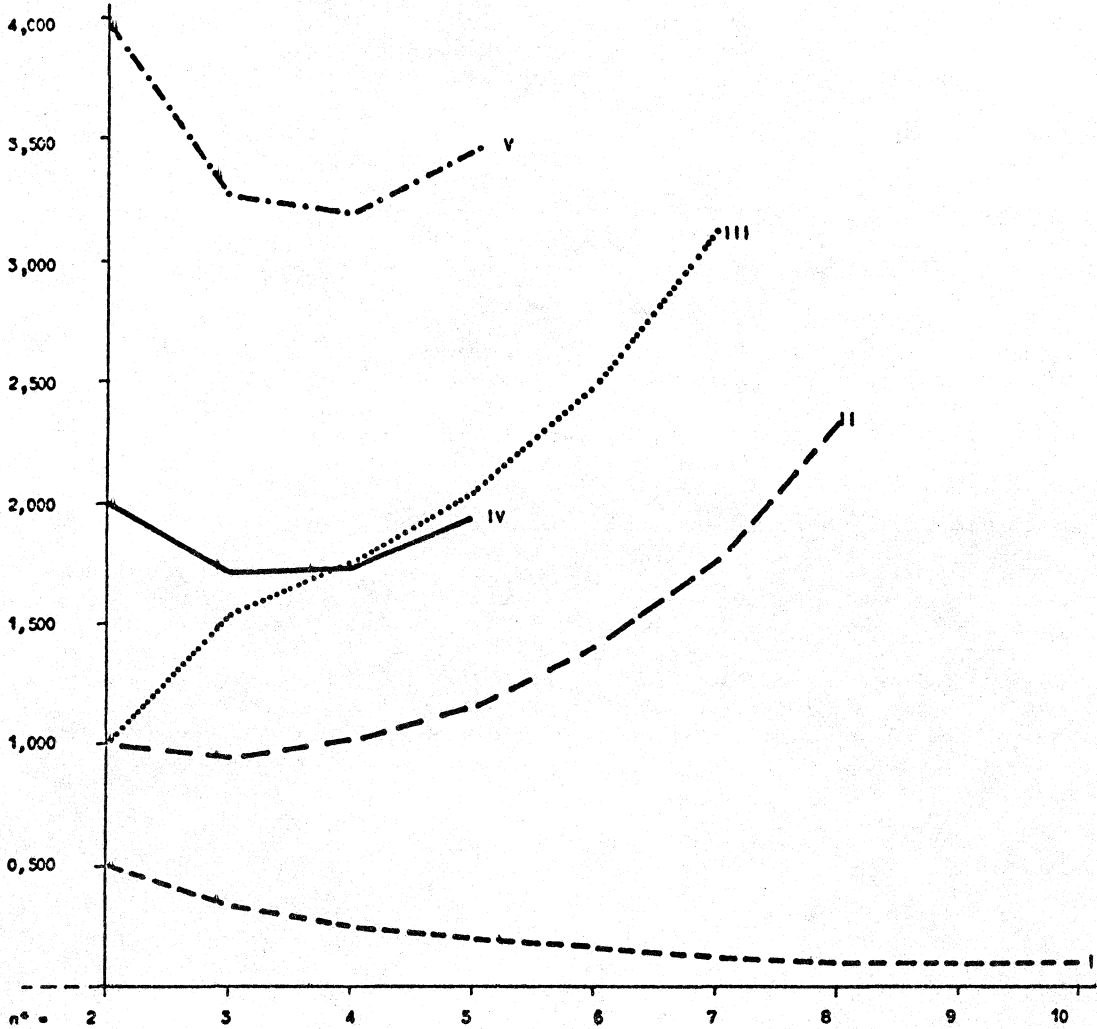
E_i	HYPOTHESIS									
	Ie(PL):n* = 10		IIe : n* = 8		IIIe: n* = 7		IVe : n* = 5		Ve : n* = 5	
	a^*_i	L	a^*_i	L	a^*_i	L	a^*_i	L	a^*_i	L
1	1/10	-	1/2	-	1/2	-	1/2	-	1/2	-
2	1/10	0,500	1/4	1,000	1/4	1,000	1/8	2,000	1/16	4,000
3	1/10	0,333	1/8	0,944	1/16	1,533	1/16	1,722	1/32	3,278
4	1/10	0,250	1/16	1,008	1/32	1,753	1/32	1,738	1/64	3,198
5	1/10	0,200	1/32	1,157	1/64	2,045	1/64	1,920	1/128	3,444
6	1/10	0,167	1/64	1,399	1/128	2,482				
7	1/10	0,143	1/128	1,766	1/256	3,132				
8	1/10	0,125	1/256	2,318						
9	1/10	0,111								
10	1/10	0,100								

it follows that :

c) the first two firms control at least 75% of the structure under consideration;

d) the second firm has less than half of the first firm's share. We may therefore set up a working hypothesis, empirical in economic terms but strictly defined and delimited from the quantitative and mathematical point of view:

e) in the case under examination there is a model of "quantitative partial monopoly" distinguished by a "quantitative dominance" in the hands of the first firm (A);

f) proceeding by exclusion, if, on the other hand, condition b) is not satisfied, i.e. if $L_{n*h<} < 1.000$, we may conclude, formulating a working hypothesis, empirical in terms but just as strict from the quantitative and mathematical point of view:

g) given that the first two firms certainly control more than 75% of the structure under consideration and the second firm holds at least half or more of the share held by the first, it follows that this second firm may be considered as sharing in the dominance of the first firm, thus representing a model of "quantitative partial duopoly".

16. Quantitative dominance and the working of competition (1)

The above illustration clearly shows that the index $L_{n*h<}$ represents an objective measure of dominance which may be considered to exist when the index exceeds the approximate value of 1.000.

This dominance increases as the value of the index $L_{n*h<}$ increases, and as the value of the point $n*_m$ decreases, i.e. as the latter tends towards $n*_{h<}$, the diameter of the oligopolistic arena decreases down to the extreme case analysed in the previous paragraph where $n*_{h<} = n*_m = 2$. In this case, as we have seen, dominance may also exist where $L_{n*h<} < 1.000$. The problem then is: what is the practical usefulness of the index $L_{n*h<}$?

In the first place, it allows comparisons to be made between different structures or between the same structure at different times, by providing a reference point, a quantitative and objective parameter which reflects the imbalance or unevenness at the top of the distribution, i.e. among the top firms, where the play of competition is much fiercer and decisive for the whole industry.

This objective representation of uneven power at the top constitutes a good working approach, allowing the absolute data on the most important firms in the industry to remain undisclosed.

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(1) See the numerous works by Professor François Perroux on the problem of dominance and, in particular, his most recent "Pouvoir et économie", Etudes Economiques, Dunod, Paris 1974, and the comprehensive bibliography it includes. In a certain sense our econometric system applied to dominance (and, above all, the index $L_{n*h<}$) puts his basic theories into practice.

In other words, this index may express the intensity of dominance in quantitative terms without undermining the principle of statistical secrecy, which many industries and managements consider should protect the basic operating data of individual firms.

In this way, use of the index $L_{n^*h<}$ can contribute to the development of specific economic analysis, by removing, or rather avoiding, the obstacle and barrier formed by the need to keep certain statistics secret.

It must be emphasized that use of the quantitative dominance index does not aim to replace economic analysis, but to provide it with basic data and serve as a working tool. With regard to the actual working of competition in a given structure, the index must be interpreted with great care and caution.

For there is not necessarily any automatic relationship between quantitative dominance and the existence of a restriction or obstacle to the working of the "competition mechanism". In practice therefore it may happen that:

a) the index $L_{n^*h<}$ expresses such an intense degree of dominance that competition would seem to be quite out of the question, whereas the opposite is in fact the case; competition is both vigorous and effective;

b) conversely, the index does not seem to show any substantial dominance which could be a danger to competition, whereas in actual fact the play of competition is distorted or even suppressed.

As far as a) is concerned, it may simply be that the structure analysed is highly concentrated, but nevertheless open to the cold wind of substitute competition (coming from manufacturers belonging to other industries and structures) or from abroad. And the essential goal of competition is to ensure some "range of real choice" to the consumer or user.

As far as b) is concerned, it must be recalled that it is assumed that the index in question is applied on the basis of the industry, i.e. to the sample n^* of the major firms belonging to a given industry, and therefore this index may show a relatively balanced structure not affected by strong dominance, while in practice:

- there is some production specialization, so that certain key product markets are under the dominance of one or more firms, whereas the industry as a whole does not appear to be so;

- there are interlocking directorates and shareholdings and agreements between the different firms, which, although they are quite separate legal units, in terms of economic behaviour represent a single entity.

In these last cases, therefore, the "range of choice" available to the consumer or user, which is a feature of the market and of competition, does not exist in practice.

The $L_{n^*h<}$ index of dominance is an econometric concept and not a legal concept. However, it serves to place the questions appropriate to economic analysis in a systematic framework, requiring explanations for the various "whys" and "hows" of this quantitative dominance. In this way, the basic guidelines for specialized research and analysis are suggested and determined; the wastes of empiricism and arbitrary formalism are left behind.

In my opinion, as regards methodology, the index in question has a decided advantage. It can be read and used without any reference to all the other points on the structural curve, in particular the n^*_m (or minimum) point, when they do not count, i.e. when they have no role to play, for the **position** of the firms to the right of $n^*_{h<}$ is of no relevance. If, on the other hand, the **share of the latter is not** exactly irrelevant, because together they represent a force to be reckoned with, the phenomenon **might be expressed in two ways:**

- by a decrease in the value of the index $L_{n^*_{h<}}$; and/or:

- point n^*_m shifts to the right, tending to draw closer to point n^* and even to coincide with it.

In this hypothesis, we may usefully consider the value of the index L_s, which expresses the synthesis of existing oligopolistic equilibrium. Moreover, since the index L_s is also a function of the point n^*_m, or minimum of the structural curve, let us look further into the meaning of this "minimization" and some of the problems to which it gives rise in certain practical cases.

17. The sample (n^*) of the large firms

When the size of the units or firms studied decreases regularly, the relative structural curve appears more or less parallel – though of course it expresses the values of **some higher** L indices – to the PL = MC = I/n^* curve (even distribution or perfect balance of size). As seen above, this occurs because the L index is a function, not only of the degree of unevenness, but also of the units or firms (n^*). In this hypothesis, no minimum of the L index can be determined, because it will always decrease as the number of units or firms increases.

In this respect it may be recalled:

1) that the point n^*_m brings out the existence of a "size gap", which occurs whenever $n^*_m < n^*$, thus separating the distribution of the sample firms into two distinct groups:

   - firms situated on the left-hand side of the curve (n^*_m) and constituting the "oligopolistic arena";

   - firms situated on the right-hand side of the curve $(n^* - n^*_m)$;

2) if however we have $n^*_m = n^*$, a "size gap" or minimum point does not exist, nor does the oligopolistic arena; therefore we may consider all the firms in the sample as being oligopolistic units or as all being non-oligopolistic. This is merely a matter of terminology;

3) though, where $n^*_m = n^*$, we lose a general abstract criterion for defining and delimiting the oligopolistic arena, I feel that the structural curves can still help to suggest either a more or less conventional "point" for marking off the firms in the sample or a more empirical solution, such as including all the n^* firms in the sample.

The solution to the problem of the oligopolistic arena is thus brought back to the choice of n^*, i.e. the sample of big firms to be analysed.

Though it is of course difficult to say at what point oligopolistic power and interdependence ends, there is no problem in deciding when it definitely and indisputably does not exist, at least in purely quantitative terms.

We may therefore state that, in all cases, and whatever the structure, the firms accounting for less than 1% of the total structure must be excluded from the sample because they can definitely not be considered oligopolistic and therefore **n* will never exceed 100. Since it has been established that, the distribution being uneven,** in practice n* will never exceed sixty firms, when as a general criterion the firms accounting for less than 1% are excluded.

Finally, it will be seen that in practical terms the problem hardly ever arises, because the sample n* is determined on the basis of data actually available, which implies that the value of n* is generally well below 50 - 60 units.

In cases where the L index steadily declines as n* increases (i.e. in the hypothesis in which n^*_m tends towards n*), the value of the L_s index changes little when a slightly higher or lower number of firms is taken into consideration: this index is the arithmetic mean of all the indices L_2, L_3, L_4, ... $L_{n^*_m}$, which illustrate the degree of unevenness up to each point n* = 2, = 3, = n^*_m in the distribution. And in the given hypothesis, the values of the first indices (= L_2, L_3, ...) are the highest ones and influence the L_s most.

III. THE VARIABLES

18. The definition and function of the variables

Use of the system of indices presupposes and allows the use of numerous variables ; therefore :

- these variables must previously be definied and accurately determined ;

- comparisons may be made between the numerous aspects of the structure as expressed by these variables, both through Linda curves or structural curves (see 1.14) and the oligopolistic "unevenness" matrices.

In the industry studies programme sponsored by the Commission of the European Communities, the following variables have been used :
- 01 : sales
- 02 : employment
- 03 : wages and salaries
- 04 : net profits
- 05 : cash flow (i.e. gross income)
- 06 : gross investments
- 07 : own capital

When imports-exports flows are relevant, the addition of two new variables ("domestic market" and "exports") is very advisable.
Future studies will attempt to also use "added value" (i.e. "cash flow" plus "wages and salaries"),based on a very simple definition,"net cash flow", "net fixed assets" and "capital employed". Each of these variables will be examined separately ; the section on sales includes some more general comments.

19. Sales (or turnover ; chiffre d'affaires, Umsatz)

This is the monetary value, relating to a given year, derived from the sale of products manufactured or sold by the relevant firm plus sales of services to third parties. It includes expenses charged to customers (non-returnable packaging, transport, supplementary services). It does not include :

- state subsidies

- export refunds

- income from sales of real estate, plant and machinery owned by the firm.

In the Commission's original programme, the duties and taxes the seller is entitled to pass on such as the Italian l'imposta generale sull'entrata, the United Kingdom purchase tax, the French taxe sur la valeur ajoutée, and the German Mehrwehrsteuer, were to be excluded from the sales variable.

This criteria was logically justifiable - if "pure", comparable results were to be obtained - for the following reasons :

- the tax rates vary from country to country,

- tax reforms in a number of countries have led to the gradual introduction in the Community of the various value added taxes replacing the traditional multi-stage purchase taxes (the last country to go over to VAT was the United Kingdom, in April 1973), but the implementing procedures and, more importantly the rates of the new taxes are by no means uniform from country to country.

In practice, however, the amount of tax could rarely be deducted from the figure for total sales to customers and therefore the sales variable has been taken (as, for example, in almost all industries in Italy and in the French food industry) including taxes charged to customers.

As far as Italy is concerned, in view of the low rate of the "imposta generale sulla entrata" chargeable until 1972, for the practical results and the purposes of our studies, it is of no great consequence whether it is included or not.

The same is true of the United Kingdom, since until April 1973 purchase tax was in force at low rates.

The determination of sales gives rise to difficult problems in the case of big conglomerate-type multinational companies which include in their consolidated accounts revenue from operations outside the relevant industry.

Generally speaking, the principle has been to use an overall approach, taking into account comparable values corresponding to the variables analysed, i e. these variables all refer - for each given firm - to the same type and to the same group of economic activities ; the variables are relatively "homogeneous" and may therefore be used in subsequent work.

When the group of variables relating to the sample of the largest firms in the industry is being analysed, "homogeneity" in respect of the firm must take precedence over "homogeneity" in respect of the industry. In extreme cases, therefore, the aggregate sales of the sample of firms may exceed the total for the industry, when one or more of these firms derive a substantial proportion (but always, by definition, less than 50 %) of their turnover from other fields of economic activity.

In these cases, two separate econometric calculations have had to be carried out :

- one based on the industry as a whole, comprising the exact sales of the units which go to make it up, treated as kind-of-activity units, i.e. by deducting from the sales of each one the part derived from other industries and, at the same time, including those units accounting for less than 50 % of their sales in the industry, for the actual part entering into the relevant industry ("K.A.U." approach) ;

- the other, based on the n* large firms, taking into consideration their aggregate sales, even when partially derived from contributions to other industries ("enterprise" approach).

20. Employment (addetti, Beschäftigte, effectifs)

The number of employees is represented by the number of persons working in the firm or unit studied (including shareholders, owners or partners who permanently work in the firm and unpaid relatives).

This includes :

- persons working outside the firm, but who belong to it and are paid by it (e.g. sales representatives) ;

- persons absent owing to holidays, illness, special leave, etc. ;

- persons on strike.

However, the number of persons employed excludes :

- persons working at home, not listed on the firm's payroll ;
- persons seconded to other firms against compensation ;
- persons on protracted or indefinite leave ;
- persons on military service.

In some cases, executives have been excluded.

21. Wages and salaries (masse salariale, massa salariale, Lohn und Gehaltssumme)

This means gross wages and salaries ; they are made up of all the gross remuneration due, in a given year, to the firm's employees (both white and blue collar), i.e.

- basic pay (wage or salary), cost-of-living index, overtime, bonuses for holidays, national holidays or Christmas, 13th and 14th months, benefits in kind ;
- social security costs and contributions paid by the firm and amounts set aside every year in various funds (redundancy, retirement, etc.) for the benefit of the workers.

Remuneration paid to persons working at home has been excluded.

22. Net profit (bénéfice net, utile netto, Nettogewinne)

This is the profit for the financial year as shown in the balance sheet. The figure is generally for the pre-tax profit of the firm or unit studied and in most cases is net of interest on capital loans.

In some cases, however, chiefly in Italy, provisions for taxes or other purposes may not be included in the profit shown in the balance sheet.

The net profit is usually obtained from the gross profit on sales, account being taken of the evaluation of unsold stock (gross trading profit), deducting amounts set aside for depreciation and adding various amounts of income derived from other activities and investments.

A succinct definition of net profit, used by a British Research Institute is : "Profit is before tax and dividend payments and after depreciation and other charges".

23. Cash flow (or "gross cash-flow" or "gross income")

This is the sum of the net profit as defined above and the amount set aside for depreciations, account being taken of variations in unsold stock. The gross cash flow is fundamental to the calculations based on the methodology used for the different industry studies. Net cash flow may be obtained from the gross cash flow (also known as gross income), by deducting income or corporation tax, capital levies and dividends (and sometimes, in certain companies, also interest paid on capital loans, when this has not already been deducted from the net profit).

24. Gross investment (investissements bruts, investimenti lordi, Bruttoinvestitionen)

This is fixed investment (in real estate, plant, machinery and often furniture) and therefore includes annual amounts for depreciation.

In other words, this heading includes the variations – in a given year – in the total immobilized capital of the firm or unit studied.

25. Own capital or equity (capitaux propres, capitali propri, Eigenkapital)

This heading is made up of the algebraic sum of the paid up capital and the total reserves (extraordinary and ordinary), but it usually excludes provisions set aside to cover specific charges and liabilities, as well as profits (or losses) carried forward.

It has been defined as "issued share capital actually paid up plus retained profits and reserves".

A firm's "own capital" should not be confused with the "total capital" used or invested by the firm, which includes borrowings. This last variable could not be used, through it would certainly be of interest.

IV. THE MATRICES OF OLIGOPOLISTIC INTERDEPENDENCE

26. Market mechanism and corporate performance

Let us assume that corporate performance and profitability are a socially useful and desirable goal of economic policy and necessary as a means of increasing national wealth and of feeding the development process.

The problem which arises is how we are to measure, examine and stimulate corporate performance and profitability and avoid waste and parasite revenue arising from the phenomena underlying Parkinson's laws. This involves determination of :

(a) the level at which performance and profitability should be studied ;

(b) the most suitable technical and methodological tools for carrying out the study.

With regard to (a) we can distinguish :

- the industry and national level, as in methodology already used ;

- the overall and international level, part of an approach in which the major multinational groups operating throughout the European Community - i.e. in all the nine countries - are contrasted and compared in quantitative terms.

We will deal with the development of the analysis by the first approach only (industry and national). The problems connected with (b) are particularly difficult. In my opinion, there are only two complementary, inseparable criteria for measuring and examining performance and profitability :

- market mechanism ;

- comparative performance of firms.

We have thus arrived at the focus of today's fundamental problems, where the macroeconomic approach towards coherent, effective and above all "efficient" economic policy - i.e. directed towards more rational utilization of all available resources - associates and units with the microeconomic approach towards a theory of the firm directed towards "efficient" development, represented by high rate of yield and profit (an antidote to the gigantism of Parkinson's laws).

This focus also denotes the two knotty points of the quantitative theory of concentration :

- the first is the deficiency of the market mechanism and its structural inability to play its proper distinctive role in the oligopolistic context of the modern world ;

- the second is the objective and intrinsic difficulty of comparing the performance of the various oligopolistic firms studied in the analysis.

The first of these problems is linked to the following question : how can one explain the high profitability of a given firm in a given industry in a given country, i.e. in given practical circumstances ?

To what extent does this profitability depend on :

- the firm's high level of efficiency ;

- the firm's possible dominance - or even monopoly - on one or more markets ?

It is well known that under current circumstances, oligopolistic structures and units are exposed to the aberrant temptation of "power", which, by its very nature, tends to impair the market or competition mechanism as soon as certain limits are exceeded.

Good performance in a firm is a measure of its efficiency only when the firm, in carrying on its business, is exposed to the full force of the market mechanism. If, as a result of its power, the firm has managed to transcend the "power of selection" wielded by competition, its performance expresses no more than the result and the existence of this power, and not the firm's efficiency.

In this respect, the measures of concentration can provide certain points of reference, particularly by virtue of the calculations made with the matrix $n^* = 1$ (see 28.).

In certain situations, it may also be worth extending the quantitative analysis from the industry level to the market or subindustry so as to give a better picture of the scope available for operation of the market mechanism.

27. The basic data of matrix analysis

The second problem concerns, in my view, the way in which the accounting and legal institutions in the various countries operate, for they work on very different criteria when determining annual profits and boards are left with a varying but in my view nearly always excessive, degree of discretion, even if there are country-to-country and industry-to-industry differences. As a result, for practical purposes, the profits of different firms are not perfectly homogeneous or comparable.

Nevertheless, I do not feel that we should exaggerate this disparity in the profits of different firms, because I do not think they are substantial enough, as will be seen later, to undermine the results of the following econometric calculations, especially where these analyses are not confined to a single year, but extend over a sufficiently representative length of time.

In any case, the above reservations may be considered irrelevant to the proposed methodology and they therefore do not detract from the methodology's rigorous logic : it is clear that this is only an initial approach and, being innovatory in nature, is also capable of improvement.

We shall consider in order three different and connected matrices, which may be termed "the matrices of oligopolistic interdependence", for that is the principle on which they are based.

They are :

(1) matrix No 1 : oligopolistic inequality ;

(2) matrix No 2 : large firms' comparative performance ;.

(3) matrix No 3 : large firms' comparative growth rates.

The following pages illustrate :

(a) the models of the three matrices (Table 4) ;

(b) an outline of the symbols and formulae relating to the matrices of oligo-
    polistic interdependence (Table 5).

28. Matrix No 1

This matrix highlights the various aspects of oligopolistic unevenness through
a multidimensional approach.

Among other things, it highlights :

(i) the existence and quantitative value of dominance, expressed by the index
      $L_{n*_{h<}}$ (maximum of L) ;

(ii) the degree of unevenness of the oligopolistic arena, expressed by the
      index L_s ;

(iii) the ranking of the several variables based on the ranking of the two above
      indexes ($L_{n*_{h<}}$ et L_s), giving the SCORE (or total number of points)

      $= {}_v 1^i   +   {}_v 2^i$.

TABLE 4

THE THREE MATRICES OF OLIGOPOLISTIC INTERDEPENDENCE

INDUSTRY:

COUNTRY :

YEAR: t

MATRIX No 1:

OLIGOPOLISTIC INEQUALITY

(of n* firms)

		$v1^i$ / VARIABLES	1	2	...
$v2^i$	VARIABLES	L_s $L{n*}_h$			
1					
2					
...					

MATRIX No 2:

COMPARATIVE PERFORMANCE

(of n* firms)

		1^r / 2^r	$r1^i$	1	2	...	n*
			E_i				
			1^r_i				
$r2^i$	E_i 2^r_i	1^{x}_i / 7^{x}_i	$1[\_]$	$1[\_]$	...	$1[\_]$
1		$7[\_]$				
2		$7[\_]$				
...		...				
n*		$7[\_]$				

MATRIX No 3:

COMPARATIVE GROWTH RATES

(of n* firms)

		1^c / 4^c	$c1^i$	1	2	...	n*
			E_i				
			$1^c_{i,t}$				
$c4^i$	E_i $4^c_{i,t}$	$1^{x}_{i,t}$ / $4^{x}_{i,t}$	$1[\_]$	$1[\_]$	$1[\_]$	$1[\_]$
1		$4[\_]$				
2		$4[\_]$				
...		...				
n*		$4[\_]$				

TABLE 5

Symbols and formulae used in the matrices of oligopolistic interdependence

Matrix No 1

$L_{n*_{h<}}$ = value corresponding to the highest point of the Linda index in the interval from $n* = 2$ to $n* = n*_m$

L_s = arithmetic mean of the L indices starting from the hypothesis that $n* = 2$ up to $n*_m$

$_v 1^i$ = ranking of a given variable according to the value of the index $L_{n*_{h<}}$

$_v 2^i$ = ranking of a given variable according to the value of the index L_s

SCORE = $_v 1^i$ + $_v 2^i$

Matrix No 2

E_i = unit or firm studied

A, B, C, = designation of a given firm ; the letters of the alphabet are attributed according to a decreasing ranking of sales in a given year t

$_r 1^i$ = ranking of a given firm (A, B, C, etc.) in terms of performance calculated on sales $(_1 r)$

$_r 2^i$ = ranking of a given firm (A, B, C, etc.) in terms of performance calculated on own capital $(_2 r)$

$_1 \begin{bmatrix} & \end{bmatrix}^i$ = ranking of a given firm (A, B, C, etc.) in the terms of sales $(_1 X)$

$_7\left[\ \right]^i$ $= $ ranking of a given firm (A, B, C, etc.) in terms of own capital $(_7X)$

$_1r = {_1r_i}$ $= $ ratio $\dfrac{\text{net profit}}{\text{sales}}$ (in %) of a given firm (A, B, C, etc.)

$_2r = {_2r_i}$ $= $ ratio $\dfrac{\text{net profit}}{\text{own \; capital}}$ (in %) of a given firm (A, B, C, etc.)

$_1x = {_1x_i}$ $= $ absolute value of the sales of a given firm (A, B, C, etc.) in thousand millions/millions/thousands of ...

$_7x = {_7x_i}$ $= $ absolute value of the own capital of a given firm (A, B, C, etc.) in thousand millions/millions/thousands of ...

SCORE $= {_r1^i} + {_r2^i}$

re_i $= $ quantitative index of firm's performance $\underline{i}$ (A, B, C, etc.) expressed by the following formulae :

re_i $= \dfrac{\dfrac{r1^i}{_1\left[\ \right]^i} + \dfrac{r2^i}{_7\left[\ \right]^i}}{2}$

$n{**}$ $= $ number of firms where $re \leqslant 1$.

Matrix No 3

t $= $ year

A, B, C, $= $ designation of a given firm in the year $\underline{t}$, remaining constant in subsequent years (t+1, t+2, etc.) even when its sales ranking changes.

$_c1^i$ $= $ ranking of a given firm (A, B, C, etc.) in terms of growth rates calculated on sales $(_1c)$

$_c4^i$ $= $ ranking of a given firm (A, B, C, etc.) in terms of growth rates calculated on net profits $(_4c)$

$_1\left[\ \right]^i$ $= $ ranking of a given firm (A, B, C, etc.) in terms of sales established in year t

$4\begin{bmatrix} \ \ \end{bmatrix}i$ = ranking of a given firm (A, B, C, etc.) in terms of net profit established in year t

$$_1C = {}_1^{t+1}C_{i,t} = {}_1^{t+1}a^*_{i,t} - {}_1^{t}a^*_{i,t}$$

$$_4C = {}_4C_{i,t} = {}_4^{t+1}a^*_{i,t} - {}_4^{t}a^*_{i,t}$$

$_1^{t+1}a_{i,t}$ = percentage share of the sales variable relative to the n* firms or units in the sample, of a given firm (A, B, C, etc.) <u>in year t+1</u>

$_1^{t}a^*_{i,t}$ = percentage share of the sales variable relative to the n* firms or units in the sample, of a given firm (A, B, C, etc.) <u>in year t</u>

$_4^{t+1}a^*_{i,t}$ = percentage share of the net profit variable relative to the n* firms or units in the sample, of a given firm (A, B, C, etc.) <u>in year t+1</u>

$_4^{t}a^*_{i,t}$ = percentage share of the net profit variable relative to the n* firms or units in the sample of a given firm (A, B, C, etc.) <u>in year t</u>

$_1x = {}_1x_{i,t}$ = absolute value of the sales of a given firm (A B, C, etc.) in thousand millions/millions/thousands of ...   <u>in year t</u>

$_4x = {}_4x_{i,t}$ = absolute value of the net profit of a given firm (A, B, C, etc.) in thousand millions/millions/thousands of ...   <u>in year t</u>

SCORE $= C1^i + C4^i$

Interpretation of matrix No 1 presents no difficulties if the structure and development of the L indices used are known.

If the value of an index $L_{n^*h<}$ exceeds 1, the dominance of the first firm (or the first two firms) in the oligopolistic arena is clearly very extensive. For example, in this case, the first firm's share in the variable will undoubtedly account for double (or more) that of the second firm.

In contrast, if the index $L_{n^*h<}$ corresponds to 0.500, bearing in mind that when n* = 2, $\frac{I}{n^*} = 0.500$, we may deduce that the first firm in no way dominates the other unit in the sample.

With regard to the index L_s, which expresses a quantitative synthesis of the structure of the whole oligopolistic arena, reference can always be made to an empirical or conventional scale of values or basic points of reference. We may thus assume that when $L_s <$ 0.100 (approximately), the structure seems relatively balanced, with many centres of decision ; it is based on a reasonably large number of oligopolistic firms or units, whose degrees of dominance appear, in quantitative terms, to be broadly similar.

The value L_s = 0.100 can be considered as a reference point of definite practical interest and corresponding to the outline hypothesis of an oligopolistic arena made up of about thirty oligopolistic units of uniform size.

As the value of the index L_s rises, the number of oligopolistic units decreases and/or the extent of unevenness between them increases. We may consider that up to the value L_s = 0.200, the oligopolistic structure is satisfactorily broad and balanced and remains so up to L_s = 0.300.

Beyond L_s = 0.300, the concentration in the oligopoly and/or the unevenness can gradually create obstacles to the functioning of the market mechanism. When however the values of L_s exceed 0.500, a qualitative and far-reaching survey of the market and structures can often prove promising and revealing.

29. The ranking of the variables

We will study two indices ($L_{n*_{h<}}$ and L_s) for each variable. In matrix No 1, all the variables are indicated in decreasing order of their respective values ($L_{n*_{h<}}$ across and L_s down).

Using the symbols and formulae in Table 5, the SCORE = $v_1^i + v_2^i$ provides the ranking of each variable.

A practical example : if the index $Ln*_{h<}$ is higher for net profit (for example, 2.500) than for any other variable (for example, cash flow = 1.800 ; employment = 0.900 ; sales = 0.500 and so on, in decreasing order) the net profit variable will be v^{1i} = 1 (while, for example, cash flow will be v^{1i} = 2 ; employment will be v^{1i} = 3 and sales will be v^{1i} = 4).

If the index L_s is higher for the cash flow variable (for example 0.850) than for any other variable (for example, net profit = 0.800 ; employment = 0.250 ; sales = 0.150), the following will be obtained :

$$v^{2i} = 1 \text{ for cash flow}$$

$$v^{2i} = 2 \text{ for net profit}$$

$$v^{2i} = 3 \text{ for employment}$$

$$v^{2i} = 4 \text{ for sales}$$

The ranking of each variable will be provided by the score (3 for profit and cash flow, 6 for employment and 8 for sales). Therefore, the following will be obtained :

1) Net profit   = 1 + 2 = 3

2) Cash flow   = 2 + 1 = 3

3) Employment   = 3 + 3 = 6

4) Sales   = 4 + 4 = 8

In our example, therefore, net profit and cash flow will rank equal first, followed by employment and sales.

What does this "ranking of the variables" mean ? It has :

(a) a general meaning, which holds true for all cases and applications ;

(b) a special meaning, which holds true only when certain conditions are met.

As far as (a) is concerned, it is particularly important that we should know for which variables the degree of concentration is higher or lower. Though there are many different facets of modern oligopolistic competition, modern oligopolistic concentration also has many different facets, which must therefore be analysed.

From an empirical survey on twelve manufacturing industries in Italy, it was found :

- that it is not true that the absolute level of concentration changes little from one variable to another ;

- rather, that there is a kind of "size gap", applying to the level of concentration between two types of variables (the financial ones and/or the others) ;

- more accurately, the financial variables - i.e. net profit, cash flow, own capital and gross investments - show, in nine cases out of ten, a much higher level of concentration than the three traditional variables of sales, employment and wages and salaries ;

- generally speaking, despite the fact that the concentration values for the last three variables are relatively similar, the sales variable - the one most commonly used in traditional research on concentration - almost always ranks last.

Obviously, therefore, traditional methods of quantitative concentration analysis, generally based on sales and/or employment, tend, because of their basic principles, to underestimate concentration levels.

30. Comments on the results of an empirical survey

The survey carried out on twelve manufacturing industries in Italy has already been mentioned. We shall now briefly examine some of the aspects and results of this survey.

It extended over an eight-year period (from 1962 to 1970) and covered twelve industries, thus providing ninety-six cases or structures (8 x 12) which form a sufficiently wide and representative basis. The industries are listed below, with the number n* of firms making up the sample analysed, in the years 1962 and 1969 respectively, indicated in brackets :

pharmaceuticals (n* = 47 ; = 45)

wool (n* = 30 ; = 30)

cotton (n* = 40 ; = 40)

knitwear and hosiery (n* = 25 ; = 25)

paper (n* = 29 ; = 37)

cycles and motorcycles (n* = 12 ; = 13)

electrical engineering (domestic electrical appliances, radio and TV, etc.) (n* = 30 ; = 30)

office machinery (n* = 8 ; = 8)

tractors and agricultural machinery (n* = 19 ; = 22)

textile machinery (n* = 17 ; = 24)

lifts (n* = 5 ; = 5)

hoisting and handling equipment, excluding lifts (n* = 14 ; = 19).

The ninety-six matrices were then calculated – one for each industry and for each year – taking into consideration all the seven variables used in the Commission methodology (sales, employment, wages and salaries, net profit, cash flow, gross investments, own capital).

The following results were obtained :

- in forty-three of the ninety-six industries studied, the net profit variable ranks first among the seven variables used, while the sales variable ranks first in only two industries (or cases) ;

- in twenty-three of the ninety-six industries studied, the net profit variable ranks second, while sales ranks second in only six ;

- as a result, out of the ninety-six structures considered the net profit variable ranks first or second in sixty-six industries (or cases), while the sales variable does so in only eight.

The following table shows the distribution of the different variables in the
ninety-six cases in question :

VARIABLE	RANKING OF THE VARIABLES							TOTAL
	I	II	III	IV	V	VI	VII	
01 – Sales	2	6	12	15	13	26	22	96
02 – Employment	9	11	15	14	17	16	14	96
03 – Wages & salaries	14	13	14	16	19	15	5	96
04 – Net profit	43	23	10	9	4	6	1	96
05 – Cash-flow	12	29	21	13	9	6	6	96
06 – Growth Investment	27	14	14	13	6	10	12	96
07 – Own capital	7	13	13	20	16	16	11	96

The results speak for themselves : the fact that concentration of profits (followed
by cash flow) is higher than that of the other variables is in itself an indication
that concentration is increasing regardless of the absolute values of the concen-
tration indices used in working out the matrices. In the first place, the firm
making the most profit probably has greater power on the market ; in the second
place, it can use this profit in order to increase its market power. This is a
classic process of capitalist accumulation, highlighted by the approach used in
matrix No 1 and the ranking of the variables (1).

31. A hypothesis of profit maximization by the largest firms

Nevertheless, the foregoing conclusions require certain additional clarifications,
reservations and comments on a general theoretical plane (ignoring then, the
specific situations in the empirical survey already described).

The question is this : do the different n* firms in the sample all occupy the same
position in the seven rankings of absolute values of the seven variables or not ?

_____

(1) See R. LINDA, Static and Dynamic Methods for Analysing Industrial Concentration:
the Italian Case, in "Markets, Corporate Behaviour and the State – International
Aspects of Industrial Concentration, "by A.P. Jacquemin and H.W. de Jong, 1976,
Leiden (Netherlands")pages 143 et seq.

We must be clear on this : we are not talking about the ranking of the variables based on the two concentration indices $(L_{n*h<}$ and $L_g)$, described in the previous paragraph. Here, we are referring to the rankings based on absolute size. For example, is the top firm always the same for all the seven variables (i.e. the one with the highest sales, the highest profit, the highest employment, the greatest capital, etc.) ? Is the second firm the same for all the variables and so on, or, for example, is a firm first in the ranking for profits, but second for sales, third for employment and then second again for cash flow and so on ?

We can hypothesize two types of answer, corresponding to two extreme cases of structure :

(a) the rankings of the firms vary from one variable to another ;

(b) the rankings of the firms match exactly for all seven variables.

The former situation undoubtedly occurs most frequently. We therefore need to consider the various n* firms in the sample individually, in order to understand the functioning and dynamism of each industry structure. This will be done by means of matrices Nos 2 and 3, outlined later.

The second situation (b) sometimes occurs, but mainly when only certain large firms are considered and only certain significant variables. Moreover, even when the rankings of certain large firms, based on absolute size, do not exactly match for all the variables, some general conclusions can still be made.

Thus, according to the hypothesis of a structure approximately resembling type (b), we may deduce that :

(1) greater unevenness (or concentration) of profits than of sales signifies that the profit share (a^*_i) of the larger firms (or the largest of all the firms) in the sample n* is greater than their share of sales ; the largest firms therefore make more profit than sales when compared with the smaller firms included in the sample n* :

(2) If the largest firms in question make more profit than the smaller ones on their sales, it is reasonable to assume that their performance is better than that of the smaller firms in the sample n* :

(3) Consequently, the largest firms do not tend to maximize sales – more, at any rate, than the smaller firms included in the sample n* – but they possibly tend to maximize profit (since their performance is better than that of the smaller firms), as a result of the numerous factors connected with their large size, such as economies of scale and enhanced market power.

When the industry approach is used, there is what seem a virtually automatic corollary : insofar as the largest firms perform better, and this is connected with their market power, this power is attained through their large size which, among other advantages, allows them to choose (in order to dominate) the product markets which seem to offer the most promising and profitable prospects for the future.

In spite of their market power, very large diversified firms often have lower levels
of performance than medium-sized firms (1). This paradox will have to be explained
and analysed.

As far as methodology is concerned, since hypothesis (b) is relatively infrequent,
analysis of the relations between firms' size and profitability entails use of the
"individualizing approach" of matrix No 2. See Part V.

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(1) See R. LINDA, Un modèle de développement avec relations asymétriques, in
    Mondes en développement, Paris, No 11/1975 (Crise du capitalisme ou Ordre
    International Nouveau), pages 413-459.

32. The question of performance

The structural matrix No 2 is a typical tool of oligopolistic analysis ; its main hypothesis is based on the interdependence and unevenness (of power) between the various oligopolists.

This matrix is designed to provide "a quantitative picture" of unevenness of performance (and, implicitly, of efficiency and capital intensity) among the various oligopolists.

It can be called : "the matrix of large firms' comparative performances". It can be used to establish a ranking of firms by performance and to assign a complex index (re_i), whose meaning will be explained later, to each of them.

In order to draw up matrix No 2, accurate concepts, hypotheses and formulae must be defined.

A firm's performance may be measured in various ways, but no measure can be considered satisfactory and complete in itself.

The matrix approach has the advantage of allowing two measures, instead of just one, to be taken into consideration for the econometric calculation. In this case we will consider the two following measures, applicable to each firm i of the n* large firms constituting the sample :

$$_1r_i = \frac{\text{net profit}}{\text{sales}} \times 100 \qquad \text{or} \qquad _3r_i = \frac{\text{cash flow}}{\text{sales}} \qquad (1)$$

$$_2r_i = \frac{\text{net profit}}{\text{own capital}} \times 100 \qquad \text{or} \qquad _4r_i = \frac{\text{cash flow}}{\text{own capital}} \qquad (2)$$

The two measures are, in a certain sense, complementary, though they must be used with caution and reservations.

Since the objective of this econometric system is to determine the "comparative" performance of the various firms in the sample, we must take net profit as a basis for reference. It depends, of course, on the criteria used to evaluate unsold stock and to determine annual amounts set aside for depreciation of immobilized capital.

In other words, the criteria used to determine net profit vary, within certain limits, from one firm to another ; the type of firm and policies on balance-sheets also vary considerably from one to another.

In these times of inflation, different criteria used in evaluating and drawing up the balance-sheet can lead to differing net economic results.

Comparison of the net profits of different firms therefore implies a certain degree of approximation and inaccuracy, but it appears unlikely that this would be sufficiently extensive to invalidate the results of the analysis, especially when it covers a fair number of consecutive years.

To overcome these inaccurracies gross cash flow (the sum of the net profit and annual amounts set aside for depreciation) may be used instead of net profit (see 22 and 23).

Performance based on sales (formula 1) is clearly a function of a given firm's production structure, i.e., the industry and markets on which it operates and its degree of vertical integration and capital intensity.

Moreover, sales are such an objective and comparable factor (apart from certain small firms with a propensity for tax evasion) that it would be unreasonable to reject it, all the more so since matrix No 2 is usually based on an industry (or subindustry), which therefore increases comparability between the units (or firms) studied.

In terms of pure economic logic, performance based on own capital (formula No 2) is certainly the most meaningful and accurate measure, since the most important factor in analysing the economic efficiency of a given firm is the rate of return on capital. In practical terms, however, own capital is obviously affected by the criteria on which balance-sheet policy is based ; this should not be overlooked, above all in present times of inflation.

Performance based on total fixed invested capital would also be a significant measure, but the date gathered were not suitable for this type of calculation.

33. The ranking of firms by performance

The firms of the sample are classified in decreasing order of performance $_1r_i$ across the matrix and the performance $_2r_i$ down the matrix.

In addition, the value of $_1[\quad]i$ is also indicated across the matrix ; this is the ranking of each firm $\underline{i}$ in terms of absolute sales (these are the values $_1x_i$, indicated for reference purposed), while the value of $_7[\quad]i$ is indicated down the matrix, i.e., the ranking of each firm $\underline{i}$ in terms of absolute values of own capital (these are the values $_7x_i$, also indicated for reference "purposes"). (*)

Matrix No 2 has a dual purpose ; it can be used for two series of calculations :

(a) the ranking of firms by performance ;

(b) the evaluation of "dimensional performance".

For (a) the procedure is the same as for matrix No 1 : calculation of the score. However, in this case, it is not applied to the variables but to the firms. Therefore, if a given firm E_i ranks first ($r1^i$) in the $_1r_i$ list and fourth ($r2^i$) in the $_2r_i$ list, its score will be obtained from $1 + 4 = 5$, while if a firm E_i ranks tenth (r^i) in the $_1r_i$ list and fourth ($r2^i$) in the $_2r_i$ list, its score will be $10 + 4 = 14$.

If we then place the different firms in order of their scores, we will obtain the ranking of the firms by performance.

(*) $3^r i$ would be used (instead of 1^r) and $4^r i$ (instead of 2^r) if cash flow were used instead of net profit.

With regard to the designation of the individual firms, letters of the alphabet
(A, B, C, ... Z, then A', B', C', ... Z', and then A", B", C", ...) can be used,
linking the alphabetical order to the absolute size of a given firm E_i in a given
year $\underline{t}$ (for example, sales of the firm in 1970), so that the letter designating
one same firm through a number of subsequent years remains the same, even though
the firm may change its ranking in terms of the absolute values of the relevant
variable.

According to this method, firm A is the one with the highest sales in 1970, while
firm A' ranks 27th by sales for the same year.

Finally, it should be noted that, for the purpose of establishing matrix No 2 and
the related rankings, all the n* firms in the sample of the large firms analysed
for each industry should be taken into account, but no other.

34. The evaluation of "size performance"

Here, we assign to each firm E_i in the sample n* a certain index $\underline{re}_i$ which can
have at least two different names :

- index "of size performance" ;

- "size reducer" of performance.

This $\underline{re}_i$ is of purely technical significance and must be analysed and interpreted
with great care, to avoid all possibility of misunderstanding.

The starting point for the calculation of re_i is still matrix No 2 and it is obtained,
for each firm i, from the following formula :

$$
re_i = \frac{\dfrac{rl^i}{_1\!\left[\ \right]^i} + \dfrac{r2^i}{_7\!\left[\ \right]^i}}{2} \quad (3) \quad \text{or} \quad \frac{\dfrac{rl^i + r3^i}{_1\!\left[\ \right]^i} + \dfrac{r2^i + r4^i}{_7\!\left[\ \right]^i}}{4} \quad (3\ bis)
$$

where $_{rl}^{\ i}$ is the ranking of firm $\underline{i}$ in terms of performance based on sales and $_7^{\ i}_r$
is the ranking of the same firm $\underline{i}$ in terms of performance based on own capital
and as regards formula (3 bis) account is also taken of ratios based on cash flow
instead of net profit.

Interpretation of the index $\underline{re}_i$ is based on a convention corresponding to an abstract
structure : if each firm has a comparative performance proportional to its ranking
in terms of absolute values of the variable (sales and/or own capital), we will
obtain $re_i = 1$. In this case, the performance is a function of the ranking in abso-
lute size.

The first firm for sales (and/or own capital) is the one with the highest rate of
performance based on sales (and/or own capital), the firm ranking second in terms
of absolute sizes will also rank second in terms of performance and so on up to the
last firm (or n*th firm) of the sample, which, since it is the smallest in the sample,
will also be the one ranking lowest in terms of performance among all the firms in
the sample.

51

In this respect, it must be pointed out that the rankings are indispensable quantitative terms, which summarize the position – in an oligopolistic view of multidimensional competition (or lack of competition) – of each firm based on its absolute size and performance, distinguished from all the other firms in the sample.

This approach involves the formal division of each firm's performance into two separate parts :

- size performance ;
- efficiency performance.

As we have seen, the performance of a firm depends primarily on its size (effect on production facilites : capital intensity, sophisticated technology, economies of scale; effect on the market : dominance over demand curves and prices) and efficiency (economical, efficient organization and management, thanks to quality of management and employees).

The index re_i is designed to show, by means of the matrix No 2 approach, the portion of a given firm's performance which must be attributed to the "size" factor.

Clearly, the greater the portion of performance attributed to the "size" factor, the lower the remaining portion, represented by "efficiency" will be, and vice versa.

What are the practical grounds for using the re_i index ?

Many economists, industrialists and politicians insist on the need to promote increases in firms' sizes, through mergers, acquisitions and joint ventures, in order to increase firms' competitivity. It is particularly important that we should have the quantitative tools to verify the validity of these objectives and the extent to which they are being achieved.

The various calculations based on matrix No 2 can help in this, above all the index re_1, whose value must not exceed 1. If it should exceed 1, it may be argued that in firm E, "size performance" prevails over "efficiency performance" and is achieved at its expense. In other words, too great a share of this firm's performance is derived from its size and too small a share from its efficiency.

The mechanism of the re_i index shows the "size performance" as a negative concept, because this size yield obscures and diminishes the scope and value of the performance. It is just as if we said to the firm, "you have earned Ł 100. All well and good. But your re_i index is, for example 3.083, which is far above 1. The Ł 100 you made have been achieved not through good management but only through your large size. Your performance is therefore a "size performance" and your firm is"inefficient".

This is why the re_i index can also be called a "size reducer" of performance.

Can this approach be justified in terms of theory and general economic policy ?

We will look at this again after analysis of the concept of the "size performance curve".

35. Ranking of firms based on "size performance"

In my opinion, the abstract hypothesis $re_i = 1$ is particularly useful for analysing the unevenness of performance among oligopolists, for it indicates the <u>demarcation line</u> between the two categories of firms :

- those in which "efficiency performance" prevails over "size performance" ;
- those in which the opposite occurs.

<u>First category</u> : $re_i < 1$

The minimum limit of the index re_i is $1/n^*$ and corresponds to the hypothesis that firm <u>i</u> is <u>last</u> in the ranking of <u>absolute values</u> of the variables (sales, own capital) and <u>first</u> in the performance ranking.

According to the definition taken here, this firm in which $re_i = \frac{1}{n^*}$ is that firm which has no "size performance", in contrast with all the other n* firms in the sample, so that its performance is due entirely to management efficiency.

If the sample is made up of fifty firms, the lower limit of the index re_i will therefore be 0.020.

But, more generally, in all the firms in which re_i is less than 1 "efficiency performance" will prevail over "size performance", for their performance ranking is better than their ranking in terms of absolute values (of sales, own capital, etc.). In an extreme case, where all the firms in the sample really do give <u>the same performance result</u>, they will all have a different re_i index, but this will still be less than 1, for all but the largest firm, for which we will have $re_i = 1$.

<u>Second category</u> : $re_i > 1$

The upper limit of the index re_i is n* and corresponds to the hypothesis that firm i is the <u>first</u> in the ranking of <u>absolute values</u> of the variables (sales, own capital) and <u>last</u> in the performance ranking. Consequently, all its performance is attributable to size and none to "efficiency".

Generally, all firms with the index re_i higher than 1 have "size performance" higher than their "efficiency performance". Their position in the performance ranking is lower than their position in the ranking of absolute values.

<u>Third category</u> : re = 1

There is a third category of firms, represented by those situated on the "demarcation line". For example, the <u>fourth</u> firm in the performance ranking is also <u>fourth</u> in that of absolute size (ratio $\frac{4}{4} = 1$).

36. The concept of the "anti-size arena"

Let us now use n** for the number of firms in the first category (re < 1), i.e. those whose performance is not size-based, for their performance ranking is higher than their ranking in terms of absolute size. This arena may be called the "anti-size arena".

Thus, for example :

- if a firm is <u>eighth</u> in the ranking of absolute size (sales and own capital) and <u>seventh</u> in the performance ranking, it falls within the anti-size arena (ratio $\frac{7}{8} < 1$) ;

- if however a firm is <u>third</u> in the ranking of absolute size, but <u>fourth</u> in the performance ranking, it falls outside the anti-size arena (ration $\frac{4}{3} > 1$).

$\frac{n^{**}}{n^*}$ may be used to indicate the ratio between the number of firms in the anti-size arena and the total number of firms in the sample.

Where all the n^* firms in the sample have the same rates of performance, this ratio will be $\frac{n^* - 1}{n^*}$ for only the first firm will fall outside the arena.

The minimum of the ratio $\frac{n^{**}}{n^*}$ is 0 and this occurs when all the firms fall into the third category ($re_i = 1$), i.e. they are all situated on the "demarcation line".

37. <u>The size performance curves</u>

The re_i index may be used for a number of interesting applications and developments. All the re_i values relating to the n^* firms in the sample form a curve displaying the unevenness of the structure when performance is linked to size.

Let us therefore call it the "size performance curve". The various firms $_r i$ will be indicated on the axis of the abscissae in decreasing order of the re_i values appearing on the ordinates axis.

Let us now suppose that this curve is a line (r') parallel to the axis of the abscissae, which occurs in the hypothesis where all firms in the sample have an index $re_i = 1$. A parallel line (r') does not however indicate that all firms in the sample have the same rates of performance, but that performance is linked to the position of each firm in the ranking of absolute values and therefore decreases with the size of the firm (measured, in this case, by these absolute values). However, where all the firms in the sample have the same <u>rate of performance</u>, the curve (r'') will increase, taking the values $\frac{1}{n^*}$, $\frac{1}{n^* - 1}$, $\frac{1}{2}$, 1. The first $_r i$ on the axis of the abscissae will be the last one in the sample (based on the ranking of absolute values) and re_i will be $\frac{1}{n^*}$, the second $_r i$ will be the penultimate one in the sample and re_i will be $\frac{1}{n^* - 1}$, up to the last $_r i$, which will correspond to the top one in the sample (based on the ranking of absolute values) and the re_i of this firms will be $\frac{1}{1}$.

In the given hypothesis all the $_r i$ numerators are the same for all the firms and are therefore all equal to 1, while the denominators $\begin{bmatrix} \\ \end{bmatrix}_i$ change according to position and therefore rise from $\begin{bmatrix} n^* \end{bmatrix}$ to $\begin{bmatrix} 1 \end{bmatrix}$. (1)

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(1) Even though all the n^* firms in the example occupy different positions in the ranking of absolute values, they all occupy the same position, i.e. the first position, in the performance ranking ($_{r1}i$).

TABLE 6

THE SIZE PERFORMANCE CURVES

First hypothesis : Perfect correlation between ranking and performances (r')
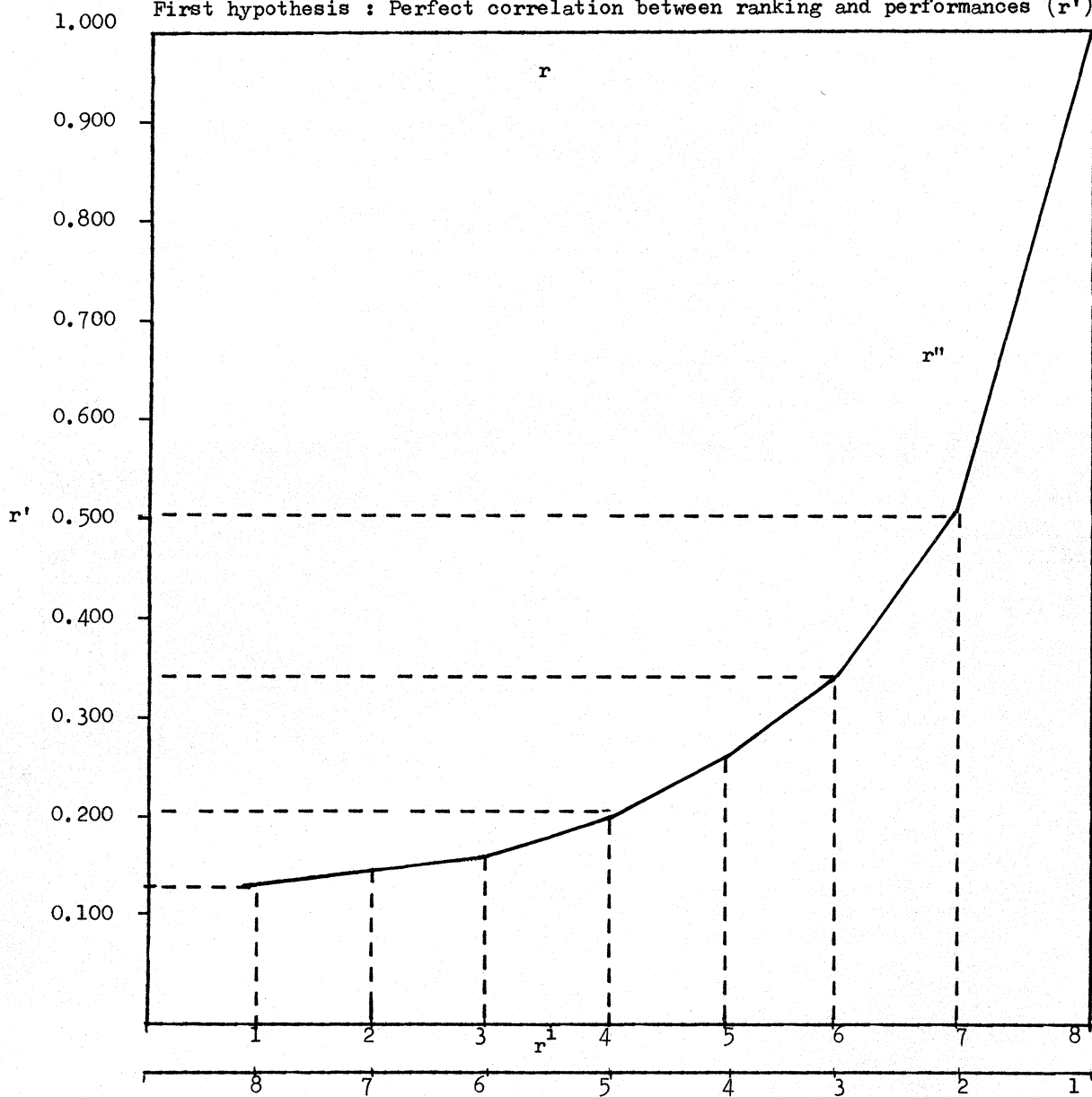
Second hypothesis : Equality of performance (r")

$i = 1$; $re_i = \frac{1}{8} = 0.1250$ $i = 5$; $re_i = \frac{1}{4} = 0.2500$

$i = 2$; $re_i = \frac{1}{7} = 0.1429$ $i = 6$; $re_i = \frac{1}{3} = 0.3333$

$i = 3$; $re_i = \frac{1}{6} = 0.1667$ $i = 7$; $re_i = \frac{1}{2} = 0.5000$

$i = 4$; $re_i = \frac{1}{5} = 0.2000$ $i = 8$; $re_i = 1 = 1.0000$

The graph shows two curves r' and r'' , and assumes a sample of $n^* = 8$.

In building the r' curve the axis of the abscissae may be interpreted in two con-trasting ways, since the value of re_i is the same for all firms :

(a) the largest firms in absolute terms (on the basis of sales and/or own capital)are on the left and their size decreases as we move towards the right, or

(b) conversely, the smallest firm is on the left and as we gradually move towards the right the larger firms come to the fore, the final one on the right being the largest in the sample.

Only the second interpretation (b) is needed for building the r'' curve however, for the value of re_i is lower for the smallest firm (index value $\frac{1}{1}$) and greater for the largest firm (index value $\frac{1}{8}$).

38. Size and performance in a market economy

The"economic philosophy" at the basis of this mathematical construction can be explained in logical terms. In the case of the r'' curve, size has <u>no</u> effect on performance, in other words size is no way a source of profitability.

The smallest firm ($i = n_m$) operating in the oligopolistic arena can be defined as <u>primus inter pares</u> and the largest firm ($i = 1$) may be defined as <u>ultimus inter pares</u>.

In fact :

(a) the increase in firms' absolute size, and therefore in oligopolistic concen-tration, tends, <u>ceteris paribus</u>, to change a decentralized economy into a centralized economy, reducing the extent of freedom and economic enterprise and therefore the intensity of competition. This increase in concentration can even damage the market mechanism, which is one of the main tools of econo-mic and productive efficiency ;

(b) this efficiency is also endangered in the long term, for increasing size and concentration lead to increased rigidity in supply and production capacity. Only if certain welfare losses are tolerated, notably in terms of employment, will it be possible in such a situation to strike a balance between over-rigid supply and erratic and declining demand ;

(c) in the light of all these negative aspects, and consider the general interest, there is a factor - only one, but a fundamental one - which militates in favour of concentration : its necessity. Increased size is the precondition for the existence, implementation and general dissemination of technological innovation ;

(d) since large size and concentration are linked to capital intensity, they must inevitably - through economies of scale - lead to a high level of performance (on sales and own capital) ;

(e) similarly, large size being the source of market dominance (and therefore of power over prices and the demand curve), the practical result must be an increase in the level of performance.

It is therefore natural, almost a <u>physical necessity</u>, for large firms to be more profitable than small firms.

If profitability is not higher, the following factors must be present :

- the greater capital intensity is not paying off ;

- the considerable accumulation of resources (to finance large-scale technical investment) is not paying off ;

- economies of scale are either not being made or are offset by "diseconomies of scale" (a polite way of saying that management cannot cope and that Parkinson's laws are applicable) ;

- extra profits are not being generated by the enhanced degree of market power and dominance conferred by the features, conduct and effects induced by size.

To conclude then, all this signifies that - in the hypothesis in question - the large firm is less efficient than the smaller firm, despite the "natural" advantages gained from its position and size.

This is clearly expressed in the hypothesis by the r" curve, where all the n^*_m firms in the oligopolistic arena have the same level of performance : the most efficient firm is the smallest (<u>primus inter pares</u>), the least efficient is the largest (<u>ultimus inter pares</u>).

39. <u>Concentration and proof of efficiency</u>

The conclusion is obvious : large size and industrial concentration must still establish their claim to legitimacy in the eyes of public opinion and the social system. This claim can only be advanced on the grounds that they are "<u>absolutely necessary</u>" from the technical and economic point of view and this must be manifest through greater performance. In the absence of such proof of "efficiency" and profitability, large size and concentration are harmful ; they cause waste, abuses and imbalance and are generally linked with all forms of dominance.

The alternative is clear :

- either the economies of scale really exist in a given instance, in which case they must then be expressed, if the unit is efficient, through performance ;

- or the economies of scale do not exist, in which the large firm, its size and concentration are not justified in the eyes of the general public.

Consequently, when the situation in an industry and an oligopolistic arena is similar the hypothesis and the r" curve (i.e. equality of performance), the structure and concentration process can be considered undesirable, particularly if major firms are involved (i.e. those which are not more efficient than the smaller firms).

Let us now assume that in a given industry, the top firm, i.e. the largest, is also the most efficient, i.e. the one with the highest level of performance as compared with all the other firms in the sample. Let us suppose that in this case the industry is tending towards the r' curve, i.e. that in general the performance ranking of all the firms in the distribution is linked to their ranking in terms of absolute values.

This is a natural hypothesis, inherent in the modern, progressive and technologically sophisticated oligopoly, where the greater profitability of the major firms in fact represents one of the main features and motive forces of the system of oligopoly and the concentration of capital, production facilites and markets.

The approach based on analysis of rankings - i.e. assembling and appraising them - starts by combining the performance and absolute size rankings, and then formulates the hypothesis and the r' curve (where performance is a function of absolute size).

This r' curve is the expression of a model reflecting the demands and implication of an oligopolistic, technological and modern industry.

For the purposes of operating a structural economic policy, working from this hypothesis under which the firm which ranks first in terms of size also ranks first on performance, the efforts of the smaller firms to increase their size must not be hindered. The tendency of smaller firms to grow larger - and thus to rise in the size ranking - expresses their attempt to raise their performance and thus to attain a higher position in the performance ranking (re_1 indexes). This tendency and effort contribute towards the process of competition and its dynamism ; it will be recalled that either the oligopoly is dynamic and hence competitive or else it tends to produce the effects of monopolistic rigidity.

40. Balance of forces and conduct

However, in practice, the following are fundamental in relation to the r' hypothesis:

- the position and strategy of the top firm ;

- the components and causes of its greater profitability.

As far as the position of the top firm (or top two) is concerned, the $L_{n^*h<}$ index - and, in addition, the L_s index - may be used, both shown in matrix No 1 (concerning the ranking of the variables).

In this respect, one of the basic concepts of oligopolistic competition must be stressed : the balance of forces between the various firms operating in the oligopolistic arena. If the $L_{n^*h<}$ index exceeds 1 for some significant variables (net profit, sales, own capital, etc.), the top firm's dominance may appear so great that the smaller firms simply cannot compete effectively. In other words, beyond a certain limit - registered by the value of the L index - competition and dominance become incompatible, for the latter prevents the former from developing and gaining ground.

The conduct of the top firm may be regarded as the product of at least two components, and a distinction can be made between :

(a) various forms of conduct <u>on the market</u>, i.e. on all the markets on which the firm operates ;

(b) conduct outside the market.

The strategy and "competitive armoury" of a large firm are expressed and operate both through the market and through the structures constituting the overall sur-rounding environment ("environnement globalisé"), and modify and influence both the market and the environment.

The "competitive armoury" chiefly consists of : prices, advertising, quality of products, sales organization (or "implantation commerciale"), production facilities, welfare and wages policies and, finally that residual area which is known as conduct "outside the market".

All these "competitive weapons" can act as <u>barriers to entry</u>, keeping other firms out of the industry and the market ; this, indeed, is precisely what the large firm aims at when it develops its dominance in the oligopolistic arena (1).

The degree and intensity of this dominance are manifested in practice by a <u>high proportion</u> either of the industry's <u>total sales</u> or of its <u>total profit</u>. Here, then, are the operational and practical factors which support the econometric analyses contained in the <u>three Linda matrices of "structural oligopolistic unevenness"</u>.

Though greater profitability logically seems to point to dominance by the top firm, we must develop still further the analysis of two crucial factors :

- the practical aspects of conduct ;

- the practical aspects of <u>"economies of scale"</u> and <u>"diseconomies of scale"</u>.

41. <u>Abuse of dominance</u>

In the first place, we must make sure that the top - i.e. the largest - firm in the oligopolistic arena does not use its dominance to break the "rules of the game" of competition.

It can do so in many different ways, as numerous and varied as technocrats' and businessmen's creative imagination. The following are but a few examples :

- the top firm may feel the need to force its own competitors to accept price-fixing agreements, agreements on trade practices or market-sharing agrements (possibly fixing quotas on the various national, regional or local markets) ;

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(1) See : R. LINDA, Concurrence oligopolistique ..., pages 352-369.

- the top firm may feel the need to impose on its own _purchasers, distributors and wholesalers_ oppressive conditions, resale prices and sales quotas on various markets (national, regional or local), export bans or other barriers and obstacles to the free movement of goods ;

- the top firm may even consider it should require its own _subcontractors and suppliers_ to accept restrictions on production and supplies to competitors, obligations, limits or exclusive rights connected with the granting of licences (patents, know-how) ;

- the top firm can use its own financial strength and its own industrial, commercial and technical structures :

  (1) to create surplus production capacity so as to saturate the market and drive its weaker competitors out ;

  (2) to operate intensive advertising campaigns coupled with predatory pricing ;

  (3) to act on public authorities, administrations, associations and political parties in order to obtain - through devious, illicit and fraudulent means - decisions on the award of public contracts which work to their own advantage and to the detriment of weaker competitors.

The foregoing brief examples alone provide good reasons for continuous, far-reaching investigation of all the various forms of conduct of a large firm which _dominates_ a given industry or a given market. The _conduct of this firm_ must be analysed, continually and without respite, by the public bodies and authorities responsible for economic policy in general and competition policy in particular.

This _analysis_ of conduct must be even deeper and even more detailed when the top firm is _the most profitable_ (on the basis of matrix No 2) or the most dynamic from the point of view of _growth rate_ (on the basis of matrix No 3, to be considered in the following pages).

42. Diseconomies of scale

However, the foregoing assumptions do not mean that an investigation of the _largest firm_ in the industry (or the firm dominating one or more markets) should be excluded when this firm is _less profitable_ (on the basis of matrix No 2).

For this firm may well have abused its dominant position but at the same time be burdened by "_diseconomies of scale_" and take advantage of accounting and administrative strategems to underestimate or transfer profits to its own executives or subsidiaries (however covertly).

According to this hypothesis - i.e. lower profitability of the largest firm - different aspects of its conduct must also be analysed, but not conduct alone : the structure of _this large firm_ must also be analysed.

More generally, the largest firm may therefore be :

- more profitable, because it is more efficient and/or because it abuses its own dominance ;

- less profitable, because it does not abuse its dominance or because it does abuse it but the firm is inefficient.

The problem is therefore obvious. The conclusive hypothesis will result from a combined analysis of :

- economies of scale ;

- diseconomies of scale.

In operative terms, what we must do is :

(a) draw up an inventory of the various indicia so as to indicate the separate and distinct existence not only of economies of scale but also of diseconomies of scale ;

(b) establish methods for collecting and analysing these indicia.

This analysis implies that the following must first be taken into consideration :

- the firm's own capital ;

- the total capital it actually uses, i.e., total capital employed ;

- external financing ;

- the comparative performance for each of those three factors (own capital, invested capital, external financing).

The analysis must then cover personnel expenditure, distinguishing executive and managerial salaries from wages and salaries proper (blue-collar wages and white-collar salaries).

Executive and managerial "inflation" may be an aspect of the diseconomies of scale connected, for reasons of political nepotism, with absenteeism and low worker pro-ductivity, since the latter is really an aspect of these diseconomies.

At any rate, it appears that the fraction of turnover or added value accounted for by remuneration of staff and executives may provide an indication which though complex and multiple, is not without its value.

The question becomes much more complex when we go on to actually use and relate these indicia for the purposes of reliable calculation and in order to track down and attack possible "white elephants" or "colossi with feet of clay".

43. <u>Method of comparison- selecting firms - corollaries of economic policy</u>

The comparative method is based on the logic of oligopolistic interdependence and therefore determines that of matrix No 2 (and of the other matrices). All the firms constituting a given "oligopolistic structure" must be analysed together in order to determine, through <u>objective and quantitative criteria and tools</u> :

- which are the most <u>profitable</u> firms ;

- which are the most efficient firms, i.e.,more <u>profitable</u> without actually being dominant.

Once matrix No 2 has been set up, I believe it is the <u>sine qua non</u> of any attempt at solving problems of efficiency and dominance. We must say yes to <u>efficiency</u>, and yes - but subject to reservations and to checks by public opinion and public authorities - to efficient dominance, but no, absolutely no to <u>inefficient dominance</u>.

The problems have perhaps been somewhat simplified for the sake of quantification, but the main thing is to make public opinion aware of the issues.

Through the approach based on the structural matrix, on comparative profitability and on the "anti-size arena", rankings can be analysed and discussed. This implies singling out <u>the units or firms</u> to be studied in the sample $n*$, which represents the starting point of the analysis

The method of comparison is based on <u>selecting the firms</u>, each being examined under the microscope of quantitative analysis, with its rankings and other features.

This is a fundamental step in economic and competition policy, highlighting the various aspects of the unevenness in a given oligopolistic structure, distinguishing the individual oligopolistic units meaning the firms which determine, represent and create this structure.

However, this argument may be developed at an operative and more general level, where public authorities have a twofold task before them :

(a) <u>formulating their own structural policy</u> on the basis of the quantitative data obtained by the methodology already described ;

(b) informing public opinion, the trade unions and consumers' associations on the <u>development of the various structures</u> studied and the large firms forming them, with reference particularly to :

(i) the level of inequality (or concentration) ;

(ii) conduct, i.e. economic and business strategies ;

(iii) comparative performance levels.

The information (b) is of course preparatory to and a functional requirement of the structural policy (a). Each oligopolistic unit of the sample n* for each industry (and country) has an objective position in matrix No 2.

The fact that each of these units is designated by a letter of the alphabet (A, B, C, etc., A', B', C', etc.) underlines the objectiveness of the approach and methodology and allows the confidential nature of certain date to be protected where necessary. The fact that individual units or firms are taken does not mean that they are being singled out for praise or for blame, but only that a basic functional requirement of the objective quantitative investigation is being met.

Matrix No 2 therefore provides precise quantitative information on individual firms (anonymous insofar as letters of the alphabet are used to denote the firms) as regards the two main points :

(1) the level of inequality (or concentration) ;

(2) comparative performance levels.

Matrix No 2 therefore requires that a link be established between (1) and (2) and this link is provided by the detailed study of conduct (point 2). This analysis of conduct must explain how and why a given firm in a given uneven industry obtains a given comparative performance level and a given performance ranking. The analysis of conduct covers many fields of investigation.

The choice of industries and above all of the markets - both product and geographic markets - in which a given firm operates is the primary aspect of economic rationality. This aspect is linked with economic and business strategy (in particular, policy on production capacities, product diversification and pricing which the firm intends to follow. The practical result of the choices will be a definite performance level and a definite performance ranking. In actual fact, the oligopolistic system simplifies and clarifies the role of public authorities. There are a few hundred oligopolistic units in each country and there is therefore no difficulty in placing each of them in a given industrial matrix No 2. At the same time, the public authorities have the duty and responsability of being aware of oligopolistic reality, logic and development in order to carry out their own political function consciously and objectively. If, for example, it becomes clear that a given firm is abusing its dominant position - i.e. breaking the "rules of the game", laid down by law or agreed on as a policy - public authorities must respond with suitable action.

The objective pursuit of economic policy, of which the matrix approach represents merely one aspect and tool, requires the existence of clear, unambiguous "rules of the game", well-defined objectives and efficient means of intervention.

Here, however, what we are tying to do is to emphasize that there is no contradiction between the objective pursuit of economic policy (structural and competition) and selecting the oligopolistic units or firms. Indeed, the latter is fundamental to attainment of the former.

44. Seeking-hypotheses to explain industry-to-industry differences in performance

Industry-to-industry and/or country-to-country differences in performance may be caused mainly by a number of differences in :

- technology, in the broadest sense ;

- legal forms, institutions and accounting and management standards ;

- the efficiency of management.

Identifying the relative importance of each of these factors is a difficult task involving detailed, far-reaching and accurate analysis.

Let us now consider a basic structural factor, namely technology, working from the difference in performance noted between different industries in one country on the basis of numerous empirical analyses.

Technology, in the broad sense of the term, covers all the economic and hence all the technical industrial and technical commercial aspects of a given industry.

We will distinguish three fundemental factors :

(a) capital intensity ;

(b) the extent of purchases from third parties ;

(c) the duration of the firm's (or its various divisions') economic and production cycle.

(a) Capital intensity

This is closely connected with :

- the degree of industrialization ;

- the degree of technical production and commercial diversification ;

- the degree of vertical integration.

Clearly, greater capital intensity will lead to higher performance.

Therefore, a key industry, highly capital-intensive and using sophisticated technology (office machines, pharmaceuticals), must, managerial efficiency being equal, be more profitable than other industries (such as the food industry).

Greater capital intensity and more sophisticated technology entail in practical terms, substantial intangible property, such as ownership of patents, know-how, etc.
- connected with extensive activity in the field of general and applied research - which in turn entails very high launching costs, which, under the rules in force in various European countries, cannot be recorded in the books as own capital and thus represent a reserve which is at the same time covert yet legitimate. Since these launching costs do not appear as such in the accounts, the own capital of the firms belonging to key, advanced technology industries is, in practice, undervalued in the balance-sheets.

64

Consequently, the fact that the $_2r$ ratios (performance based on own capital) are generally considerably higher for key industries (office machines and pharmaceuticals) than for the food industry does not in itself imply that the latter is less efficient than the former.

Substantial intangible property in a given industry inevitably raises a barrier to entry, which gives the firms in the relevant industry and market a certain degree of dominance over demand and prices which tends in its turn to produce higher prices and profits (and therefore higher earnings) than in industries where there is no such barrier.

The degree of industrialization varies not only from industry to industry but also from firm to firm and is connected with the degree of diversification and vertical integration. There is a fundamental difference between a pharmaceutical firm which develops and launches new products (whether they do more harm than good is another matter) and a firm which just fills and labels phials and bottles.

More generally, greater capital intensity affects the cash flow and added value variables, which also take provisions for depreciation into consideration, apart from the above reserves concerning intangible property.

(b) The extent of purchases from third parties

This mainly effects the $_1r$ ratio which, of course, will be much lower in a distribution firm, which simply sells a product which is already manufactured and packaged, than in a firm whose operations extend through all stages of processing a given product. The value added by the first firm will necessarily and invariably be lower than that added by the second one.

More generally, for example, a food industry which purchases agricultural, semi-agricultural or semi-processed raw materials, generally accounting for a large proportion of the final price of the processed product, tends to have a $_1r$ ratio (performance based on sales) lower than that of more integrated industries with greater added value, managerial efficiency being equal.

(c) The duration of the firm's (or its various divisions') economic and production cycle

The longer the duration of this cycle — the period during which the article remains in the firm, with consequent immobilization and utilization of production facilities — the greater the added value will inevitably be, other conditions being equal.

The **duration** of the production cycle for a chocolate or for a can of peeled tomatoes is much shorter than for a computer, whatever the components and parts needed in the latter's production process. A firm has the time to manufacture thirty or fifty or a hundred successive runs of chocolates or canned goods in the time needed to manufacture one single run of computers and, because of competitive pressures, this necessarily affects the selling price and ratio of net profit to sales.

All the foregoing considerations therefore aim to demonstrate that :

- comparisons based on different levels of performance are dangerous and misleading when made between industries, chiefly because of structural differences inherent in different technologies ;

- results based on a sample n* of firms may also be, at least in certain cases, relatively misleading, when there are important structural differences between the different technologies applied by firms in one single industry.

It follows that :

(1) comparisons based on the $_1r$ and $_2r$ ratios should be limited to the same industry, possibly considered at different times and in different countries ;

(2) comparisons should not be based on a sample of firms whose technological structure is often different, but on the matrix No 2 approach, which implies selecting the various firms in the sample and therefore the relevant aspects of inequality of performance and size ;

(3) quantitative points of reference should be examined, for they may provide a basis for a reliable and meaningful comparison between industries.

45. Differences in performance established in country-to-country comparisons

The considerations in the previous paragraph help to put into perspective the problem of the difference in performance of the same industry in different countries.

I believe that all three of the previously-mentioned factors (technology, legal forms and accounting standards, and managerial efficiency) have their role to play, though the importance attached to them varies in cases of country-to- country comparison.

As far as technology is concerned, the food industry, to take an obvious example, clearly has a different structure in Italy from that in the United Kingdom. Nevertheless, it cannot be denied that many (though not all) the firms in the sample manufacture a relatively comparable range of products. In other words, they are not completely different industries,from the technological point of view,as would be the case if I compared food processing firms with office machinery or pharmaceutical firms.

To take the same example, the same multinational groups operate – often on the same product markets – both in Italy and the United Kingdom and also in other countries of the European Community (such as, for example, Unilever, Union International Limited-Weddel, Cadbury-Schweppes, Brook Bond Liebig, J. Lyons, Nestlé, Kraftco, Swift, Campbell, Nabisco, etc.).[1]

All things considered, the technology factor does not seem to represent an insurmountable obstacle to drawing up and interpreting international comparisons of a specific industry, even if it is as complicated and diversified as our example of the food industry.

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(1) See : I processi di concentrazione industriale : Metodologia e applicazione all'industria alimentare, by SORIS and R. LINDA, published by Franco Angeli Editore, Milan, 1976.

The factors connected with the legal forms and institutions and accounting and management standards in different firms and different countries may, however, bear more weight. Analysis of these factors necessarily implies making a distinction between the various firms in order to understand the significance of performance levels ($_1r$ and $_2r$) or ($_3r$ and $_4r$).

From this point of view also, the effectiveness and in my view, the need for the matrix No 2 approach seem to be confirmed.

We must now say go on to the third source of differences in performance-management efficiency. This is a residual factor, in the sense that, after consideration and analysis of the first two factors (technology, and legal forms and accounting standards), the remaining difference between the various levels of performance in the industries under consideration can be due only to management efficiency. This seems fairly obvious, as does the need to base this type of analysis on the selection and description of the individual firms, their structure, power and conduct.

46. **An extension of matrix No 2**

The foregoing analysis has shown, amongst other things, ways and means of singling out and determining differences causes by technology and their consequent effect on firms' performance.

Three particularly interesting variables have not been included in the Commission's studies on concentration trends because of certain technical difficulties in some industries and countries. They are :

- added value ;

- capital employed ;

- net fixed assets.

Since value added tax has now been introduced in all the countries of the European Community, investigation of the first variable is considerably easier. For this case, a second matrix No 2 could be constructed, based, not on $_1r$ and $_2r$, but on two other ratios resulting from the net profit related to added value (instead of sales) and capital employed (instead of own capital).

The comparison between the two matrixes No 2 and the relative ranking of the firms could provide useful quantitative points of reference, particularly if the survey can be extended to a fair number of industries and years.

It will be recalled that the objective of studies being carried out for the Commission's Market Structure Division is to determine each of the four ratios mentioned at 32 for the major firms in a number of industries :

1^r = net profit over sales, i.e. $\dfrac{04}{01}$

2^r = net profit over own capital, i.e. $\dfrac{04}{07}$

3^r = cash flow over sales, i.e. $\dfrac{05}{01}$

4^r = cash flow over own capital, i.e. $\dfrac{05}{07}$

VI. MATRIX No 3 CONCERNING LARGE FIRMS' COMPARATIVE RATES OF GROWTH

47. Matrix No 3

Like the two previous ones, matrix No 3 is based on the principle of oligopolistic interdependence and, like matrix No 2, is intended to provide a ranking of firms. The ranking of each of these firms is a function of the ranking of all the other firms in the sample.

The main differences between matrices No 3 and No 2 are the following :

(a) the starting point for constructing the matrix is not firms' performance but :

- the fraction (in % terms) of the <u>sales</u> of each firm in relation to the aggregate sales of the sample of n* firms ;

- the fraction (in % terms) of the net <u>profit</u> of each firm in relation to the total net profit obtained by the sample ;

(b) then, the variations of these percentages from one year (t) to the next (t + 1) are calculated and the <u>individual firms are placed in order</u> of the degree of variation :

- in the percentage of the aggregate sales of the sample n*, across the matrix ;

- in the percentage of the aggregate profit of the sample n*, down the matrix.

The resulting ranking of firms may be defined as a ranking based on the "rate of growth".

Since the percentage share of an individual firm i (i.e. A, B, C, etc.) in a given variable in a given year is expressed by $t_{a}*_{i,t}$, the variation relating to this firm with regard to the variable in question will be provided by the following formula :

$$c_i = {}^{t+1}c_{i,t} = {}^{t+1}a*_{i,t} - {}^{t}a*_{i,t}$$

Therefore, <u>c</u> (i.e. rate of growth) is used to denote the difference between one year and another in the percentage of a given variable accounted for by a given firm.

The advantage of the matrix approach is that it permits measurement of the rate of growth on <u>two variables</u> (and not just one).

Of course the variables have to be distinguished and chosen. My view is that all the variables – apart from gross investments, because of their generally cyclical nature – are suitable for representing the rate of growth.

Here, $_1c$ (sales) and $_4c$ (net profits) have been chosen and used as a basis for constructing matrix No 3. (1)

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(1) It must be pointed out that the figures relating to the measures <u>c</u> coincide with the figures assigned to the same variables in the computer programme used in the industry studies on concentration. The following code was used for these last-mentioned figures : 01 : sales ; 02 : employment ; 03 : wages and salaries ; 04 : net profit ; 05 : cash flow ; 06 : gross investments ; 07 : own capital.

48. The ranking of firms based on rate of growth

The sample of n* firms considered for matrix No 3 is the same as that used for matrices No 1 and No 2. However, in this case it is not the series of size or power relationships between the various firms in a given year which is shown, but the series of differences or variations appearing in the structure, by definition oligopolistic, which they form.

These differences or variations may be positive (when a firm increases its percentage share of the variable considered) or negative (when the opposite is the case).

When constructing matrix No 3 and the subsequent ranking, one of two criteria may be selected :

(a) either all the firms in the sample n* producing sales and a profit in the two years t and $t + 1$ are considered, whichever way they vary from one year to the next (increase or decrease of a^*_i) ;

(b) or only those firms in the sample n* are considered which register either a positive or no variation (not negative) in their share (a^*_i) in the case of both the variables considered (sales and net profit) between the year t and the year $t + 1$.

Both criteria are sound, but the former can provide a more complete and more extensive ranking of firms based on rates of growth, even though it will not necessarily differ from the ranking of firms when the second criterion is used.

However, for practical reasons (and for the printer's convenience, the aim being to keep the matrices within manageable proportions)and etymological reasons, for we are concerned with the rate of "growth" (and not the rate of " decline "), it is possible to choose the second criterion and therefore to disregard firms that register a negative difference or variation between year t and year $t + 1$, even for one variable only (either sales or net profit).

What is the significance and practical purpose of the ranking of firms based on rate of growth ?

In the first place, the firms registering the highest rate of growth may be determined.

In the second place, two sets of meaningful comparisons may be established by taking :

- the firms with the highest performance, resulting from the ranking produced by matrix No 2.

- the firms with the greatest absolute size, measured by sales and/or own capital.

Since a certain letter of the alphabet always denotes the same firm whatever the matrix and approach (No 2 or No 3) and whatever the time (t, t + 1, t + 2, etc.), this type of comparison can lead to conclusions and deductions of considerable interest.

49. Lack of synchronization in growth rates

Let us now imagine a practical example in which the rate of growth will be measured by the sales and net profit variables.

We must therefore proceed as follows :

The sales variable will be considered from various aspects :

- an increase of the share in the variable held by a given firm $(_1c_i)$, the measure of which determines the ranking of the firms based on the rate of growth in sales (in national currency) ;

- absolute size of each given firm in the reference year, expressed in terms of sales ;

- finally, ranking of each individual firm in terms of absolute values of sales.

The same elements are considered down the matrix, but refer to the net profit variable, the absolute values being expressed in national currency.

Various practical applications of matrix No 3 allow us to arrive at two immediate conclusions.

The first is that the rates of growth of the individual firms are not synchronous in the sense that there is no quantitative correspondence between the variations (or differences) in the two variables considered : sales and net profits.

In fact, if the rates of growth were synchronous, the rankings of all the n* firms in the sample would all be exactly situated across the diagonal of matrix No 3, for the firm ranking first in rate of growth of sales should also rank first in respect of net profits, the second would always rank second with respect to rate of growth of both sales and profits, and so on.

However, in reality, each firm grows and/or declines in a different manner with respect to each variable, thus modifying its structure and ranking in relation to the other firms in the sample n*. Indeed, a firm may have a positive rate of growth $_1c_i$ (for sales) and in contrast, a negative one $_4c_i$ (for net profit), or vice-versa.

Empirical investigations have shown that this divergent development in rates of growth between the two variables is a relatively frequent occurrence and that two explanations are possible :

(a) When a firm increases its share of sales but declines in terms of net profits (or increases them much less we cannot exclude the possibility of a cumulative effect linked with a growth or sales maximization strategy, as where, during the period studied (for example 1970 to 1971), this firm preferred to lose on prices and profits in order to increase its sales.

This increase in sales may be accompanied by massive and costly advertising campaigns. There is also the possibility that, when a firm is considerably increasing its sales, the reaction of the trade unions (and consequent wage rises) may push net profits down somewhat. Again, firms considerably increasing their sales tend to understate their profit to the extent that the law and practical considerations allow.

(b) In contrast, where the share of sales decreases and the share of profit in-
creases, it may be that the firm is pricing for higher profits and better returns,
even at the cost of losing some of its customers. Such contraction of sales may
follow a phase of vast expansion, for once a certain market has been won and
the price paid (in terms of advertising, special launching prices, etc.) greater
attention may be given to the profit margin and less attention to the actual
quantities sold.

At any rate, only a detailed analysis of the structure and competitive strategies
of the main firms in the sample n* will provide the answers to the various ques-
tions arising from the lack of synchronization in growth rates.

Hence, for purposes of methodology, it can be particularly interesting to consi-
der the c_i values (expressing the rates of growth of each firm) for the greatest
possible number of variables and not just sales and net profit.

The second conclusion ensuing from the examination of many matrices No 3 (and their
rankings of firms) is that the variations (or differences) are much wider for the
net profit variable than for the sales variable.

This is a distinguishing feature of different industries studied in various countries
and is demonstrated in particular by Italian manufacturing industry. The net profit
variable tends to be a dynamic variable, while the sales variable tends to remain
static.

50. In search of an index of competition

The range of matrix No 3 may be extended in order to obtain an index of competition,
so that explanations are required on :

(a) the alterations to be made to matrix No 3 ;

(b) the meaning of an index of competition.

In the extended matrix No 3 account is taken of all the n* firms in the sample, even
though some of them register a negative share (a^*_i) in respect of the total of the
variable, and not just a negative difference or variation (c_i). Of course this can-
not be done for the sales variable (for there are no firms with negative sales),
but it can be done in the case of the net profit variable (there are always firms
returning losses and not profits).

How are we to calculate the difference c when a firm records a loss instead of a
profit in one of the two years (t and t + 1) considered ?

Let us now suppose that, in a given sample n* of large firms, firm A has recorded
a net profit equal to 13 % of the total profits obtained by the sample of n*
firms in 1970. Let us now suppose that in 1971 firm A records considerable losses,
amounting to about 7 % of the total net profit obtained in 1971 by all the other
firms in the sample.

In this case the difference c_i, relating to firm A, will be - 13 %, between the
years 1970 and 1971 (and not - 20 % = 13 % + 7 %). In other words, the negative
values are made equal to nil, in order to quantify the "dynamism" of the structure
considered.

This procedure is in line with the basic principles of the econometric and computer systems used, for it takes into account - even for calculating the system of indices (as in matrix No 1) - only the positive net profit variable (and not the financial year's losses), thus disregarding negative figures.

As far as (b) is concerned, it is demonstrated that the index d or D (index of dynamism) is obtained by adding the <u>absolute values</u> of the differences (positive and negative) between year t and year t + 1, for each of the n* firms in the sample and then dividing the sum by 2.

The formula will therefore be :

$$d = \frac{\sum_{i = 1}^{n*} \left| c_i \right|}{2}$$

If we use the algebraic sum of the differences c_i, since the total of the sample n* to which the percentages refer is by definition equal to 100 %, the result would necessarily be nil, for the negative differences would be offset by the positive ones.

Since however, the index $\underline{d}$ is derived from the sum of the absolute values, the upper limit of the index will be equal to 200 % divided by 2, i.e. 1, while the lower limit will be 0. If $\underline{d}$ is multiplied by n* the index F will be obtained (1),but this is not examined in this paper.

51. Competition as dynamism and variations of market shares

We still have to define the relationship between the development of a given structure and an index $\underline{d}$ which is supposed to express this structure's degree of dynamism or even represent an index of competition.

Let us therefore suppose that we are calculating $\underline{d}$ on the sales variable which - assuming the effect of imports and exports to be nil or negligible - generally reflects the structure and development of the market.

Let us suppose that this market is made up of $\underline{n*}$ firms and may be defined as either (a) static, or (b) dynamic or competitive.

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(1) See previously-mentioned work by R. LINDA, <u>Concurrence oligopolistique et plani-</u><u>fication concurrentielle internationale</u> in"Economie Appliquée", 1972, pages 388 et seq. The applications of the "indices of dynamism" are to be found in the following reports published by the Commission of the European Communities : (I) <u>L'évolution de la concentration dans l'industrie de la brasserie en France</u>, Chapter V, (Cat. No 8705, IAM and INRA research team, Montpellier, by D. Boulet and J.P. La Porte, under the responsibility of J.L. Rastoin), Brussels - Luxembourg, October 1975 ; (II) <u>Etude sur l'évolution de la concentration dans</u> <u>l'industrie des spiritueux en France, Second Part and Annex 3</u> (by the above research team) Brussels-Luxembourg, 1976.

(a) <u>Static market</u>

This is a market in which all firms keep the same share $(a*_i)$ against the others from one year (t) to the next (t + 1).

There is no competition in this market, for even if there were competition, it would be ineffective, in that it would produce no change in the market shares $(a*_i)$ of the individual firms. In this case the index <u>d</u> is nil.

(b) <u>Dynamic or competitive market</u>

This is a market in which the shares $(a*_i)$ of the individual firms vary considerably from one year (t) to the next $(t^1 + 1)$. Consequently, some firms record an increase and others a decline in their shares, presumably as a result of the pressure exerted by competition.

Maximum competitive dynamism will give <u>d</u> = 100 % = 1.

The above classification and quantitative definitions are inherent in the present-day concept of competition.

It must be emphasized that :

(1) "The necessary condition for modern competition is the existence of an unequal and flexible power ... giving rise to numerous changes ... while the <u>process of competition puts the changes into effect</u>".

(2) The natural setting of modern competition is the <u>oligopoly</u>, represented – in the various structures – by the sample of n* firms.

(3) When an oligopoly is in motion (or dynamic) it thereby becomes a <u>competitive structure</u>, whereas, in contrast, an oligopoly becomes a <u>monopolistic structure</u> (as regards its practical effects and results) if it stagnates, static and immutable for all time. In this respect, there is no better index of monopolistic rigidigy – whatever the number of units present with legal personality on the given market – than the <u>immutability of market schares</u>.

52. <u>Results of an empirical survey on dynamism</u>

The index <u>d</u> may be considered a general index of dynamism "capable of interpreting the many aspects of this dynamism". It may therefore be useful to apply this index to <u>all</u> the variables studied, for the comparative deductions should prove very interesting. Moreover, this aspect of the research has not yet been fully investigated and we may therefore mention here an empirical survey which has been carried out, where the index <u>d</u> was applied only to sales and net profit.

The starting point was provided by the same sample of the Italian manufacturing industry mentioned at 30, but reduced for technical and practical reasons to only eight industries instead of the original twelve.

DYNAMIC OF PROFITS AND SALES (index d) (in %)

INDUSTRY	1968/1967		1969/1968	
	Profit	Turnover	Profit	Turnover
PHARMACEUTICALS	9.9	2.9	13.4	2.6
COTTON	12.8	6.1	8.7	6.6
PAPER	38.8	3.5	41.3	7.9
CYCLES AND MOTOR CYCLES	20.9	5.0	–	–
ELECTRICAL ENGINEERING	11.6	7.6	36.2	3.0
OFFICE MACHINERY	1.6	0.8	56.7	3.8
TEXTILE MACHINERY	34.5	6.2	31.0	11.1
LIFTS	34.3	1.3	17.9	6.3

The following indications are suggested for interpretation of the table :

- hyperridigidy   : $d \leqslant 2\%$

- rigidity   : $2\% < d \leqslant 3\%$

- qualified rigidity : $3\% < d \leqslant 5\%$

- qualified dynamism : $5\% < d \leqslant 10\%$

- high dynamism   : $10\% < d \leqslant 20\%$

- very high dynamism : $20\% \leqslant d \leqslant 50\%$

- hyperdynamism   : $d > 50\%$

A number of comments may be made on this table :

(1) The dynamism of profits is constantly much higher than that of sales ;

(2) The net profit variable is therefore a dynamic variable, while the sales variable
    is static.

With regard to the rigidity of sales, it must be emphasized that it tends to express
the "rigidity of market shares", for the total value of a firm's sales is derived
from the aggregate of its sales on the various product markets on which the firm
operates.

We may therefore suppose that the "rigidity of market shares" represents one aspect
of that rigidity which is a general feature of oligopolistic structures, for it is
connected with :

(a) the possible existence of dominant positions in certain product markets ;

(b) the practice of administered prices which, at least in non-inflationary times,
    tend to maintain a certain degree of price rigidity.

Rigid or administered prices express oligopolists' tendencies to avoid price compe-
tition ; they make changes in market shares difficult or even impossible over periods
of time, on markets where there are dominant positions or barriers to entry. We
obviously do not wish to say that certain forms and strategies of competition cannot
operate in static markets. But the fact remains that this rigidity always gives
cause for concern.

53. The dynamism of net profits in oligopolistic structures

With regard to the dynamism of net profit, the explanation is complicated. This is
a highly anomalous occurrence whose roots are the be found in the abnormal development
of certain Italian manufacturing industries, from 1967 to 1969, the most obvious
demonstration being the profit squeeze (1).

However, the greater dynamism of profit than of sales seems to be a normal occurrence
in oligopolistic structures (even though it very rarely reaches the very high values
we have already seen in the case of certain Italian industries).

In a certain sense, the rigidity of the oligopolistic market tends to cause greater
dynamism in firms' internal structures – affecting the profit variables (chiefly
net profit) – since the reaction of prices and quantities produced (and supplied) –
and above all production capacities – to variations and trends in demand, is not
automatic and does not re-establish balance. These variations in quantities deman-
ded therefore directly affect firms' profitability, but have virtually no effect on
either market shares or price levels, which remain unscathed by the complex rebalan-
cing process (continuous and unstable) to which all markets are subject, as a result
of the cyclical and structural fluctuations induced by demand situations and
variations.

We could carry on much further with this argument. Suffice it here to say that the
principles and analysis of structures can be verified by means of objective econome-
tric tools, linked with the general index of dynamism (or index d).

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(1) For further developments see : R. LINDA, Static and Dynamic Methods for
    Analyzing Industrial Concentration : The Italian Case in "Markets, Corporate
    Behaviour and the State "by A.P. Jacquemin and H.W. de Jong, Leiden,
    Netherlands, 1976, pages 156 et seq.

VII. CONCENTRATION ON PRODUCT MARKETS AND DISTRIBUTION

54. Industry approach and product market analysis

All concentration research is faced in practice with the dichotomy between the industry approach and the product market approach. Since modern firms are more and more tending to produce several different products for sale on different product markets (multi-product firms), the study of concentration and competition is obliged to take account of this reality by beginning with the industry approach. As was recently stated, "the structure of an industry is defined by reference to the number of units or firms manufacturing certain products, the industry link being established either on technological lines (production aspect) or on commercial lines (market aspect). Analysis of an industry inevitably leads to analysis of the main product markets and firms doing business on them " (1).

Thanks to the industry approach, based chiefly on comparative analysis of the structure and performance of a sample of n* large firms in business in the relevant industry, it is possible to highlight not only the most significant products into which the industry can be broken down, but also :

(a) what firms should be selected ;

(b) what interlocking shareholdings and directorates exist between them ;

(c) what effect, if any, is exerted by international competition, substitute competition and endogenous competition(2).

(d) what flexibility there is in production facilities (meaning their ability either to produce different products at the same time or to change over from one type to another without difficulty) ;

(e) what forms of cooperation exist between firms in the sample and other firms, through joint ventures, subcontracting, or whatever ;

(f) what marketing methods and strategies are applied and what concrete form distribution takes.

Awareness of all these factors is the sine qua non for defining inter-market relations and hence for defining, delineating and selecting the most significant product markets for concentration and competition study.

55. Characteristics of product markets

For the analysis of product markets the Commission has developed its own methodology which falls in line with that described above (3).

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(1) Commission of the European Communities, Fifth Report on Competition Policy, Brussels - Luxembourg, April 1976, point 180.

(2) See under heading 58.

(3) The practical application of this methodology can also be seen from Appendix 1, which considers a number of subindustries and product markets : "Concentration on certain markets in certain Community countries : 1973/74"

The methodology derives from six conclusions of fact :

(i) since most of the firms are multi-product firms it is impossible to establish
     the financial or social variables for each product market, so that the metho-
     dology can consider no more than the domestic sales variable ;

(ii) in general, there are very few firms in business on each product market ; there
     is usually a very dense or very narrow oligopoly ;

(iii) it is frequently difficult to establish the individual share of each of the
     oligopoly - or even dominant - firms, and this entails using brackets, with
     the market share lying between the two limits ;

(iv) most firms do not wish their individual market shares or the way they are deve-
     loping to be made public ;

(v) frequently financial links are found to exist between the companies concerned,
     while it is also found that firms operating on a given product market are
     subsidiaries or parent companies of other firms, operating on the same or on
     other product markets ;

(vi) it is also fairly frequent for a major share of a given product market to be
     taken by a foreign exporting firm or, though this means much the same thing,
     by local subsidiaires acting primarily as distributors and importers.

56. The methodology of product market analysis

It follows almost automatically from the foregoing that the methodology has to be
worked out along the following lines :

 I) All that can be analysed is the share of the domestic product market, expressed
    in terms of sales, held by both domestic producers and importers.

II) The degree of concentration is measured by a pair of linked indices (no others
    are likely to meet our very strict requirements) :

    - the concentration ratio (C_4), representing the aggregate percentage share of
      the relevant product market accounted for by the four largest firms (or impor-
      ters);

    - the coefficient of disparity $(4L$ or $4L_4)$, which is no more than the Linda index
      calculated on the first four firms $_4$ $(n* = 4)$ and multiplied uniformly by 4.

    The lowest possible value of 4L will consequently be 1, or 100 %, since, assuming
    absolute equality of size (and working on four firms), $L_4 = 0.250$ and it is fairly
    evident that $0.250 \times 4 = 100$ %. In other words, 4L expresses the relationship
    between the L index calculated in a specific case and the L index or CM correspon-
    ding to the hypothesis of absolute equality : i.e. $CM = \dfrac{1}{n*} = \dfrac{1}{4} = 0.250$ (1).

    Consequently, it is evident that where $L_4 = 0.250$, $\dfrac{0.250}{0.250} = 1 = 100$ %.

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(1) See Y. MORVAN, La Concentration de l'industrie en France, Collection U, Libr.
    A. Colin, Paris 1972, page 190.

The <u>lower limit of the coefficient of disparity</u> (or 4L index) thus corresponds exactly to the <u>upper limit of the concentration ratio</u> (C_4). This occurs when the four firms control 100 % of the market. If these four firms are also of the same size, we have the extreme hypothesis that $C_4 = 4L = 100$ %. Presentation in these terms, already followed by the Fifth Report [4] on Competition Policy (1), makes it possible to give the main quantitative data on the structure of the relevant product market <u>without divulging specific market data</u> for the four largest firms.

57. <u>The firms in business on the product markets</u>

Side by side with the C_4 and 4L indices the same table will give the names of the firms (in some cases designated by a letter of the alphabet) and their respective rankings. The effect of this will be twofold :

- one and the same table will highlight those firms which occupy strong positions on the various product markets analysed ;

- the bottom of the same table will also indicate the interlocking shareholdings and directorates between these firms, whether or not they do business on the same pro- duct market (2).

In my view, adequate attention will never be given to the operational and strategic importance of the methodological innovation consisting of the <u>individual</u> analysis, explicit designation and comparative study of the individual firms in the sample - referred to by a code letter - which is what both the second and the third matrices of oligopolistic interdependence and the table on product market concentration do.

58. <u>Endogenous competition and company-to-company links</u>

It is clear from the foregoing that, if a concentration table covering different product markets is to be worked out, prior consideration must be given, not only to <u>international</u> and <u>substitute competition</u> (for the sake of a clear definition of the product market to be selected), but also to <u>endogenous competition</u> which may exist between firms belonging to the same group (especially if the group is a multinational conglomerate) (3).

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(1) See Tables 8 - 15 in points 183 - 194 of the Fifth Report on Competition Policy, April 1976. See also Appendix 1 to this methodology : "Concentration on product markets in some Community countries".

(2) An interesting example is given by Table 9, at points 183 and 184 of the Fifth Report on Competition Policy, referring to concentration on the markets for textile products in the United Kingdom. It will be seen that on certain of these markets strong positions are held by Courtaulds, Tootal and Carrington-Viyella. But the footnote to Table 9 records that Tootal is linked financially both to Courtaulds and to ICI and that ICI controls the Carrington-Viyella Group.

(3) See : R. LINDA, <u>L'evoluzione della società industriale e la concorrenza endogenà</u>, in"Il Politico", Ed. Giuffré, Milan 1965, pp. 218 - 239.

If there is qualitative information to suggest that there is such competition, then consideration will be given to those of the group's individual subsidiaries which are in business on the relevant markets, though a footnote will specify the parent group. Otherwise, the group will be taken as a whole.

59. Duopoly and triopoly - criteria for analysis

In the specific case of a highly concentrated product market, consideration will be given not to the first four firms but only to the first two or three, giving concentration ratios C_2 or C_3, whereas the L_2 and L_3 indices will still be multiplied by 4.

The following is an objective point of reference of general validity for all such cases :

- In general terms, the market share of the first four firms will be studied (giving a C_4 ratio), provided that the smallest firm considered must have a market share of at least one tenth of that held by the largest firm. If, exceptionally, the second firm has a market share of less than one-tenth of that of the first firm, the C_2 ratio will also be calculated (together with the $4L_2$ index).

  In any case, if the product market concentration table is based on C_2 and C_3 rather than C_4 hypotheses, we may treat this very fact as a warning signal (for there is probably serious danger to effective competition).

60. Ranking of product markets by degree of concentration

The foregoing considerations raise the question whether it is possible to set up concentration tables in which product markets are ranked by degree of concentration.

Two solutions are possible :

First solution

Markets are ranked in decreasing order of the C_4 ratio and again by the L_4 coefficient. Then, by the same procedure as was applied to the three matrices of the oligopolistic interdependence, we calculate the score for each market and determine the ranking of each of these markets in relation to the aggregate of the markets studied.

It is a simple, almost mechanical operation to work out rankings on the 4L coefficient. Problems may, however, arise in the use of the C_4 ratio, since in some cases there will be no C_4 but only a C_3 or C_2 . Hence the need for recourse to a "convention", enabling concentration ratios worked out on different bases to be used for the purposes of the same ranking.

- Where a C_2 ratio is concerned, half its value will be added (so that, if C_2 = 100 %, we write $*C_4$ = 150 % to make that C_2 ratio comparable with the C_4 ratios);

- Where a C_3 is concerned, one third of its value will be added (so that if C_3 = 100 %, we write $*C_4$ = 133.33 %).

The convention is thus based on the assumption that the missing firm or two firms would have had exactly the same size as the average of the three firms (C_3) or the two firms (C_2) for which aggregate data are available.

Hence product markets can be ranked on the combined basis of the C_4 (or $*C_4$) and 4L indices.

Second solution

This solution consists of working out an index combining the C_4 concentration ratio and the 4L coefficient and then ranking the individual product markets in decreasing order of value of this combined index. But this raises serious methodological difficulties, which cannot be analysed in this paper.

61. Dynamism of product markets

As a source of deep and detailed knowledge of the evolution of market shares taken by a given product over a sufficiently long period - at least eight or ten years - an index of dynamism "d" could be calcultated for each reference year. Comparisons could then be made between different industries and markets in different Community countries.

The calculation and analysis of indices of dynamism could provide information of considerable interest to the analyst of competition.

62. Competition and prices

This brings us straight to the very complicated problem of the role and working of modern competition. While it is unfortunately only too true that simple statements in this field tend (generally) to be (relatively) false, it is not true to say that whatever is complex is by definition useless. So we shall now go on to attempt to sketch out a series of methodological criteria with the aim of showing that the empirical, practical study of competition in different industries and markets is not only possible but also highly fruitful.

It goes without saying that analysis of the degree of competition on different product markets would have virtually no practical value if it were not accompanied by analysis of competition. A number of factors influence competition, its imperfections and any restrictions on it, and the degree of concentration - and the related market power - is but one of these factors.

The organizations studying the evolution of concentration for the Commission are constantly endeavouring to gather and analyse all information and all factors (even what are called "qualitative" factors) so that they can establish and assess actual situations of fact in terms of structures, evolution and trends.

In brief, there are at least two fundamental aspects of each product market which must be analysed :

- concentration ;
- prices.

This paper has already said virtually all there is to be said on how to approach, describe and highlight the major phenomenon of concentration. A brief idea of the degree of concentration on a number of selected product markets can also be found in Appendix 1.

On prices, however, a good deal of work remains to be done - both in working out a methodology and in the field of direct empirical research (1).

63. Price galaxies

Incontestably, the periodic and systematic survey and analysis of prices enables significant pointers to the existence and operation of competition on different markets to emerge. In general terms, subject to a number of highly specific exceptions, a finding that prices tend to be static may seem to go hand in hand with a finding that market shares for the same products also tend to be static. The combined existence of static market shares and static prices would suggest that the existence of competition on the relevant product markets is open to considerable doubt, and what competition there is is likely to be highly imperfect and substantially restricted.

But two points have to be made here :

- Firstly, we are not living in times and in a system of price stability but in an inflationary situation so that, even if prices change, and change frequently, they cannot be assumed to do so under the pressure of competition and market forces ;

- Secondly, in our economic system based on price freedom (with the obvious exception of certain specific areas where prices are regulated) and on product differentiation, there exist veritable price galaxies - millions and millions of prices - which it would be physically very difficult and in any case exceedingly expensive to survey.

For the fact is there are as many prices as there are products and markets :

(a) firstly - and obviously - there is a price for each product ;

(b) prices vary according to the moment in time (t) ;

(c) prices vary with the level of distribution ;

(d) finally, and this more particularly concerns consumer prices, prices vary with the form and type of business and with the location of sales point.

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(1) For a general review of the problems arising from the study of prices, see :
  -R. LINDA, Méthodologie de la recherche sur la concentration appliquée au domaine de la distribution de produits alimentaires, in Options Méditerranéennes, No 34, pp. 28 et seq., Centre International des Hautes Etudes agronomiques méditerranéennes, 11 rue Newton, 75116 Paris.
  -Appendix 2 to this methodology : Survey of retail prices and mark-ups: provisional outline methodology.

64. The breakdown of product markets and the sample method

Each industry taken as a whole consists of a set of subindustries, each covering a
number of products which, in their turn, can frequently be broken down into diffe-
rent qualities, packings, volumes, and even brands.

To take one example, the food industry covers a large number of subindustries, the
technological and commercial links between them being frequently extremely tenuous :
examples are preserved foods, milk and derived products, cereal products, animal
feed, baby foods, sugar and the like, oils and fats, chocolates and confectionery,
frozen foods, condiments and spices and broths and soups.

A subindustry can then be broken down into, for instance, preserved meat products,
preserved vegetables and preserved fish. Preserved fish can then be broken down
into sardines, anchovies, tuna, salmon, mackerel, prawns and shrimps, crabs, fish-
paste and, thereafter, for all the individual brands of each of these sub-divisions
The price of each product under each brand then varies according to the packing
and the size. Small packs usually tend to cost more per unit than large packs.

Moving on to brands, it will be clear that, in the food industry alone, there are
thousands and thousands of different products under different brands, each having
its own price.

Ultimately, then, any analysis of prices will have to be centred on consideration
of the brand of any given product, together with each types and sizes of packaging
from which the consumer may choose.

Bearing in mind, however, the need for at least some figures on the structure and
evolution of retail prices in certain manufacturing subindustries, and more par-
ticularly in food subindustries, the Commission has been obliged to use the sample
method, already applied to research on concentration in manufacturing industries.
A number (y*) of products and brands were selected so as to constitute a product
sample for the food industry, having certain specific features (industrial products
manufactured by multinational firms with well-defined comparable brands distributed
widely in several Community countries and in several sales points). The price of
the sample products were surveyed at the same time at the different sales points
covered by the survey.

Research is currently going on in France, Germany, Italy, the United Kingdom and
Denmark and an extension to other Community countries is planned.

The list of the products constituting the sample varies slightly from country to
country in view of specific situations which on occasion make it necessary to
consider different brands. Basically, however, the following products are covered :

    preserved meat ;

    preserved fish (salmon, tuna, sardines) ;

    preserved vegetables (peas, beans, etc.) ;

    baby foods (Heinz, Gerber, etc.) ;

    prepared soups (Heinz, Kubor, etc.) ;

margarine, butter, different types of branded oils ;

instant coffee, tea, cocoa ;

a few brands of mineral water ;

fruit juices ;

Coca-Cola, Fanta, Schweppes, Tonic, various quality beers ;

tomato ketchup ;

certain brands of chocolate ;

certain frozen foods (Iglo, Findus, Birds Eye, etc.) ;

various types and brands of jams and marmalades ;

powdered milk, evaporated milk, (Carnation), condensed milk (Gloria, Nestlé) milk creams ;

various types and brands of cheese (Camembert, Boursin, etc.) ;

sugar ;

rice and pasta (Buitoni, Panzani, etc.) ;

biscuits, crackers and the like (l'Alsacienne, Ritz, Lu, McVities, Bahlsen, de Beukelaar, etc.) ;

prepared potato purée (Pfanni, Maggi, Mousseline).

As in the past, the Commission will be publishing reports on the distribution and prices of food products in the individual countries.

This research will be pursued since its interest lies not so much in the survey of prices at a given moment in time as in analysis of the comparative evolution of prices for the different products at different sales points in different Community countries (1).

In general, prices are to be surveyed either quarterly or six-monthly.

65. The sample of sales points : the analysis of distribution circuits

The price of each product varies not only with brand and packing but also with the time and with the location of sales points (1). Clearly, it is impossible to visit every sales point, so that here, too, the sample method has been found necessary.

For each Community country, therefore, we have taken :

(a) only one area or city (Montpellier for France, Munich for Germany, Turin for Italy, Greater London for the United Kingdom and the Aarhus/Odensee area for Denmark) ;

(b) in the sample area or city, a sample of roughly 30 or 40 sales points representing different types of business, account also being taken of their location.

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(1) See Appendix 2.

The sample of different groups and types of business for instance, included :

A : hypermarket - out of town ;

B : hypermarket - suburban ;

C : supermarket - out of town ;

D : small independent self-service store - out of town ;

E : small independent self-service store - suburban ;

F : small self-service stores - town centre ;

and so on.

Initial results of these surveys showed not only that the prices for several pro-
ducts varied sharply from one sales point to another, depending on the location
and/or type of shop, but also that prices developed in very different ways, again
depending on the sales point.

Let us give a few typical examples :

- at Montpellier, on 16/17 April 1976 :

(a) L'Alsacienne biscuits cost FF 1.07 in one shop and FF 2.50 in another shop in
    the same town ;

(b) Amora mustard cost FF. 1.15 in one shop and FF 2.20 in another ;

(c) Buitoni pasta cost FF 3.65 in one shop and FF 6.85 in another.

- in London, in January 1976, chocolate homewheat were selling for 11 pence in one
  shop and 20 pence in another, while Marie Elisabeth canned sardines sold for
  15 pence in one shop and 24 $\frac{1}{2}$ pence in another.

- in Turin, in January 1976, one kilogram of Barilla branded flour cost Lit. 390 in
  one shop and Lit. 210 in another in the same town ; the same brand and quantity
  of butter (Optimus, made by Polenghi-Lombardo) cost Lit. 800 in one shop and
  Lit. 550 in another ; Certosino cheese (made by Galbani) cost Lit. 2700 per
  kilogram in one shop and Lit. 1800 in another ; the same bottle of Schweppes
  Tonic (Acqua Tonica) cost Lit. 200 in one shop but half that in another.

These are just a few examples.

As regards price changes, surveys carried out by the Institut IFO in Germany, cove-
ring the city of Munich, revealed major differences in changes in prices from
15 January to 15 April 1976. For example, Nescafé Gold (instant coffee, 200 gram
jar) went up by 10.3 % to DM 13.97 in one shop, by by only 1.9 % to DM 12.30 in
another. But other products, such as Salat Mayonnaise Kraft (500 grams), rose
during the relevant quarter by 20.2 % to DM 2.98 in one type of shop but fell by
nearly 1 % to only DM 2.33 in another shop.

There are a number of points to be made on this divergent evolution of prices.

Firstly, since this evolution is the result of a large number of specific co-factors, any conclusion of general validity implies not only that there must be a substantial enlargement of the sample (both of products and of areas and sales points) but also that these periodic surveys must be continued so as to give the greatest possible number of factual data (in this case the multiple price galaxies) enabling each of these co-factors to be identified and highlighted.

Secondly, the fact that price levels vary sharply and develop in divergent ways would seem to suggest that competition is not working perfectly, though this is not necessarily in itself a bad thing since,if competition is working imperfectly, we can conclude that it is at least working, which is a good sign. Modern competition is not perfect competition and does not have a single price as one of its features, perfect information not being available on the state of the market (1). On the contrary, uniform prices should be regarded as giving definite cause for concern, since the chances are that they are the result of tacit or overt collusion between the relevant (manufacturing and distribution) firms. In other words, at first sight and subject to further checking, analysis and surveys, it seems that :

- differences in comparative levels and developments of prices generally reflect imperfections of competition, whereas uniformity in the levels and developments of these prices are likely to reflect restrictions of competition ;

- the consumer is better served by imperfect competition than by restricted competition.

66. Mark-ups

As we have seen, the finding that there are major price differences for a number of products in several Community countries prompts us to seek the cause.

The Commission's programme of research on distribution (2) envisages precise analysis of the distribution chain for each product, highlighting two points of definite interest :

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(1) I analysed the phenomena of competition and prices in my work Concurrence oligopolistique et planification concurrentielle internationale, in"Economie Appliqué, Archives de l'ISEA,"Librarie Droz., Geneva, 1972, No 2-3, pp. 325-369. Among other things I said that "perfect (or pure and perfect) competition is ... a shadow effect" whereas "modern competition is dynamism ... it provokes and crystallizes innovation, expansion, growth ... Modern competition is also strategy, aggression, defence, negotiation ... " (op. cit., page 367). And indeed it may well be that divergent price trends are actually the   effect of competitive strategies and aggressive policies operated by certain groups (or chains) of major (and even minor) retailers.

(2) See : R. LINDA, Méthodologie de la recherche sur la concentration appliquée au domaine de la distribution de produits alimentaires, in "Options Méditéranéennes," 1976, No, 34, page 28, and Appendix 2 to this paper.

- the final price payable by the ultimate consumer, in other words the retail price, whose characteristics have already been outlined ;

- the initial price - in other words the buying price (or producer price).

From a comparison of these two prices we can determine the mark-up, or gross profit margin attained by each retailer on a given product. If the retailer pays 100 (the buying or producer price) for a given product and sells it to the ultimate consumer at 120, he has applied a mark-up of 20 %. But the problem is highly complex since we are again confronted with buying price galaxies, varying :

(a) according to the sales point, since the producer price differs with the importance and size of the retailer ;

(b) according to the quantity purchased, since bulk discounts may be given ;

(c) according to the time at which the product is purchased.

As is made admirably clear by the report of the Soris Institute in Turin on the distribution of food products in Italy (now with the printer), major differences were recorded in the buying price for the same product at the same sales point. The pressure of inflation in Italy has had the effect that a can of preserved food will have cost the retailer 100 at a given moment in time and 200 a month later. Thus it is evident that retailers who are clever enough or lucky enough to buy in large quantities before a large price rise have had the good fortune to enjoy particularly impressive mark-ups when re-selling.

The problem remains, however, of determining what is the real mark-up at a given sales point or for a given retailer when the retailer has bought several batches of the same product at different times and at very sharply different prices. Despite the remarkable frank cooperation of certain retailers with the Soris Institute, which was carrying out these surveys in Italy for the Commission, certain very complex theoretical and practical problems still have to be settled. At any rate, the following points should be noted.

This complex of problems and data provides the Commission with a factual basis and a set of reference points of inestimable value as a factor permitting study of the real and specific working of competition in several product markets. When prices are stable, it is particularly difficult to explain why their level is what it is, why it is uniform and why it is static : is the effect of prices neutralized by competitive pressure or is there, on the contrary, no competitive pressure whatsoever but only collusion of one form or another ?

To put it another way, when prices are stable, they constitute a most ambiguous item of information for the economic analyst.

In times of inflation, on the other hand, despite all the methodological and practical difficulties entailed in gathering and analysing figures, it is possible to grasp the logic and physiology of these prices, to acquire an understanding of the laws governing their divergent evolution, to detect flash points, parallel developments, the speed and the extension of price alignment, and, more generally, a whole series of symptoms of the operation of trade circuits, and thence :

- the main inflationary co-factors ;

- certain monopoly rents (1).

Ultimately the existence of inflation provides competition economists with a unique opportunity for getting to grips with the dynamic, deep-seated realities of modern markets.

67. New distribution structures - causes and salient features

We have so far discussed the final price, in other words the price which the ultimate consumer has to pay, but we cannot ignore the fundamental problem of the formation of the initial price. This obviously depends on the comparative negotiating strength of supply (generally meaning the producers) and demand (generally meaning traders, purchasing cooperatives and large-scale retailers).

The relations of force between sellers - notably manufacturers of branded goods enjoying qualified monopoly power (of the type described by Mr Chamberlin's theory of monopolistic competition) - and buyers - meaning the major distribution chains and organizations controlling the retail supermarkets and so on - are undergoing radical change in several Member States. The change is taking place in a context of oligopolistic competition which for the moment is working to the benefit of the ultimate consumer, although this does not mean that we should not analyse the longer-term trend which may change the picture completely. This is a highly complex subject and we shall consider only the distribution of food products. All we shall do is outline, very briefly, the main causes and trends of the current structural transformations.

The factors governing these structural changes are, in the following order :

- firstly, the ever expanding ownership of private means of transport (and particularly motor cars) ;

- secondly, the resulting constant proliferation of supermarkets, hypermarkets and all the other different sales points designed primarily for customers with their own means of transport ;

- the extension of the territorial or geographical area in which competition works, since it is no longer shops of the same area or street which alone compete with each other (as it was in the model analysed by Piero Sraffa forty years or so ago).

The broadening and intensification of competition in the retail business, notably as regards food products and other intensive consumption goods, are likely to produce three types of actions and reactions :

(a) the emergence of negotiating strength in the hands of the major retailers and supermarkets which, taking advantage of the large quantities of each product which they can sell and therefore buy, can exert considerable pressure on producers and manufacturers so as to obtain supplies at particularly favourable prices and terms ;

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(1) R. LINDA : Méthodologie de la recherche sur la concentration appliquée au domaine de la distribution de produits alimentaires, op. cit. p. 29.

(b) the formation by small retailers of <u>purchasing cooperatives and large distribution chains</u> with the aim of enjoying similar negotiating strength vis-à-vis producers and manufacturers and thereby surviving the competitive onslaught of the supermarkets;

(c) a process of concentration between large retailers, supermarkets, purchasing cooperatives and distribution chains, with a <u>threefold objective</u>:

   I) relaxing or, in the case of some products or items, doing away completely with the over-keen competition which in certain countries is still raging between individual retailers and between different types of retailer (supermarkets, small independent retailers, small retailers grouped together, etc.): the reduction in the number of brands marketed by supermarkets and chain-stores is another means of restricting the play of competition;

  II) achieving economies of scale in marketing, by reducing the range of brands and articles sold, economizing on the packing and presentation of these articles and imposing their own label for a few or even several articles, to which they have the exclusive or monopoly right;

 III) giving a further booster to their negotiating strength vis-à-vis manufacturers and producers by reducing or gradually even eliminating the power over demand which each manufacturer of a branded product can exercise over his product through advertizing.

It is deduced that as the degree of concentration of demand (represented by the supermarkets, major purchasing cooperatives and distribution chains) rises, it boosts the power of this demand over manufacturers and producers while reducing the probability that gains made at the expense of these manufacturers or producers will actually be passed on to the ultimate consumer in the form of retail price cuts.

68. <u>Concentration in distribution – effects and trends</u>

A process of concentration in distribution presents very serious risks for the functioning of competition. Even if the degree of concentration is in itself not high, there is a fundamental need for in-depth analysis of the scope and <u>trends of the concentration process.</u>

Here certain main aspects of the <u>structure of demand</u> should be clarified, with a distinction between:

(a) consumer demand (generally households); and
(b) retailer demand (e.g. demand by supermarkets, purchasing cooperatives, distribution chains and small independent retailers).

Consumer demand is increasingly concentrated since, in order to gain time rather than money, consumers generally now prefer to group their shopping and go out once or perhaps twice per week. In other words they go to a sales point to buy a whole set of goods and not just one item or one specific brand. Hence large-scale retailers exert considerable real power over consumers by imposing a <u>basket</u> of articles or goods in which the various <u>components</u> – the actual articles and brands – are not determined by the consumer but <u>exclusively</u> by the seller.

In other words the large-scale retailer has specific monopoly power over the consumer in respect of each brand or article displayed on his shelves, taken individually or separately.

All that the consumer can do is, consequently, to decide to buy from the basket of articles and goods offered for sale in one sales point or from the basket offered for sale in another. The housewife rarely has time to shop around for her favourite brand of cheese or tinned food. Thus she gradually loses the habit of having a favourite brand and acquires the habit of "choosing" the brand displayed on the supermarket shelf.

Finally, in view of the time element, the consumer is not really in a position to visit a large number of sales points to compare the qualities and prices of the various articles offered for sale. We may indeed speak of the existence of local oligopolistic arenas since, in general terms, a consumer living in a given town or area has a relatively limited number of sales points to choose between. The number is further limited by the fact that certain supermarkets or hypermarkets belong to the same group or chain. In the most highly competitive areas, then, the consumer will be able to choose between a dozen or so independent sales points whereas in less densely populated areas there may be only two or three (in one area of France, for instance: Casino Géant, Leclerc Distribution and a few small independants).

The genuine dominance wielded by the supermarkets and chainstores over the retail market relative to specific products taken separately, has substantial repercussions (and there is a multiplier effect which has still to be measured) on the purchase market from manufacturers or producers of these same products. These large retailers control several local oligopolistic arenas and their demand, being the result of the juxtaposition of demand from numerous sales points within numerous regions, is so intense as to be oligopsonistic or even monopsonistic. Brands and goods which fail to reach the supermarket shelf may end up being withdrawn from production altogether, since manufacturers can no longer benefit from the technical economies of scale linked to mass production. For mass production is only possible where mass sales are possible, and this means having access to supermarkets and chain-stores. The result is that manufacturers and producers are very highly dependent on the supermarkets and chain-stores and become more and more so as the size and the concentration of sales points increases (the multiplier effect).

The major retailers and distribution firms tend to constitute integrated oligopsonistic systems of local oligopolistic arenas, enjoying cumulative multiplier dominance which in the current situation is intensifying to the detriment both of the ultimate consumer and of the manufacturer or producer. Hence, the effects of a merger or agreement between major retailers, and between distribution firms in general, have to be analysed in the light of this cumulative multiplier and its influence on the dominance conferred by the merger or agreement.

69. The purchasing power of distribution firms and cross-industry dominance

Cross-industry dominance
terminology of François Perroux)(1) was analysed in my work "Concurrence
oligopolistique et planification concurrentielle internationale" (2).

Among other things, I put forward the following principle:

"The dominance of one industry A over another industry B, which supplies
industry A, together with the dominance of industry A over a third industry C,
a customer of industry A, tends to reinforce the power of the firm /or of the
group of firms constituting and/or dominating industry A7 both over each of
the industries individually and over all these industries as a whole."
(op. cit., p. 422).

Let us assume that industry A is the retail trade (which is growing more and
more concentrated and more and more powerful in relation both to B and to C)
whereas B represents the supplier manufacturers or producers and C represents
the aggregate of ultimate consumers. Industries B and C are typically atomistic
industries, which is a platitude in the case of C and demonstrable in the case of
B; industry A (the firm or group of firms constituting and/or controlling it)
possesses substantial dominance and negotiating strength because:

(a) it is protected by exceptionally high barriers to entry while it is also
    evident that, ceteris paribus, barriers to entry are a strategic factor of
    dominance crystallizing the maintenance and reinforcement of structural
    power (of industry A over industries B and C)(op. cit., p. 424); and

(b) industry A has enormous – and expanding – freedom of choice, since it can
    choose and buy all the brands and products which exist anywhere in the
    world in the quantities it wants, and consequently at the prices and on
    the terms which are most favourable to it.

It follows that the structure of industry B – which supplies industry A –
consisting of the multitude of domestic and foreign producers and manufacturers
of the articles and brands sold by industry A must be atomistic (op. cit.,
pp. 414 and 415). In my work I stressed that:

– dominance is the bonus given to the firm (or group of firms) in industry A
  which through technical innovation (in distribution in this case) and/or
  market expansion has been better able than any other firm to take advantage
  of economies of scale (in this case economies of scale in distribution);

– any expansion in industry B (the supplier) is the result of the power wielded
  by a firm (or group of firms) in industry A (the buyer);

– the benefit of this expansion is generally not enjoyed by industry B but by
  industry A, since this is the most oligopolistic and the most concentrated
  industry, because of its dominance and negotiating strength, which
  can reap the benefit of expansion and of increased productivity to the
  detriment of the less concentrated and more competitive industry.

(1)F. Perroux, Indépendance de l'Economie Nationale et Interdépendance des Nations,
   Collection RES, Aubier-Montaigne, Paris 1969; F. Perroux, Esquisse d'une
   théorie de l'économie dominante, in "Economie Appliquée", April-September 1948.
(2)R. Linda, in "Economie Appliquée", 1972, Nos 2-3, pp. 412 to 424.

Extrapolating the series of chain reactions which could follow from the logic of cross-industry dominance, it may be expected:

- either that industry B (manufacturers and producers) will engage in a process of concentration, reorganization and restructuring so as to boost its negotiating strength vis-à-vis industry A (distribution);
- alternatively that the same firms in industry B (manufacturers and producers) will attempt to penetrate industry A and acquire control of a number of sales points enabling them to escape the effects of the distribution industries' purchasing power.

Ultimately the cumulative effect of these chain reactions can only be a higher degree of concentration both in industry A and in industry B. The bill for all these successive concentration processes would ultimately have to be paid by industry C (the consumer), which by nature is <u>utterly atomistic</u> and is therefore virtually incapable of negotiating from a position of strength.

Although the growing number of supermarkets can be seen not as a threat but as a stimulus to competition, we must nevertheless be on our guard against the trend towards concentration among the groups controlling the supermarkets, for excessive concentration would indeed be the end of competition.

It follows that there must be very strict control of agreements and mergers between distribution firms if the <u>current state of oligopolistic competition</u> is to be preserved (with large distribution firms enjoying considerable purchasing power but competing with each other); in any case this situation does offer considerable advantages for the ultimate consumer in certain countries and areas. Up to a certain point power creates and stimulates competition; beyond that point, it stifles it.

Here it should be recalled that, according to the theory of the oligopolistic dynamic equilibrium set out in my above-mentioned work, <u>power does not in itself exclude the possibility of competition</u> since <u>oligopolistic competition</u> is based precisely on power and, more specifically, on the <u>dynamic balance of power.</u> Nevertheless there are certain fundamental preconditions which must be met if competition is to work satisfactorily.

In the case we are considering – power relationships between distribution (industry A), production (industry B) and consumption (industry C) – it may be assumed that there are two such preconditions if the manifold competitive mechanisms are to operate:

(a) there must always be an <u>adequate plurality of large retailers</u> (supermarkets, chain stores, etc.), completely <u>independent</u> of each other (in other words there must be no collusion nor interlocking shareholdings or directorates, etc.);

(b) each of these large retailers must display and market a <u>certain minimum number of different brands</u> of each type of product, so that the consumer can actually choose what he wants.

The foregoing outline gives, in general terms, the main features of a
dynamic process which is taking place in different manners, at different
times and different stages in the various Community countries.

70. <u>The impact of international trade on domestic prices</u> (1)

The existence of inflation pressures, in a given country should, in an open
economy such as that of the European Community, provide a <u>stimulus</u> to imports
of products whose prices have risen more sharply on domestic markets than
elsewhere. For which products does this stimulus actually operate in reality
and to what extent? How is the mark-up on an imported product shared out
between the importer and the retailer? Or is it a frequent occurrence for the
retailer to import direct? Is the mark-up higher for imported goods than for
domestic goods?

And there is a mass of other fundamental questions for the competition
economist which are linked to those we have just asked! For instance, do
the consumer prices of imported products rise more quickly or less quickly
than the prices of domestic products? Does a rise in the price of domestic
products actually provoke greater imports of competing products – and, if
so, to what extent, in what conditions and after what time-lag? Do the
retail prices of imported goods align on those of similar domestic goods
or do the prices of domestic goods tend to fall under the impact of imports?
Are the relationships and reactions between prices of imported products and
domestic products operating in an uniform and simultaneous way or are there
differences according to countries and areas and/or to sales points in the sample?

71. <u>The main features of the research on distribution: summary</u>

The answer to these questions will entail a series of other analyses,
already planned in the Commission's study programme, entailing:

– the gathering and sorting of basic data on international trade, both
  within the Community itself and between the Community and other countries;

– detailed analysis of basic economic and financial data (sales, net
  profit, cash flow, own capital) in respect of:

(a) a sample of large firms in the manufacturing industry – in this case the
    food industry – manufacturing the products whose <u>prices</u> are analysed;

(b) a sample of large national distribution firms (in this case retailers of
    food products) working in the <u>retail business</u> and perhaps also in the
    wholesale business;

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(1) R. Linda: <u>Méthodologie de la recherche sur la concentration appliquée au</u>
    <u>domaine de la distribution de produits alimentaires,</u> page 29.

93

(c) a fairly limited sample of large national food distribution firms in business as <u>wholesalers</u> but <u>not as retailers</u>.

This will give a picture of:

– the profitability of firms manufacturing the products whose prices are periodically analysed and compared;

– the profitability of retail distribution groups who own a large number of sales points in the sample for the periodic price surveys;

– possibly even of certain wholesale distributors who sometimes import goods covered by the surveys.

At a subsequent stage, in view of the interdependence of economic systems and circuits, we shall have to consider the possibility:

– of determining, describing and measuring a number of <u>local oligopolistic arenas</u> in the various Member States;

– of analysing the power wielded by the main retail distribution groups under our approach of the <u>integrated oligopsonistic system of local oligopolistic arenas</u>, and in particular the manifold implications of this power for competition

  • between producers and trade buyers;

  • between retailers themselves on different local markets.

The foregoing considerations do not aim at an exhaustive examination of such a complex subject, buy they do suffice to show the great practical value of an extension of the Commission's studies to distribution and of analysis of concentration in product markets, particularly the analysis of the evolution of prices, mark-ups and all the other significant information which may help to clarify the operation of competition on the relevant product markets and circuits (1).

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(1) Appendix 2 to this methodology (Surveys of retail prices and mark-ups: provisional outline methodology) gives a preliminary view.

VIII. CLOSING REMARKS AND GENERAL CONCLUSIONS

72. General appraisal of the concentration studies

The Commission has already published sixty or so volumes in the series of studies on concentration in individual industries and markets. So far these have been provided free of charge (subject to availability) to whoever asked for them. Annex 2 to this paper lists the volumes published to date.

The results of the studies thus being available to all, all can reach their own assessment on the utility of the research.

For my part I feel it is in order to base my general view on a recapitulation of the aims and means, and by seeing to what extent the means depend on the aims and are warranted and conditioned by them.

Now that the means — the methodology — have been set out in detail in the foregoing pages, this becomes a possible and indeed fruitful exercise.

The objective of the studies can be determined and classified if a distinction is made between:

(a) the whole set of specific or direct objectives;

(b) the ultimate or general objective, which might also be called the target.

As regards point (a), it has been possible in practice to obtain these objectives:

- by helping to apply the provisions of the treaty establishing the European Economic Community, through the systematic analysis of a mass of detailed information;

- by enabling the Community to make the comparisons and summary studies which are set out in part III of the annual Report on Competition Policy submitted by the Commission to the European Parliament;

- by informing public opinion and relative circles through the publishing of the various individual studies.

But I feel more attention should be directed to the general objective (the target) whose scope, in one sense, explains and transcends the various individual objectives.

The idea here is, in brief, to explore and determine the numerous relationships between concentration and competition. And this brings us to the question whether the approach and methods which we have selected and applied were the most direct and the most effective means of hitting this target.

Or should other approaches and other methods have been preferred?

First, let it be clear that there is definitely a need for a methodology. The reason for this is that, in view of the great diversity of structures and situations which have to be considered, a large number of institutes or research teams (1) have had to be used, and they must all work in the same direction and use the same methods if their results are to be complementary and comparable.

This can be taken for granted. But the next question is: since competition exists and since its effects are felt on the market (for a specific product or group of competing products), why is it not possible to confine the analysis to individual markets rather than working the industry approach?

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(1) Annex 1 lists the institutes and experts which have done research work for the Commission.

73. <u>Relation between concentration and competition: general context</u>

Matters here are more complicated. Two points have to be made:

(1) All major firms in fact do business, not on a single market, but on several markets. They manufacture and sell a large number of products, generally belonging to the same industry but sometimes also penetrating other industries.

(2) Concentration analysis cannot be confined to determining and describing the shares held by a given firm on a given market but must seek to grasp the causes and effect of concentration. These are to be found in the structure, performance and competitive strategy of the individual firm.

The industry approach thus inevitably provides the link with analysis of all the structural economic relations which develop around individual market shares and different market situations.

In other words, the industry approach is the point from which analysis of the relation between concentration and competition proceeds, since it permits analysis of:

- each market;

- each firm, though if necessary a sample n* of large firms may be selected.

It is, again, the industry approach which allows large firms to be put under the econometric microscope, for the study of concentration must:

- achieve something;

- explain something.

74. <u>Concentration and performance</u>

As a rule, concentration should serve the objective of boosting corporate performance. But are the results in practice to be welcomed or not?

This question has to be answered industry by industry, market by market and, clearly enough, firm by firm. Hence the need to verify:

- whether a firm operating in the most highly concentrated industries or markets has a higher or lower level of performance than firms operating on more atomistic or more balanced markets;

- if a firm operating in the most highly concentrated industries and markets – and perhaps even enjoying quantitative dominance – turns in a higher level of performance, we still have to find out whether and to what extent this higher level of performance is the result of:

(a) better management;

(b) greater size.

The effects of this greater size then have to be determined and classified in terms:

(b)(1) firstly, of effects on the production apparatus which, by permitting greater capital intensity, more advanced technology and the achievement of economies of scale, make for reduced costs (which is beneficial, both to the manufacturer and to the consumer);

(b)(2) secondly, of effects on the market, since the producer may acquire the power
to dominate and control demand curves and prices and this may, in given
circumstances, make for higher prices (which is harmful to the consumer).

But it is very frequently found that the largest firms do not in reality have a
higher level of performance than smaller firms, and this has been evidenced by a
considerable amount of empirical research (1).

All these analyses can be made only on the basis of a comparative method, which is
to say:

- by comparing the structures and performance of the various firms operating in
a given industry at a given time;

- by comparing the evolution of all the principal ratios concerning the structures
and firms in question.

75. Conclusions

By way of conclusion, let it be emphasised that:

- research into concentration in specific industries means that certain aspects,
and particularly concentration on product markets, have to be considered more
fully and in greater detail;

- analyses of prices and mark-ups - on a growing number of products and brands -
should enable new light to be cast on the various inter-relations between
concentration and competition, closely linked to the structures and conduct
of major manufacturing and distribution firms and to their manifold effects.

The industry studies and market analyses relating to concentration and competition
are polyvalent studies which aim not only to describe the evolution of the specific
industries considered but also to create and utilise new methods and objects of
analysis, research and knowledge.

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(1) R. Linda, Un modèle de developpement avec relations asymétriques (Italy), in
"Mondes en developpement" (Crise du capitalisme ou ordre international nouveau),
Paris, 1975, No. 11, pages 428-443 and 451-459.

APPENDICES

APPENDIX 1

Concentration on certain markets in certain
Community countries : 1973/74

MARKET CONCENTRATION — YEAR: 1972   COUNTRY: GERMANY

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
MANUFACTURE OF MACHINERY OTHER THAN ELECTRIC MACHINES						
Tractors and agricultural machinery (Landmaschinen und Ackerschlepper)	37.2	103	KHD*	IHC	Claas	J. Deere
Tractors (Ackerschlepper)	63.9		IHC	KHD	Fendt	MF
Combine Harvesters (Mähdrescher)	88		Claas	MF	J. Deere	Fahr/IHC
Office machinery (Büromaschinen)	64.4	138	Olympia	NCR	Triumph/ Adler	Kienzle
Calculators (Rechenmaschinen)			Olympia	Triumph/ Adler		
Typewriters (Schreibmaschinen)			Olympia	Triumph/ Adler		
Textile machinery and accessories (Textilmaschinen und Zubehör)	25.3	3742	Schlafhorst	Barmag-Barmer	Meyer & Cie	Morat GmbH
Spinning machinery (Spinnereimaschinen)			Barmag-Barmer	Schubert & Salzer		
Weaving machinery (Webereimaschinen)			Schlafhorst			

* Including Fahr, in which KHD has shares of more than 51%

Concentration ratios (C_4) and coefficients of disparity (4L)

| INDUSTRY OR MARKET | MEASURE OF CONCENTRATION | | LEADING FIRMS AND THEIR RANK | | | |
| | C_4 | 4L | I | II | III | IV |
	(%)					
Civil engineering equipment and brick making and other machinery for the preparation of building materials	26.4	219	Liebherr	Orenstein & Koppel	Demag	Peiner Maschinen-werke AG
Excavators (Bagger)			Liebherr	Orenstein & Koppel	Koehring	
Earth moving machinery (Erdbaugeräte)			Frisch GmbH	Wacker		
Mechanical lifting and handling equipment (Hebezeuge und Fördermittel)	25.1	261	Demag	Linde	Rheinstahl	Jung-heinrich
Lifts (Aufzüge)			Rheinstahl	Schindler	Flohr-Otis	Haushahn
Industrial trucks (Flurfördermittel)			Linde	Eaton	Jung-heinrich	Steinbock
ELECTRICAL ENGINEERING						
Electro-technical Industry (Elektrotechnische Industrie)			Siemens AG	AEG Telefunken AG	Bosch GmbH	Alldephi GmbH
Radio, TV and record players (Rundfunk-, Fernseh- und Phonogeräte) (1973)	51.3	134	Grundig AG	AEG	Alldephi	Bosch Siemens Hausgeräte GmbH
Colour televisions (Farbfernsehgeräte)	47	135	Alldephi	AEG	Nordmende	Grundig

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Black and White televisions (Schwarz-Weiss-Tisch-empfänger)	37.6	148	Alldephi	Grundig	Nordmende	AEG
Portable televisions (Portables)			Grundig	AEG		
Car radios (Kraftfahrzeug Empfangsgeräte) (1973)			Bosch Siemens Hausgeräte GmbH	Becker	Alldephi	
Electric domestic appliances (Elektrische Hausgeräte) (1973)	73.2	260	AEG	BSHG	Bauknecht	Miele
Dish washers (Geschirrspüler)	87	308	Miele	AEG	BSHG	Bauknecht
Refrigerators (Kühlschränke)			BSHG	AEG	Bauknecht	
Deep freezers (Gefriergeräte)			AEG	BSHG	Bauknecht	
Washing machines (Waschmaschinen) (1973)	60	157	BSHG	AEG	Miele	Bauknecht
MOTOR CYCLE INDUSTRY						
Motorcycle Industry (Motorradindustrie) (1974)	98	151	BMW (29%)	Herkules (28.5%)	Zündopp (25.5%)	Kreidler (15%)
CAR TYRES						
Tyres (Neureifen)	61	153	Michelin (23%)	Continental (18%)	Dunlop (11%)	Uniroyal (9%)

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
CAR ACCESSORIES						
Lighting equipment for motor vehicles	87.5 (c)	340	Westfalische Metall-Industrie (45%)	Bosch (30%)	SWF (12.5%)	
Spark plugs	85 (b)	480	Bosch (60%)	Bern-Werk (25%)		
Bulbs and headlamps for motor vehicles	85 (b)	480	Osram (60%)	Deutsche Philips (25%)		
Batteries for motor vehicles	70 (b)	266	Bosch (40%)	Varta (30%)		
Generators, regulators and starters for motor vehicles	80 (a)		Bosch (80%)			
FOOD AND DRINK INDUSTRY						
Canned meat	13.1	193	Coop (4.9%)	Herta (3.9%)	Artland-Dörffler (2.4%)	Schafft (1.9%)
Canned fruit and vegetables	20	116	Carl Kühne (5.5%)	Müllers Mühle (5.2%)	Schwartauer Werke (4.9%)	Hengsten-berg (4.4%)
Ice Cream	84.5	396	Langnese-Iglo (1) (50%)	Schöller Lebens-mittel (18%)	Südmilch AG (9%)	Oetker Eiskrem (7.5%)

(a) C_1 instead of C_4

(b) C_2 instead of C_4

(c) C_3 instead of C_4

(1) Controlled by: Unilever 75%; Nestlé 25%

MARKET CONCENTRATION — YEAR: 1974 COUNTRY: GERMANY

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Canned fish	35.3 (b)	640	(1) Nordsee (26.9%)	(2) Fisch-Union (8.4%)		
Margarine, Oil and Cooking Fats	60 (a)		Unilever			
Soup	91 (b)	306	Maggi (55%)	Knorr (36%)	Unox	
Prepared potato purée	90 (c)	428	Pfanni-Werk (57%)	Maggi (20%)	Knorr (13%)	
Beer (Brauerei und Mälzerei)	13	207	DUB-Schult-heiss-Brauerei	Binding-Brauerei	Wicküler-Küpper-Brauerei	Henninger-Bräu
Spirits (Spirituosenindustrie)	25	142	Eckes	Mast	Doornkaat	Asbach
(Weinverarbeitende Industrie)	63	256	Henkell	Söhnlein	Rüttgers	Deinhard
Soft drinks including natural spa waters	15	278	Coca-Cola	Überkinger	Blaue Quellen	Gerolsteiner

(a) C_1 instead of C_4

(b) C_2 instead of C_4

(c) C_3 instead of C_4

(1) Controlled by: Unilever 68%; Dresdner Bank 32%

(2) Controlled by: Nordsee, Unilever, Fisch-Union

MARKET CONCENTRATION — YEAR:1972/74 COUNTRY: FRANCE

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
TEXTILE INDUSTRY						
Combed wool (1974)	37 (b)	1034	Peignage Amédée (31%) (Groupe Prouvost)	Peignage de Mazamet (6%)		
Yarn of combed wool (1974)	45 (c)	224	Lainière de Roubaix (20%)	Les Fils de L. Mulliez (15%) (E)	Filés de Fourmies (10%)	
Wool knitting yarn (1974)	56 (b)	248	Lainière de Roubaix (31%)	Les Fils de L. Mulliez (25%) (E)		
Woven woollen fabrics (1974)	48.5	193	Louis Lepoutre (17.5%)	Roudière (14.5%)	Tiberghien Frères (10%) (E)	Dumons Frères (6.5%)
Cotton velvet (1972)	35 (a)		Groupe Agache-Willot			
Flax yarn (1972)	50 (a)		Groupe Agache-Willot			
Woven fabrics of jute (1972)	75 (a)		Groupe Agache-Willot			
Tufted carpets (1972)	40 (a)		Groupe Agache-Willot			
Fishing nets (1972)	35 (a)		Groupe Agache-Willot			
Canadian tents (1972)	35 (a)		Groupe Agache-Willot			

(a) C_1 instead of C_4 (b) C_2 instead of C_4 (c) C_3 instead of C_4
(E) Very approximate estimations

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Embroidery thread (Fils pour ouvrage de dames) (1973)	85 (a)		Dollfus Mieg et Cie			
Industrial sewing thread (Fils à coudre industriels) (1973)	40 (a)		Dollfus Mieg et Cie			
Sewing thread (Fils à coudre mercerie) (1973)	80 (a)		Dollfus Mieg et Cie			
Lining material (Doublure) (1973)	55 (a)		Dollfus Mieg et Cie			
Bedding (Tissus pour literie) (1973)	35 (a)		Dollfus Mieg et Cie			
PHARMACEUTICALS INDUSTRY (E) (1972)						
General analgesics (non-narcotic)	54 (c)		(46%)	(8%)		
Anti-rheumatic drops (non-hormonic)	37 (c)	393	(26%)	(7%)	(4%)	
Antibiotics (penicillin and derivatives)	47 (c)	309	(30%)	(11%)	(6%)	
Psychotropics (non-narcotic tranquillizers)	48 (b)	440	(33%)	(15%)		

(a) C_1 instead of C_4 (E) Very approximate estimations
(b) C_2 instead of C_4
(c) C_3 instead of C_4

MARKET CONCENTRATION — YEAR: 1972   COUNTRY: FRANCE

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Psychotropics (1971)	29 (b)	214	(15%)	(14%)		
Cardiovascular drugs (not containing reserpine)	62 (c)	588	(44%)	(11%)	(7%)	
Peripheral vasodilators	50 (c)	444	(30%)	(14%)	(6%)	
Drugs for respiratory disorders (cough remedies, anti-histamines)	33 (b)	272	(19%)	(14%)		
Anti-haemorrhage drugs (drugs for increasing vascular resistance)	45 (c)	164	(17%)	(15%)	(13%)	
Hyper-cholesterolaemic drugs (Serum clarifying agents)	52 (b)	452	(36%)	(16%)		

FOOD AND DRINK INDUSTRY (E)

Meat preparations and preserves	24	352	Olida-Caby Fleury-Michon	G.V.S.	Herta	Morey
Canned vegetables	29 (c)	272	Saupiquet	C.G.C.	Bonduelle	
Canned mushrooms	77.5 (c)	156	Euro-conserves	Champi-France	Blanchaud	

(a) C_1 instead of C_4 (E) Very approximate estimations
(b) C_2 instead of C_4
(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Canned fruit in syrup	62 (c)	252	Roussillon Alimentaire	Conserves Gard	Lenzbourg	
Jams	29 (c)	144	Andros	Lenzbourg	Materne	
Canned fish	40 (b)	258	Saupiquet	Pêcheurs de France		
Condensed milk	80.5 (b)	1332	Lait Mont Blanc	France-Lait	Préval	
Evaporated milk	95 (b)	752	Gloria	France-Lait		
Milk powder	95 (c)	360	France-Lait	Gloria	Mont Blanc	
Yoghourt	63	192	Gervais-Danone	Sodima Yoplait	Chambourcy	Gama-Nova
Processed cheese	66.5 (b)	1278	Bel	Picon	Roustang (Nestlé)	
Biscuits	51	147	Lu, Brun et Associés	Bélin	Marques étrangères	Biscuiterie Nantaise
"Biscotterie"	67.5	494	Aliment Essentiel	Picard	Clément	Lu, Brun et Associés

(b) C_2 instead of C_4

(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
"Entremets"	65.5 (c)	276	Générale Alimentaire	S.P.M.*	Ancel	
Dietetic products and infant foods	100	349	Fali (BSN-G.D.)	Guigoz	S.P.M.*	Gervais-Danone
Pasta	73 (b)	286	Panzani-Milliat	Rivoire et Carret-Lustucru	Buitoni	
Ready-prepared meals	81 (b)	322	Buitoni-Perugina	Panzani-Milliat	Barbier-Dauphin	Bretagne-Provence
Cooking oils	75 (b)	658	Groupe Lesieur	G.I.E. Interhuiles	Astra-Calvé	
Margarine	63 (b)	4000	Astra-Calvé	Excel-Soprodel		
Confectionery	39	163	Générale Alimentaire	General Foods	Lindt (Storck)	Becco
Chewing Gum	95 (b)	1700	General Foods	Chiclets	Wrigley	
Frozen foods	80.5	408	Findus	Cofralim	Ortiz	Servifrais
Ice Cream	89	231	Ortiz	France-Glaces	Motta	Ste Cremière Nantaise

(b) C_2 instead of C_4 * Sté des Produits du Maïs

(c) C_3 instead of C_4

MARKET CONCENTRATION   —   YEAR: 1972   COUNTRY: FRANCE

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Mustard and condiments	70 (b)	734	Gale Alimentaire	Segma		
Fruit and vegetable based condiments	51 (b)	480	Gale Alimentaire	Segma		
Pepper and spices	50 (b)	372	Gale Alimentaire	Ducros		
Mayonnaise	85.5 (c)	260	Mayolande	Lesieur	Gale Alimentaire	
Sauces	70 (b)	268	Gale Alimentaire	Mayolande		
Beer	69	480	B.S.N. (45%)	Union des Brasseries (12.5%)	Albra (5.9%)	Pelforth (5.6%)
"Alcools de Bouche" (1973)	42.6	151	Martell (12.8%)	Courvoisier (12.1%)	Hennessy (11.1%)	Remy-Martin (6.6%)
Aperitifs and Liqueurs (1973)	63.1	205	Ricard (20.1%)	Pernod (18.5%)	Groupe Martini (18.5%)	C.D.C. (6%)
Champagne and sparkling wines	37.1	330	Moet-Hennessy (20%)	Mumm et Cie (8.8%)	Veuve Cliquot Ponsardin (4.5%)	Piper Heidsieck (3.8%)

(b) C_2 instead of C_4

(c) C_3 instead of C_4

MARKET CONCENTRATION — YEAR: 1972/73 COUNTRY: ITALY

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
TEXTILE INDUSTRY (1973)						
Cotton yarn	38.8	310	A	B	C	D
Textile materials for household use (excluding raw material production)	33.5	261	A	B	C	D
Textile materials for household use (including raw material production)	39	174	A	G	H	B
PAPER INDUSTRY (1972)						
Newspaper	84	256	Timavo-Arbatax (32%)	Burgo (29%)	Marzabotto (15%)	Ascoli-Valcerusa (8%)
Printing and writing paper	45	131	Burgo (15%)	C.I.R. (10%)	C.R.D.M. (10%)	Tolmezzo-Prealpine (10%)
Wrapping paper	40	179	San Cesario (15%)	Vita-Mayer (10%)	Burgo (9%)	Villa (6%)
Kraft paper	74 (b)	1444	Import (65%)	Vita-Mayer (9%)		
Paperboard	85 (c)	248	Verona (35%)	Saffa (35%)	De Medici (15%)	

(b) C_2 instead of C_4

(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
MANUFACTURE OF MACHINERY OTHER THAN ELECTRIC MACHINES (1974)						
Portable machines (Portatili)	89					
Standard machines (Standard)	87					
Professional calculators (Calcolo Prof.)	91					
Pocket calculators (Calcolo Tasc.)	30					
Accounting machines (Contab. e sistemi contabili)	86					
Scientific micro-calculators (Microc. scientifici)	90					
Terminals (Terminali)	93					
Medium scale and large scale systems EDP (Sist. medio-grandi EDP)	94					
Spinning machinery (Macchine per filatura) (1973)	65.5	268	Rép. Féd. Allemagne (33%)	France (15%)	A (9%)	C (8.5%)

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Weaving machinery (Macchine per Tessitura) (1973)	56.5	311	Suisse (32%)	Rép. Féd. Allemagne (10.5%)	F (7%)	France (7%)
Knitting machinery (Macchine per maglieria e calzetteria) (1973)	51	603	Rép. Féd. Allemagne (38%)	USA (5%)	Royaume Uni (4%)	O (4%)
ELECTRICAL ENGINEERING (1973)						
Refrigerators (Frigoriferi)	94 (c)	556	Zanussi	IRE	Indesit	
Washing machines (Lavatrici)	76 (c)	344	Zanussi	Candy	Indesit	
Electric cookers (Cucine elettriche)	71 (c)	288	Zanussi	Merloni	IRE	
Radios	35 (c)	644	Hong Kong	Corée du Sud	Singapore	
Black and white televisions (Televisori monocromi)	32	113	Philips	Zanussi	Autovox	Grundig or Telefunken
Colour televisions (Televisori a colori)	64	211	Allemagne R.F.	Grundig	Philips	Emerson or Zanussi
CYCLES AND MOTORCYCLES (1972)						
Cycles and motorcycles	47	186	Bianchi Chiorda	Rizzato	Carnielli	Cicli Cinzia

(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Mopeds and Scooters (50 cc)	67 (b)	1288	Piaggio	Agrati Garelli		
Motorcycles, motorscooters and others	71	192	Moto Guzzi	Benelli	Piaggio Gilera	Aermacchi
CAR TYRES AND CAR ACCESSORIES (1973/74)						
Car tyres (original fit) (1974)	89	192	Michelin (34%)	Pirelli (34%)	CEAT (21%)	
Car tyres (replacement)	84	134	Michelin (25%)	Pirelli (23%)	Importateurs (20%)	CEAT (16%)
Spark plugs (original fit)	94.4 (c)	792	Marelli (74.6%)	Champion (10%)	Lodge (9.8%)	Bosch
Spark plugs (replacement)	88	307	Marelli (35%)	Champion (35%)	Bosch (10%)	Lodge (8%)
Batteries (original fit) (1972)	84 (c)	768	Marelli (63%)	F.A.R.* (14%)	Varta (7%)	FIAMM
Batteries (replacement) (1972)	72.4	223	F.A.R. (30%)	Marelli (22%)	Varta (10.2%)	FIAMM (10.2%)

*F.A.R. = Hensenberger, Titano, Tudor

(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
FOOD INDUSTRY (1973)						
Canned meat	92.5	454	Simmenthal (60%)	Acsal (15%)	Trinity (10%)	Star (7.5%)
Canned vegetables	52.5	183	Star (17.5%)	De Rica (17.5%)	Cirio (10%)	Arrigoni (7.5%)
Jams and marmalade	40	164	Cirio (15%)	De Rica (7.5%)	Arrigoni (7.5%)	Zuegg (10%)
Fruit prepared with or without sugar or alcohol	35 (c)	184	Calpak S.p.A. (15%)	Mon Jardin Italia (10%)	Cirio (10%)	
Tuna and other canned fish	57.5	215	Mazzola (22.5%)	Star (17.5%)	Trinity (10%)	Palmera (7.5%)
Frozen foods	88.5 (c)	964	Sages[*] (72.5%)	Surgela (8.5%)	Frigodaunia (7.5%)	
Ice Cream	40 (c)	368	Algel[*] Findus (25%)	Sanson (7.5%)	Tanara (7.5%)	Motta
Cheese	26	100	Galbani (6.5%)	Invernizzi (6.5%)	Locatelli (6.5%)	Polenghi-Lombardo (6.5%)
Biscuits, cakes and crackers			Pavesi	Saiwa	Maggiora	Doria

(c) C_3 instead of C_4 [*] Controlled by: Unilever 75%

MARKET CONCENTRATION   —   YEAR: 1973   COUNTRY: ITALY

Concentration ratios (C_4) and coefficients of disparity $(4L)$

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	$4L$	I	II	III	IV
	(%)					
Sugar	71	264	Eridania (33%)	Italiana Zuccheri (25%)	AIE[*] (13%)	
Cocoa based confectionery and chocolate	67.48	100	Ferrero (16.87%)	IBP Buitoni-Perugina (16.87%)	Motta (16.87%)	Nestlé Italia (16.87%)
Infant foods and dietetic products	97.5	335	Plasmon (50%)	Gerber (22.5%)	IBP Buitoni-Perugina (17.5%)	Carlo Erba (7.5%)
Pasta	27	110	Barilla (7%)	Buitoni (7%)	Amato (7%)	Agnesi (6%)

[*] AIE = Agricola Indust. Emiliana

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
PAPER INDUSTRY						
Total for the sector	39	276				
Corrugated board and cases	69.7	150				
Stationary and envelopes	52.6	160				
Sanitary and household paper	82	185				
Adhesive materials	83.7	414				
Wallpaper	100 (c)	175				
Folding carton	47.9	196				

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
PHARMACEUTICALS INDUSTRY						
Antibiotics	65	560	Beecham	Pfizer	Mycofarm	Hoffmann La Roche
Cardiovascular drugs	48	166	M.S.D.	Sandoz	I.C.I.	Astra
Psychotropics	64	467	Hoffmann La Roche	Wyeth	Ciba-Geigy	M.S.D.
Antirheumatics	79	509	M.S.D.	Boots	Ciba-Geigy	Midy
Dermatologicals	42	243	Schering	Ciba-Geigy	Lederle	Glaxo
Gynaecologicals	80	336	Organon	Schering	Wyeth	Noury Pharma
Diuretics	78	261	Hoechst	R.I.T.	Ciba-Geigy	Searle
Antidiabetics	73	342	Hoechst	Novo	Organon	Winthrop
Hormones	38	245	Organon	Philips-Duphar	Schering	Ayerst

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Sedatives and hyponotics	65	752	Hoffmann La Roche	Union Chimique Belge	Kalichemie	Ciba-Geigy
Spasmolytics	57	163	Brocades-Gist	Hoffmann La Roche	Philips Duphar	Boehringer
BREWING INDUSTRY (1974)						
Brewing industry as a whole	92	597	Heineken	Skol (Allied Breweries)	Grolsch	Bavaria
Draught beer	86	493	Heineken	Skol (Allied Breweries)	Grolsch	Bavaria
Bottled beer	93	473	Heineken	Skol (Allied Breweries)	Grolsch	Bavaria

MARKET CONCENTRATION — YEAR: 1968–74 COUNTRY: UNITED KINGDOM

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
TEXTILE INDUSTRY						
Spinning and weaving of wool and man-made fibres (1973)	41	220	Ill-Morris	Coats-P.	Bulmer	Lister
Spinning and weaving of cotton and man-made fibres (1973)	56	236	Courtaulds	Carr-Viy.	Tootal	Vantona
Cotton etc. spinning (1968)	47	564	Courtaulds	Tootal	Viyella	Carrington
All woven cloth (1968)	33	188	Courtaulds	Carrington	Tootal	Viyella
Woven filament (1968)	60	344	Carrington	Courtaulds	Viyella	Tootal
Sewing thread (1972)	75 (b)	200	Coats-P.	Tootal		
Hosiery and knitting (1973)	52	284	Courtaulds	Nottingham	Coats-P.	Carr-Viy.
Warp-knitted fabrics (1968)	64	436	Courtaulds	Viyella	Carrington	Tootal
Women's hose (1974)	60 (b)	560	Courtaulds	Tillings		

(b) C_2 instead of C_4

NB: Tootal is linked financially both to Courtaulds and to ICI and ICI controls the Carrington-Viyella group.

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
PAPER INDUSTRY (1972)						
Paper manufacture	49	200	Wiggins Teape Ltd.	Bowater	Reed	DRG*
Printing and writing papers	65	336	Bowater	Reed	Wiggins Teape Ltd.	Inveresk
Paper board	71 (c)	248	Unilever	Wiggins Teape Ltd.	Mardon	
Paper conversion	53	216	DRG	Reed	Mardon	Bowater
Manufactured stationery	83 (b)	620	DRG	Wiggins Teape Ltd.		
Packaging other than board	57 (b)	376	DRG	Reed		
Board packaging	51	212	Reed	Mardon	Bowater	Unilever
PHARMACEUTICALS INDUSTRY (E) (1973)						
Broad-spectrum antibiotics	80	268	Beecham	B.Wellcome	Glaxo	Lederle

DRG = Dickinson—Robinson Group Ltd.   (E) Very approximate estimations

(b) C_2 instead of C_4

(c) C_3 instead of C_4

MARKET CONCENTRATION — YEAR: 1973 COUNTRY: UNITED KINGDOM

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Systemic anti-inflammatories	88	244	M.S.D.	Boots	Geigy	Winthrop
Bronchodilators	82	516	Fisons	A. & H.	..	Boehringer
Other hypertensives	91	782	M.S.D.	Ciba	Berk Pharma*	Boehringer
Diuretics	80	310	Hoechst	M.S.D.	Searle	Ciba
Non-narcotic analgesics	70	290	Winthrop	Dista	..	Wyeth
Antidepressants	61	215	M.S.D.	Geigy	Squibb	Warner
Tranquillizers	83	657	Roche	Wyeth	S.K.F.	M. & B.
Antiangina	93	562	I.C.I.	Ciba	..	Hoechst
Plain skin hormones	87	592	Glaxo	I.C.I.	Schering	Dista
Cough remedies	69	656	Parke Davis	Boehringer	M. & B.	..

* Berk Pharma. — Berk Pharmaceuticals

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Plain antacids	65	277	Boehringer	Wyeth	Reckitt	..
Contraceptives	82	290	Schering	..	Searle	..
Non-Barbiturate sedatives	95	856	Roche	Roussel	..	..
Peripheral vasodilators	80	252	Abbott	Lilly	Upjohn	Squibb
Systemic antibiotics	90	188	Upjohn	Abbott	Dista	Squibb
Haematinics	81	232	S.K.F.	Abbott	Glaxo	Ciba
Antinauseants	82	243	M. & B.	Beecham	..	..
Penicillins	74	156	Beecham	Wyeth	Lilly	Glaxo
Corticosteroids	59	202	Squibb	Glaxo	Pfizer	..
Anti-obesity preparations	94	479	..	..	Wyeth	..

MARKET CONCENTRATION — YEAR: 1973 COUNTRY: UNITED KINGDOM

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Laxatives	70	274	Reckitt	..	Boehringer	A. & H.
ACT—systemic hormones	60	469	Upjohn	Glaxo	Ciba	..
Oral diabetic	93	213	Pfizer	Hoechst	Winthrop	Roussel
Parkinson anticonvulsants	89	239	Geigy	..	Roche	Lederle
Antispasmodics	54	128	Searle	..	M. & B.	S.K.F.
Systemic antihistamines	66	217	A. & H.	M. & B.	B.Wellcome	Winthrop
TB preparations	95	182	..	Ciba	Lederle	..
Oral cold preparations	90	377	B.Wellcome	..	Warner	..
Other vitamins	92	229	Ciba	Roche	..	..

Concentration ratios (C_4) and coefficients of disparity $(4L)$

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
PHOTOGRAPHIC INDUSTRY (1973)						
Still (sensitized surfaces for cameras)	95	599	Kodak (71%)	Agfa-Gevaert	Ilford	Boots
Cine (8,Super 8, etc.)	90	828	Kodak (72%)	Ilford	Agfa-Gevaert	Boots
MANUFACTURE OF MACHINERY OTHER THAN ELECTRICAL MACHINES (1972/1974)						
Tractors (1974)	71	150	Ford	Massey Ferguson	David Brown	International Harvester
Combine harvesters (1974)	82	195	Claas	New Holland	Massey Ferguson	John Deere
Cranes, hoists, lifting and winding devices (1972)	68	181	Coles Cranes	Clarke Chapman	Herbert Morris	NCK Rapier
Lifts and escalators (1972)	85	297	Otis Elevator	Marryot	Express Lift Company	Hammond & Chapman
Powered industrial trucks (1972)	59	234	Lansing Bagnall	Lancer Boss Group	Coventry Climax	Hyster

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
FOOD AND DRINK INDUSTRY						
Beer (E) (1974)	50	175	Allied Breweries	Bass Charrington	Whitbread	Guinness
Non alcoholic drinks (E) (1974)	50 (b)		Cadbury Schweppes	Beechams		
Canned fish (1974)	71.5	660	Unilever (John West) (43.5%)	Princes (19%)	Cucumber (5%)	Glenryck (4%)
Frozen foods (1973)	87 (c)	600	Unilever	Nestlé	Imperial	
Ice cream (1973)	84 (b)	212	J. Lyons & Co. (43%)	T. Wall* & Sons (41%)		
Condensed milk (1973)	80 (b)	200	Carnation Foods (40%)	Nestlé (40%)		
Evaporated milk and sterilised cream (1973)	97	285	Carnation Foods (49%)	Nestlé (crème) (21%)	Nestlé (lait) (17%)	Libby (10%)
Milk powder (1973)	82 (b)	1166	Cadbury Schweppes (70%)	Carnation (12%)		
Butter (1973)	62	236	Nouvelle Zélande (24%)	Danemark (22%)	Australie (8%)	Irlande (8%)

(a) C_1 instead of C_4

(b) C_2 instead of C_4

(c) C_3 instead of C_4

* Controlled by Unilever

(E) Very approximate estimations.

The market share of the conglomerate group "Grand Metropolitan Ltd." has been omitted from the figures concerning beer.

9

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Yoghourt (1974)	72	296	Express Dairy Co.	Unigate	Van den Bergh's [1]	Marks & Spencer
Margarine (1973)	77 (b)	1340	Van den Bergh & Jurgens [1] (67%)	Kraft (10%)	CWS*	Sainsbury
Breakfast cereals (1973)	89	512	Kellogg Company	Weetabix	National Biscuit Co.	Quaker Oats Ltd.
Crackers and cream biscuits (1973)	80 (E) (c)	165	ABM* (35%)	United Biscuits (30%)	National Biscuit Co. (15%)	
Chocolate biscuits (1973)	72.5 (b)	444	United Biscuits	Cadbury Schweppes		
Sugar (1973)	96 (c)	340	Tate & Lyle (54%)	British Sugar Corp. (26%)	Manbre & Garton (16%)	
Infant foods (1973)	70	196	H.J.Heinz	Glaxo Holdings	Unigate	Gerber
Dehydrated and powdered potato (1973)	80	367	Unilever	Corn Products Co.	(Nestlé) Chef	Maggi
Canned soup	80 (c)	700	H.J. Heinz (60%)	Campbell Soup (12%)	Crosse & Blackwell (8%)	Baxters

(b) C_2 instead of C_4
(c) C_3 instead of C_4
(E) Very approximate estimations

* CWS = Cooperative Wholesale Society
ABM = Associated Biscuits Manufacturers Ltd.
1 = Controlled by Unilever

MARKET CONCENTRATION — YEAR: 1972   COUNTRY: DENMARK

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
Psychopharmacological drugs	62	303	Dumex	Hoffmann La Roche	Lundbeck	Ferrosan (Wyeth)
Tranquillizers	98	684	Dumex	Hoffmann La Roche	Ferrosan (Wyeth)	Gea
Antibiotics	65 (c)	104	Løvens Kemiske Fabrik	Astra	Novo	
Analgesics	80	676	The Danish Pharmacies	Sandoz	Alfred Benzon	Løvens
Vitamins	89	254	The Danish Pharmacies	Ferrosan	Dansk Droge	Dumex
Contraceptive pills	85	224	Schering	Wyeth	Novo	Searle
Insulin for oral diabetics	63 (b)		Hoechst	Lundbeck		
Sulphonamides	66 (c)	199	Hoffmann La Roche	Gea	Pharmacia	

(b) C_2 instead of C_4
(c) C_3 instead of C_4

Concentration ratios (C_4) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C_4	4L	I	II	III	IV
	(%)					
ELECTRICAL ENGINEERING						
Magnetic tape recorders	77		Philips	Eltra-Sony	Tandberg	Bang & Olufsen
Record players	78		Bang & Olufsen	Philips	Garrard/Arena	Lenco
Colour televisions	80		Bang & Olufsen	Philips	ITT/Standard Electric	Tandberg
Radios	70		Bang & Olufsen	Philips	ITT/Standard Electric	Rank Arena
Black and white televisions	73		Bang & Olufsen	Philips	ITT/Standard Electric	Rank Arena
Dry cleaning machines	89	477	Fisker og Nielsen (47%)	Hoover (28%)	AEG (9%)	Electrolux (5%)
Articles for the treatment of hair	95 (a)		Carmen Clairol	Bøtker Hansen	AEG	Braun Electric
Electric cookers	62 (b)	928	Ernst Voss (51%)	Scan-Atlas (11%)		

(a) C_1 instead of C_4

(b) C_2 instead of C_4

MARKET CONCENTRATION — YEAR: 1974/75 COUNTRY: DENMARK

Concentration ratios (C_4) and coefficients of disparity $(4L)$

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION C_4 (%)	4L (%)	LEADING FIRMS AND THEIR RANK I	II	III	IV
FOOD INDUSTRY						
Coffee	38	196	FDB (16%)	Merrild (9%)	Frellsen (7%)	Gevalia (6%)
Margarine	76	252	Unilever (28%)	Alfa (22%)	FDB (20%)	Irma (6%)
Infant foods	98 (c)	587	Nestlé (60%)	Plumrose (30%)	Irma (8%)	
Frozen foods	80	235	FDB (28%)	Plumrose (25%)	Dybfrost (20%)	Irma (7%)
Ice Cream	91 (c)	281	Frisko (Unilever) (46%)	Premier (Beatrice Food) (28%)	Eventyr Is (17%)	
Canned fruit and vegetables	56	210	FDB (20%)	OK (19%)	Beauvais Plumrose (10%)	Irma (7%)
Canned meat	78	296	JAKA (32%)	Plumrose (30%)	DAK (8%)	Fåborg (8%)
Sugar	100 (b)	1228	De danske sukker- fabrikker (86%)	Nykøbing (14%)		
Cheese	42	241	A	B	C	D

(b) C_2 instead of C_4

(c) C_3 instead of C_4

10

MARKET CONCENTRATION — YEAR: 1974/75 COUNTRY: DENMARK

Concentration ratios (C$_4$) and coefficients of disparity (4L)

INDUSTRY OR MARKET	MEASURE OF CONCENTRATION		LEADING FIRMS AND THEIR RANK			
	C$_4$	4L	I	II	III	IV
	(%)					
Milk and milk products	39	185	A	B	C	D
Butter	40	193	A	B	C	D

APPENDIX   2

Surveys of retail prices and mark-ups
_____

(price - mark-up surveys)

PROVISIONAL OUTLINE METHODOLOGY
_____

The surveys are based on a very
confined sample of sales points
and industrial foodstuffs.

I. LIST OF INFORMATION WHICH INSTITUTES AND EXPERTS CARRYING OUT THE PRICE AND MARK UP SURVEYS ARE TO PROVIDE

1. **PRODUCT** : (weight, measure, packaging) broken down by brand : point 2.

2. **BRAND** : a distinct code number for each packing, according to weight and dimension.

3. **BRAND DETAILS** :
   - manufacturer's brand ;
   - trade brand ;
   - distributors own label.

4. **PRODUCT ORIGIN** :
   - home-produced ;
   - imported ;
   - mixed ;
   - indefinable.

5. **TYPE OF BUSINESS** : Classified according to type, location and function of the sales point (e.g. suburban hypermarket). The number of sales points analysed for each type of business is given (number of observations).

6. **SALES POINT** : (Code number, name).

7. **OWNER GROUP** : Financial, industrial or commercial group which owns or controls the relevant sales points.

8. **TIMING** : (Number and date of survey)
   Example : Survey No 1, 15 January 1976 ; Survey No 2, 15 April 1976 ; etc.

9. **TOTAL SELLING PRICE OF PRODUCT/BRAND** : The price recorded for each brand and for each type, dimension and weight of the relevant product. These are the prices which will be fed into the computer.

10. **CURRENCY** : (DM, FF, FB, LIT., etc.)

11. **UNIT OF MEASUREMENT/WEIGHT** : e.g., 100 g, 1 kg, 1 litre, 1 m^2, etc.

12. **MULTIPLIER/DIVISOR** : The weight and dimension for each product brand (e.g., 250 g, 750 g, half litre, etc.). The multiplier or divisor is thus the figure by which the total price of the relevant packing (point 9) is multiplied or divided in order to obtain the unit price.

13. **TOTAL BUYING PRICE** : Price paid by the retailer who buys the specific brand in the relevant weight or dimension, to which the total selling price corresponds exactly (point 9).

14. **EXCHANGES RATE** : The exchange rate applied to each national currency to give the selling and buying prices in a European currency.

II. SERIES OF PRICE - MARK-UPS TABLE

The detailed information briefly described above enables the Commission's Computer Centre to carry out a number of calculations.

By way of example, the following tables can be set up for each survey number (or date), for each country or area and for each product market :

Table 1 : Surveys of prices and mark-ups :
           Detailed results by sales point.

Table 2 : Price surveys :
           Rankings based on price differences between sales point.

Table 3 : Price surveys :
           Comparisons of prices and variations as between types of business.

Table 4 : Price surveys :
           Structure and evolution of the sample basket by type of business.

Table 5 : Mark-up surveys :
           Rankings based on differences in mark-ups as between sales points.

As we have seen, these tables will be set up for each country (or area) on the basis of a highly restricted sample of sales points (averaging between 30 and 50 for each country or area). Interpretation of these tables would seem easy enough.

Table 1 simply reproduces the raw data compiled by the researcher, with the sole addition of the mark-up, in other words the percentage added by each seller to his buying price in order to obtain the retail price. This table also displays the type of business (e.g. suburban supermarket) to which each sales point in the sample belongs, together with all the figures (total prices, unit prices, mark-ups) not only for the latest survey but also for the previous survey, giving a series of meaningful comparisons.
Table 1 gives detailed figures both for each sales point (on the left) and for each product (on the right).

For each product it should be emphasized that table 1 higlights two main facts, one concerning the type of brand (manufacturer's brand, trade brand or distributor's own label) and the other concerning the origin of the product (home-produced, imported, or partly home-produced).

Although the basis for successive econometric calculations is represented by the total price, table 1 also brings out the unit price so as to detect certain pathological cases where the difference in weight and packing conceals substantial differences in the price of the same quantity of the same product.

Table 2 gives the result of a series of computer calculations from the basic figures, giving the gap between maximum and minimum prices both for each product (on the left) and for each sales point (on the right). The products are ranked according to the gap between the maximum price and the minimum price. The table also gives the percentage variation from one survey to the next (t+i).

Unlike tables 1 and 2, Table 3 does not give such detailed results but marks the first stage of the gradual process of comparitive synthesis, bringing out prices and variations (together with maximum and minimum figures) for each type of business and not for each sales point. However, this table remains product analytical since each brand and packing are considered separately.

Table 3 also gives prices in European currency (i.e. in units of account : u.a.) obtained by applying the exchange rate recorded at the dates of the survey.

Table 4 no longer considers individual products (brands and packagings) but the aggregate of the products in the sample, known as the basket. However it must be born in mind that this basket is not to be regarded as representative of household expenditure in the technical sense generally employed by statisticians. Additional information is given by table 4 which, within the basket, distinguishes prices and variations for different types of brand (manufacturer's brand, trade brand or distributor's own label) and relating to the differing origin of the products (home-produced, imported, mixed).

It would, for instance, be particularly interesting to ascertain :

- the proportion of the aggregate basket represented by own labels ;

- the proportion of the basket accounted for by imported goods ;

- which products rise or fall most on average - own labels or others, imported or home goods, etc.

Variations are obtained from the average of the variations in the total prices of each of the products in the basket.

Finally, Table 5 gives full, detailed figures for mark-ups, broken down by product (brand and packing) and by sales point. However, setting this table up is a particularly onerous task, since in several countries it is virtually impossible to ascertain mark-ups. In many cases, then, they are no more than approximate estimates and econometric calculations based on them are not entirely foolproof.

*

*   *

In the near future, we shall attempt to establish intra-Community comparisons of the prices of the relevant products, mark-ups and variations (both in prices and in mark-ups), using subsequent tables (numbered 6 etc.). At any rate, we are still at the experimental stage and the price and mark-up surveys are currently carried out only in respect of the distribution of a number of industrial foodstuffs and beverages constituting a highly restricted sample of "relevant" products.

TABLE 1

SURVEY OF PRICES AND MARK UPS

DETAILED RESULTS BY SALES POINTS

N° of survey :   Country   :

Date :   Industry :

(Figures in parentheses are for
survey no   of   )   Currency :

SAMPLE OF SALES POINTS			PRICES	NUMBER AND NAME OF PRODUCT			
Type of busi- ness	No and name of "SALES POINT"	No and name of owner group	Selling price ——— Buying price ——— Mark up	Brand ... Origin ...			...
				Total price ( )	Quan- tity ( )	Unit price ( )	...
							...
	...		( ) ( ) ( )				
	...		( ) ( ) ( )				
	...		( ) ( ) ( )				
TOTAL SAMPLE			AV (AV) AV (AV) AV (AV)				

AV = Average Price (selling, buying) and Mark-up for each Product analysed by Sales
Points.

TABLE 2

PRICE SURVEYS

SALES POINTS RANKED ACCORDING TO PRICE DIFFERENCES

No of survey :   Country :

Date :   Industry :

(Figures in parentheses are for
survey no   of   )   Currency :

Ranking	PRODUCT RANKING	$t+i_{p_j}*$: SELLING PRICE ( )	CORRESPONDING SALES POINT	$t+i_{s_j}*$: VARIATIONS (2)	RANKING OF SALES POINTS in decreasing order of prices (in nation currency)					
	No and name of product	MAXIMUM ( ) MINIMUM ( ) Pourcentage diff.[1] ( )	... ... —	... ... —	Type of business	No and name of sales point	Owner group	Total price ( )	Quantity ( )	Unit price ( )
1	...	( ) ( ) ( )								
2	...	( ) ( ) ( )								
..	...	( ) ( ) ( )								
	TOTAL PRICE OF BASKET	MAXIMUM ( ) MINIMUM ( ) Percentage diff.[1] ( )								

(1) Percentage difference = $\dfrac{\text{maximum price} - \text{minimum price}}{\text{minimum price}}$

(2) Variations between the preceding survey (in parentheses) and
this survey (t + i)

TABLE 3

PRICE SURVEYS

COMPARISONS OF PRICES AND VARIATIONS BY TYPE OF BUSINESS

No of survey :

Date :

(Figures in parentheses are for
survey no   of   )

Country :

Industry :

Currency :

Exchange rate :

SAMPLE OF SALES POINT		VALUE	PRODUCT SAMPLE						
			NUMBER AND NAME OF PRODUCT						...
TYPE OF BUSINESS	NUMBER OF OBSERVATIONS	MAXIMUM ( ) MINIMUM ( ) WEIGHTED AVERAGE ( )	Brand ...			Origin ...			...
			$p_j^{t+i}{}^*$: SELLING PRICE ( )		CORRES-PONDING SALES POINT	$S_j^{t+i}{}^*$: VARIA-TIONS	CORRES-PONDING SALES POINT		
			nat.curr.	eur.curr.		in %			
...		( ) ( ) ( )							
...		( ) ( ) ( )							
TOTAL SAMPLE		MAXIMUM ( ) MINIMUM ( ) WEIGH. AVERAGE ( )							

TABLE 4

PRICE SURVEYS

STRUCTURE AND EVOLUTION OF THE BASKET BY TYPE OF BUSINESS

No of survey :

Date :

(Figures in parentheses are for
survey no   of   )

Country   :

Industry :

Currency :

Exchange rate :

SAMPLE OF SALES POINTS		VALUE	TOTAL PRICE		CORRES-PONDING SALES POINT	STRUCTURE OF BASKET							VARIATIONS IN THE BASKET [1] (%)						
						of which : brand			of which : products				of which : brand :			of which : products :		
TYPE OF BUSINESS	NUMBER OF OBSER- VATIONS	MAXIMUM ( ) MINIMUM ( ) WEIGHTED AVERAGE ( )	National Currency	European Currency		Manufact. brand ( )	Trade brand ( )	Distri- butor's own label ( )	Home pro- duced ( )	Im- ported ( )	Mixed ( )	TOTAL	Manufact. brand	Trade brand	Distribut. own label	Home pro- duced	Imported	Mixed
						in national currency												
...		( ) ( ) ( )																
...		( ) ( ) ( )																
...		( ) ( ) ( )																
TOTAL SAMPLE		MAXIMUM ( ) MINIMUM ( ) WEIGHTED AVERAGE ( )																

[1] Variations are obtained from the average of the variations in the total prices of all the pro-
ducts in the basket.

TABLE 5

SURVEYS ON MARK UPS

Rankings based on differences in mark ups as between sales points

No of survey :   Country :

Date :   Industry :

(Figures in parentheses are for
survey no   of   )   Currency :

RAN-KING	PRODUCT RANKING — NUMBER AND NAME OF PRODUCT	MARK-UPS — MAXIMUM ( ) MINIMUM ( ) PERCENTAGE DIFFER. [1] ( )	CORRESPONDING SALES POINTS	RANKING OF SALES POINTS (in decreasing order of mark-ups)			
				Type of busi-ness	Number and name of sales point	Owner group	Mark-ups $t+i \atop q_j^*$ ( )
1	...	( )					
		( )					
		( )					
..	...	( )					
		( )					
		( )					
	OVERALL MARK UPS	MAXIMUM ( ) MINIMUM ( ) PERCENTAGE DIFFER. [1] ( )					

[1] Percentage difference =

$$\frac{\text{maximum mark up} - \text{minimum mark up}}{\text{minimum mark up}}$$

ANNEXES

List of institutes and experts who have carried out
research for the Commission

GERMANY   :   - IFO-Institut für Wirtschaftsforschung, Munich.

              - Kienbaum Unternehmensberatung, Gummersbach.

FRANCE   :   - DAFSA Analyse S.A., Paris.

              - Institut agronomique méditerranéen (I.A.M.) et INRA, Montpellier
                (J.L. Rastoin, G. Ghersi, M. Castagnos, D. Boulet, J.P. Laporte).

              - GREFI, Université de Rennes (Prof. G. Bertin).

ITALY   :   - FIS-ATOR Consulenza Aziendale, Milano
                (A. Amaduzzi, R. Camagni, G. Martelli).

              - SORIS S.p.A. Studi e ricerche di Economia e Marketing, Torino
                (P. Balliano, G. Bertone, F. Guaschino, R. Lanzetti).

NETHERLANDS   :   - Stichting voor Economisch Onderzoek der Universiteit van Amsterdam
                (Prof. H.W. de Jong en A.H. Smolders).

              - Stichting Nijenrode, Breukelen (Prof. H.W. de Jong).

BELGIUM   :   - STUDIA v.z.w.d., Bruxelles (J. Hallet).
              - CRIDE, Louvain (Prof. Alex Jacquemin).

UNITED KING- :   - Cranfield School of Management, Cranfield, Bedford
DOM   (F. Fishwick, W. Hull, R.B. Cornu).

              - London School of Business, London (Prof. J.B. Heath).

              - Development Analysts Ltd., Croydon
                (R.W. Evely, P.E. Hart, S.J. Prais).

IRELAND   :   - Faculty of Commerce, University College, Dublin
                (Prof. Louis P.F. Smith, Dr. G. Quinn).

DENMARK   :   - Handelshøjskolen in Århus
                (Th.H. Nielsen, N. Jørgensen, J. Vestergaard).

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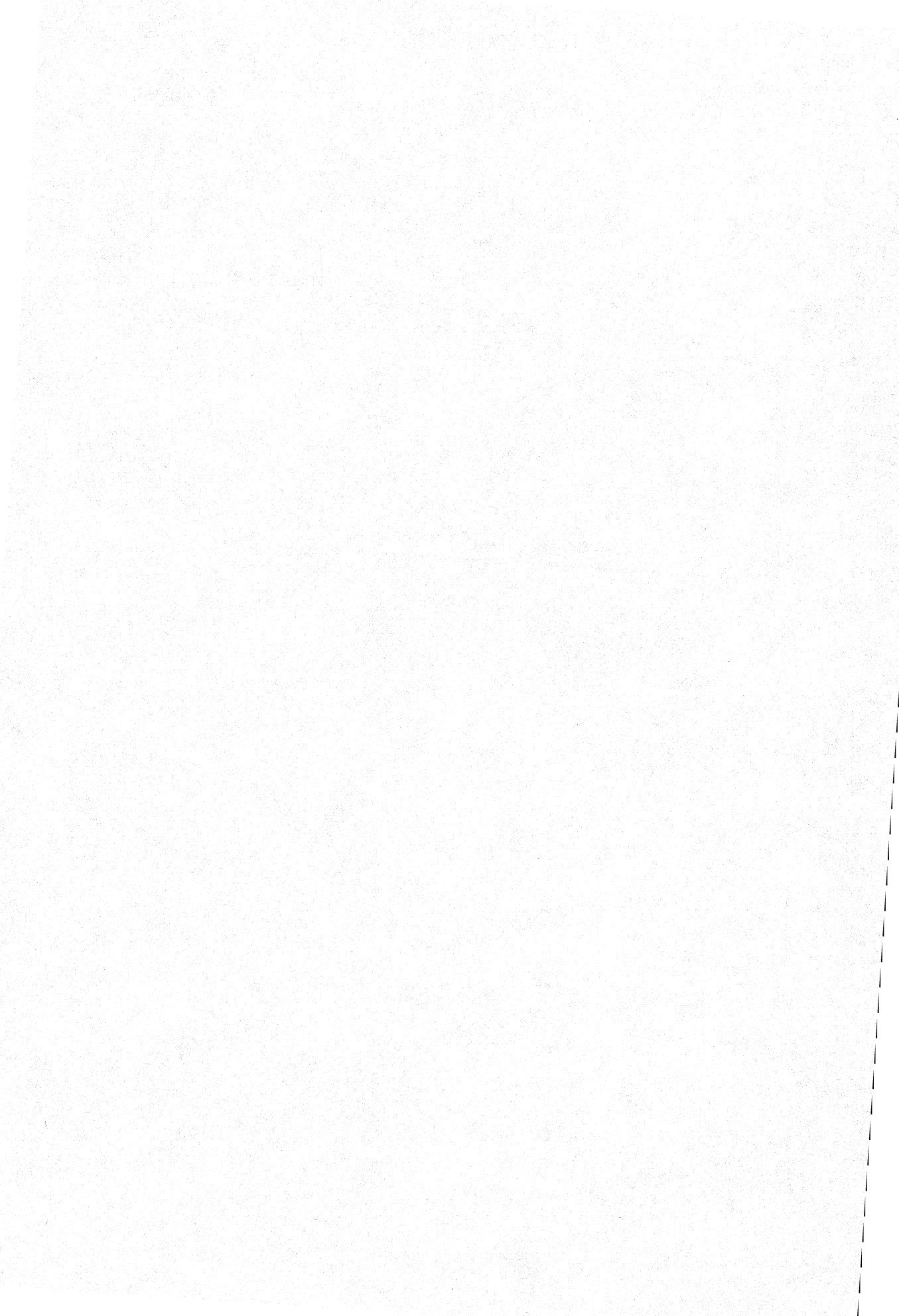
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		– Coton (NICE 233)	
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		– Transformation (NICE 272)	

FRANCE	:	– Produits pharmaceutiques (NICE 313.1)	IV/111/73-F
		– Produits photographiques (NICE 313.2)	

FRANCE	:	– Machines et tracteurs agricoles (NICE 361)	IV/112/73-F
		– Machines de bureau (NICE 362)	
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		– Matériel de génie civil (NICE 366.4)	
		– Matériel de levage et de manutention (NICE 366.5)	

FRANCE	:	– Cycles, motocycles et cyclomoteurs (NICE 385.1)	IV/113/73-F

GERMANY	:	– Landwirtschaftliche Maschinen und Acker-schlepper (NICE 361)	IV/343/73-D
		– Büromaschinen (NICE 362)	
		– Textilmaschinen u. Zubehör (NICE 364.1)	
		– Bau- und Baustoffmaschinen (NICE 366.4)	
		– Hebezeuge und Fördermittel (NICE 366.5)	

ITALY	:	– Industria di cicli, motocicli e ciclomotori (NICE 385.1)	IV/346/73-I

ITALY	:	– Lana (NICE 232)	IV/347/73-I
		– Cotone (NICE 233)	
		– Maglieria e Calzetteria (NICE 237)	

ITALY	:	– Industria della carta e della sua trasfor-mazione	IV/348/73-I
		– Carta (NICE 271)	
		– Cartotecnica (NICE 272)	

ITALY	:	– Farmaceutico (NICE 313.1)	IV/349/73-I
		– Fotografico (NICE 313.2)	
		– Prodotti di manutenzione (NICE 313.5)	

NETHERLANDS	:	– Farmaceutische industrie (NICE 313.1)	IV/350/73-N
		– Fototechnische industrie (NICE 313.2)	
		– Onderhoudsmiddelen (NICE 313.5)	

NETHERLANDS : – Rijwiel- en Bromfietsenindustrie (NICE 385.1) IV/351/73-N

GERMANY : – Rundfunk-, Fernseh- und Phonogeräte IV/446/73-D
                                            (NICE 375)
           – Elektrohaushaltsgeräte (NICE 376)

ITALY/BELGIUM : Tableaux de concentration IV/471/73-F
           – Laine (NICE 232)
           – Coton (NICE 233)
           – Bonneterie (NICE 237)

ITALY/BELGIUM : – Pharmaceutique (NICE 313.1) IV/472/73-F

GERMANY : Papier- und Pappeindustrie IV/514/73-D
           – Herstellung (NICE 271)
           – Verarbeitung (NICE 272)

GERMANY : – Wolle (NICE 232) IV/515/73-D
           – Baumwolle (NICE 233)
           – Wirkerei und Strickerei (NICE 237)

GERMANY : – Fahrräder (NICE 385.1) IV/516/73-D
           – Motorräder und Mopeds (NICE 385.1)

FRANCE/BELGIUM : Tableaux de concentration IV/540/73-F
           – Construction électrique (NICE 37)
           – Construction d'appareils électroniques,
             radio, télévision, électroacoustique (NICE 375)
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GERMANY/FRANCE : Tableaux de concentration IV/543/73-F
           – Laine (NICE 232)
           – Coton (NICE 233)
           – Bonneterie (NICE 237)

FRANCE/GERMANY/ ITALY/NETHERLANDS	: Tableaux de concentration ‑ Cycles et motocycles (NICE 385.1)	IV/564/73-F
BELGIUM	: ‑ Laine (NICE 232) ‑ Coton (NICE 233) ‑ Bonneterie (NICE 237)	IV/577/73-F
BELGIUM	: ‑ Construction d'appareils électriques, radios, télévision, électro-acoustique (NICE 375) ‑ Fabrication d'appareils électrodomestiques (NICE 376)	IV/578/73-F
GERMANY	: ‑ Pharmazeutische Industrie (NICE 313.1) ‑ Photochemische Industrie (NICE 313.2)	IV/579/73-D
GERMANY	: ‑ Ernährungsindustrie (ohne Getränkeindustrie) insgesamt (NICE 20B) ‑ Herstellung von Fleischkonserven (NICE 201) ‑ Herstellung von Obst- und Gemüsekonserven (NICE 203) ‑ Herstellung von Fisch konserven (NICE 204)	IV/580/73-D
BELGIUM	: ‑ Industrie Pharmaceutique (NICE 313.1) ‑ Industrie Photographique (NICE 313.2) ‑ Produits d'entretien (NICE 313.5)	IV/581/73-F
FRANCE	: ‑ Construction d'appareils électriques, radios, télévision, électro-acoustique (NICE 375) ‑ Fabrication d'appareils électro-domestiques (NICE 376)	IV/25/74-F
NETHERLANDS	: Papier- en papierwarenindustrie ‑ Vervaardiging (NICE 271) ‑ Verwerking (NICE 272)	IV/26/74-N
GERMANY/FRANCE/ NETHERLANDS	: Tableaux de concentration ‑ Pharmaceutique (NICE 313.1)	IV/34/74-F
GERMANY/FRANCE/ ITALY/NETHERLANDS	: Tableaux de concentration ‑ Fabrication du papier (NICE 271) ‑ Transformation du papier "cartotechnique" (NICE 272)	IV/45/74-F

GERMANY/ITALY	: Tableaux de concentration	IV/ 93/74-F

- Construction électrique (NICE 37)

- Construction d'appareils électroniques,
  radios, télévision, électroacoustique
  (NICE 375)
- Fabrication d'appareils électrodomestiques
  (NICE 376)

ITALY	: - Costruzione di apparecchiature elettroniche	IV/189/74-I

     ed elettroacustiche e di apparecchi radio
     e televisivi   (NICE 375)

- Costruzione di apparecchi elettrodomestici
  (NICE 376)

NETHERLANDS	: The Food Industry	IV/209/74-E

GERMANY/FRANCE	: Tableaux de concentration	IV/259/74-F

- Construction de machines non électriques
  (EX NICE 36)
- Machines et tracteurs agricoles (NICE 361)
- Machines de bureau   (NICE 362)

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- Machines pour matériaux de construction
  (NICE 366.3)
- Matériel de levage et de manutention
  (NICE 366.5)

ITALY	: Tableaux de concentration	IV/306/74-F

- Construction de machines non électriques
  (EX NICE 36)

ITALY/BELGIUM/ UNITED KINGDOM	: Tableaux de concentration	IV/337/74-F

- Industrie alimentaire dans son ensemble
  (NICE 20B)
- Industrie des conserves alimentaires
  (EX NICE 201/203/204)
  seulement pour l'Italie

ITALY	: - Costruzione di macchine per ufficio	IV/360/74-I

     (NICE 362)

- Costruzione di materiale per sollevamento
  e trasporto   (NICE 366.5)
- Costruzione di macchine e trattori agricoli
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ITALIE	: – Industria alimentare in complesso – Industria conserviera	IV/400/74–I
DENMARK	: The Pharmaceutical Industry	IV/457/74–E
DENMARK	: – Radio, television and electro–acoustic industry – Electrical household appliances industry	IV/458/74–E
UNITED KINGDOM	: The Food Industry	IV/70/75–E
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