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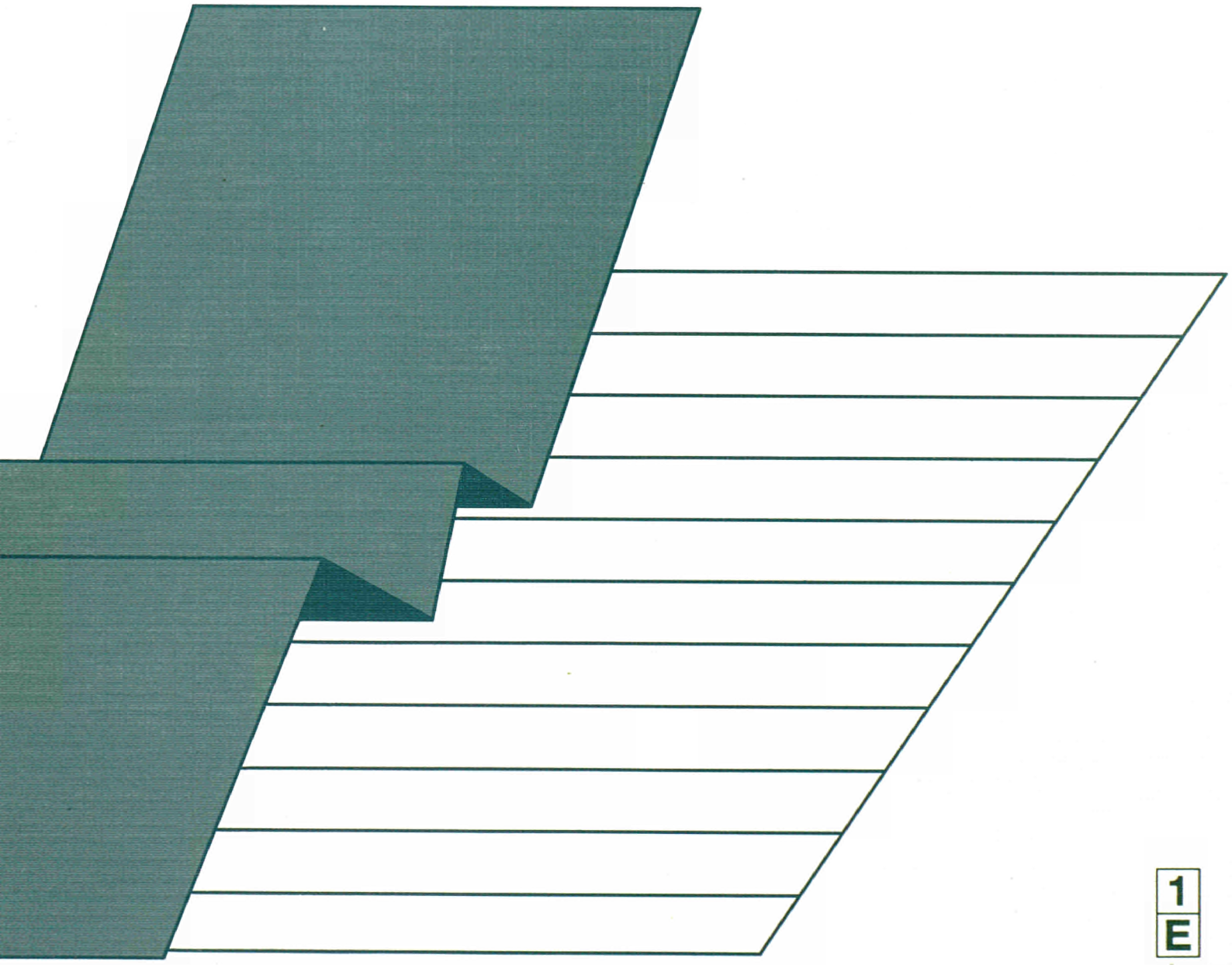
# REGIONAL ACCOUNTS METHODS

## Gross value-added and gross fixed capital formation by activity



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STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
OFFICE STATISTIQUE DES COMMUNAUTÉS EUROPÉENNES

L-2920 Luxembourg — Tél. (352) 43 01-1 — Télex COMEUR LU 3423
B-1049 Bruxelles, rue de la Loi 200 — Tél. (32-2) 299 11 11

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Y. Franchet
Directeur général

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## Gross value-added and gross fixed capital formation by activity

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STATISTICAL DOCUMENT

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# FOREWORD

Regional economic statistics have an important role to play in the formulation, implementation and evaluation of regional policies. In particular they are used for assessing regional disparities, and, in the context of the EEC Regulations on the structural funds, for the eligibility of regions to the different objectives. With increased expenditure on the structural funds, there comes a greater need for consistent and reliable regional statistics than ever before and in particular for regional economic accounts. Indicators, so widely used as Gross domestic product (GDP), Gross value added (GVA) and Gross fixed capital formation (GFCF) per region, should be evaluated in an harmonized way, in order to provide comparable figures for the European regions.

This document expands on the principles settled in the ESA regional chapter to compile regional accounts by industries[1]. It starts a series dedicated to develop the ESA recommendations with more details, giving more practical guidance. It will continue with those on regional household accounts and the regionalization of central government transactions

The manual intends to give to regional statisticians a clear guidance on the concepts and methods to compile harmonized GDP, GVA and GFCF per region. It should also help users understand the figures they are using and thus use them more appropriately.

The principles and methods are applicable to the different activities covered in the sections of the NACE Rev.1., and by extension, to other regional aggregates as employment and compensation of employees. For those activities, where statisticians have encountered particular difficulties, such as:

C Mining and quarrying

E Electricity, gas and water supply

F Construction

I Transport Storage and Communication

J Financial intermediation

a more detailed coverage is offered.

Luxembourg, February 1995

1 According to the proposal for a Council regulation (EC), COM(94) 593 final, 16/12/1994.

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# INTRODUCTION

## 1. Policy background

Reliable, consistent and relevant regional statistics provide a firm foundation for policies aimed at reducing economic and social disparities between the regions of Europe. Only by using relevant and consistent statistics can we identify objectively those regions which are in need of assistance and measure the disparities. Statistics have an important role to play at all stages of the policy process: formulation, implementation and evaluation. Thus the improvement and development of regional statistics is one of the objectives of the European Union Statistical Programme.

With increased expenditure on the structural funds, there comes a greater need for consistent and reliable regional economic statistics than ever before and particularly for regional economic accounts. Eurostat and national statistical offices must work together to ensure that these regional statistics are, and are seen to be, good enough to base important decisions on. This means not only a programme of improvement and development, but openness about methods and quality.

Also with the enlargement of the European Union, some national statistical offices are compiling regional accounts for the first time. The systems they set up and methods they employ will vary according to the available data etc, but they can learn from the experience of other member states. Moreover new systems must adopt agreed principles and use methods generally accepted as appropriate. Unless they do so, the cohesion of European regional statistics is reduced.

## 2. Relevant statistics

For the time being, two regional accounts statistics have been identified as particularly relevant to the structural funds: gross value added (GVA) and gross fixed capital formation (GFCF). GVA is used to estimate gross domestic product at regional level (GDPR); both are measures of economic activity. GFCF measures investment by producer units resident in a region. These measures of economic development are the subject of this document. Other economic statistics such as household income and government accounts provide valuable information about the people living in the regions and the effect of government on the regions. These are being developed by member states in cooperation with Eurostat.

## 3. Historical background

Regional accounts have a long history in some member states, particularly founder members of the European Union. Gross value added and gross fixed capital formation have been produced for over 20 years in some member states. On the other hand some member states who joined the European Union recently have only a few years experience of compiling regional accounts.

Progress and methodological problems are discussed at the Working Party on Regional Accounts and Statistical Indicators at Regional Level. As regional economic statistics became more important for European Union policy, the working party began to discuss regional accounts methods in more detail. This work contributed substantially to the new regional chapter of ESA and is the basis of this, more practical, document.

## 4. Principles and concepts of regional accounts

Regional accounts are a regional specification of the corresponding accounts of the nation. Thus regional accounts make use of the concepts used for national accounts. There are substantial conceptual and practical difficulties in compiling a full set of accounts at regional level. So the European System of Accounts (ESA) specifies a limited system of regional accounts. This covers some aggregates by industry and simplified accounts for households.

Until now statisticians have worked according to their own national conventions and also the Eurostat guidelines in the ESA and ESA/reg. The new regional chapter of the revised ESA provides clearer guidance on concepts, principles and methods. It will be supplemented by this document giving more practical guidance on GVA

and GFCF. Household and government accounts will be the subject of future Eurostat documents.

## 5. Methods

Methods vary because they are determined by the type of data available and the organisation of the national statistical system. Different methods can produce comparable results: for example income and output data both produce valid measures of gross value added. Of course there is always room to harmonise and improve methods of exploiting the data at a detailed level, in particular where data are incomplete. Harmonised methods should improve comparability across the European Union even if the effect on quality is unclear for individual member states.

More fundamentally, some national accounts concepts can be interpreted in different ways at regional level and new principles have to be developed to deal with multi-regional and cross-regional activity. Different interpretations suit different purposes. The ESA regional chapter has developed the interpretation of some national accounts concepts at regional level. That will lead to greater comparability between member states. The choices made for regional accounts in the European Union should develop this theoretical basis, but must also emphasize harmonization to reflect the structural funds' need for comparable estimates.

## 6. Quality

The quality of regional statistics varies between regions across the European Union, but little work has been done to assess likely errors in the estimates. This would be a difficult task. Generally we can say that statistics for small, sparsely populated regions are less reliable than those for bigger regions. However it is likely that small differences between regions are well within the margin of error of the figures, particularly for the smaller regions.

Quality depends on three things: region size, data quality and methodology. This document concentrates on improving and harmonising methods, but the other aspects must not be forgotten. Region size and data quality are often outside the control of the statistician responsible for regional accounts. So co-ordination with other statisticians becomes a key issue for regional accounts.

## 7. Scope of document

This document expands on the regional chapter of the revised ESA. Chapter I provides a set of principles governing the broad approach to producing regional GVA and GFCF. Occasionally the recommendations differ from those adopted for national accounts, as for the regional allocation of ancillary activities. Chapter II gives some practical guidance on how these should be applied in certain industries where statisticians have encountered particular difficulties with principles, methods and data.

This document is intended to help regional statisticians produce relevant, consistent and reliable figures which can provide a firm foundation for good regional policy. The document should also help users understand the figures they are using and thus use them more appropriately.

# CHAPTER I: GENERAL PRINCIPLES

This chapter explores the general principles to be adopted in measuring the gross value added (GVA) produced by and the gross fixed capital formation (GFCF) of the producer units resident in a given region. It expands on the principles set out in the regional chapter of the revised ESA.

We begin by defining the concepts of regional territory, residence and producer units, and establishing rules for the regional breakdown of GVA and GFCF. Our first principle is that the allocation rules for GVA and GFCF should be consistent: GFCF should be allocated to the same units as the GVA. (See 6.1 for details)

The economic territory of regions is largely clear cut, although boundaries can change over time. Certain activities such as off-shore extraction of oil and gas and territorial enclaves such as embassies cannot be allocated to regions and section 1 recommends the creation of an extra-regio to include these activities.

The concept of residence is discussed in section 2 and preferred to a strictly territorial approach.

Producer units are discussed in section 3 and local KAU are recommended as the observation unit for regional accounts by industry. There are great conceptual difficulties in allocating the activities of multi-regional units to regions. For example the gross operating surplus of multi-regional enterprises. However difficult it is, an allocation must be made to regions, otherwise the aggregates are not comprehensive. For comparability it is important that all member states adopt the same approach.

The different approaches to compiling regional accounts are discussed generally in section 4. Pure methods are preferred to those involving estimation and bottom-up methods are generally preferred to top-down estimates. Additional principles relating to GVA and GFCF are discussed in sections 5 and 6 respectively. In both sections we focus on key areas of difficulty and potential disagreement. For GVA an expenditure approach is not feasible at regional level, but income and output approaches are both suitable and a mixed income-output approach is common.

Member states have developed different methods essentially for practical and historical reasons. Those with a strong system of regional government or where statistics are collected in regional offices have tended to compile regional accounts by aggregating these estimates (a bottom-up approach). They usually have an output based estimate of GVA. Statisticians in other member states have exploited their access to centralized administrative data such as registers or tax records. They may have a more top-down approach to regional accounts and may compile an income estimate of GVA.

The differences in approach between member states may appear large at first sight. But different methods can produce equally valid and comparable results. Also on closer examination, the actual methods of calculation are often remarkably similar at a detailed level. For example wages and salaries is the key determinant of GVA in several industries in both output and income based estimates. These similarities are illustrated in II, which discusses the practical application of the general principles outlined here and in ESA.

## 1. Regional territory

The economic territory of a country is unambiguously defined in ESA 205 (see appendix A). For regional accounts purposes it can be divided into the regional territory and the extra-regio territory. (see ESA 1304 and 1305).

### 1.1 The regional territory

It includes:

a) the region that is part of the geographic territory of a country;

b) any free zones, including bonded warehouses and factories under customs control in the region;

### 1.2 The extra-regio territory

It is made up of parts of the economic territory of a country which cannot be attached directly to a single region. It consist of:

a) the national air-space, territorial waters and the continental shelf lying in international waters over which the country enjoys exclusive rights;

b) territorial enclaves (i.e. geographic territories situated in the rest of the world and used, under international treaties or agreements between States, by general government agencies of the country (embassies, consulates, military bases, scientific bases etc.))

c) deposits of oil, natural gas etc. in international waters outside the continental shelf of the country, worked by resident units

### 1.3 The Nomenclature of Territorial Statistical Units (NUTS)

The NUTS is the regional classification used to compile GVA, GFCF and other regional statistics.

## 2. Residence and territory concepts

Some productive activity crosses regional boundaries eg transport services and energy supply can consist of moving goods between two or more regions. Producer units[1] may also operate in more than one region either at permanent sites or on a temporary basis eg builders may undertake work in different regions. A clear principle is needed to help member states allocate this inter-regional activity consistently between regions.

### 2.1 The residence principle

The general principle chosen for regional accounts is that GVA should be allocated to the region where the producer unit is resident, and GFCF should be allocated to the same region where the producer unit owning the goods use them (see ESA 1319 and 1320). These principles conforms best with ESA. The principle adopted for GFCF ensures consistency between GVA and GFCF. The concept of a resident producer unit is covered in section 3.

The residence principle is particularly difficult to apply in the energy and transport industries which are discussed in detail in chapter II. In brief the residence principle means that GVA from transporting goods across several regions is not split between the regions, but allocated to one region - the one where the producer unit is resident. Also GFCF in national infrastructure networks is allocated to the region where the unit in charge of the infrastructure is resident rather than where the asset is located. For example GFCF on telephone cables or railway lines is allocated to the region where the engineering unit is deemed to be resident even though the cables or rails are laid in other regions.

Multi-regional units have permanent sites in more than one region. Their activity should be divided between their constituent units (see section 3). But some producer units are active in two or more regions without having permanent sites. For example a builder might acquire some equipment to work on a building site in another region. These activities contribute to the GVA and GFCF of the builder's region of residence not the region where the building site is located (unless the site is in existence long enough to become a local unit in its own right).

This residence approach will not meet all users' needs. Users wishing to consider the infrastructure of a region and its growth would wish to include these networks where they are located regardless of the relevant producer unit.

### 2.2 The territorial approach

An alternative concept of GVA and GFCF would be strictly territorial. According to the territorial concept, the activities of the builder in the example above would be allocated to the region where the building site is located. The inter-regional transport activity would be split between the regions and GFCF on energy and transport networks would be allocated to the region where the asset is located. In more general terms - activity resulting from factors of production would be allocated to the region in which the economic activities are actually carried out, irrespective of the resident regions of either the factor of production or the production units.

Differences between residence and territory based estimates of GFCF are likely to be small at NUTS level I, but more significant for smaller areas such as NUTS III.

An additional analysis of GFCF according to the territorial principle might be useful to users interested in the capital stock or infrastructure of a region. However the

1 Throughout this document, the term producer unit will be used in a general sense; when particular precision is needed, a specific reference will be made to the units included in the Council Regulation (EEC) N° 696/93 of 15 March 1993 on statistical units (enterprise, kind of Activity (KAU), local unit, local KAU etc).

principle of residence has been chosen as the primary one for regional accounts.

### 2.3 Commuting

This section outlines the principles for dealing with people living in one place, but working in another. This commuting can be across national boundaries, but is more common between regions - particularly for smaller areas and around metropolitan centres. These commuters can be employees or self-employed.

According to the residence principles, commuters contribute to GVA in the country and region in which the local KAU where they work, is resident. Thus the estimates of Compensation of Employees reflect wages and salaries in the region where they are earned, not the region where the people earning them reside, nor for that matter the region where they are spent. The income of people resident in a region is measured by primary or disposable income of households and not GVA.

Commuters also affect the calculation and interpretation of GVA per head. GVA tends to be high in metropolitan areas and low in the surrounding suburbs. When we divide GVA by the resident population, we derive a very high GVA per head for metropolitan areas and very low GVA per head for the suburbs.

## 3. The selection of units and their regrouping

### 3.1 Statistical units

Units especially suitable for compiling regional aggregates are: local units(LU), local kind of activity units (local KAU) and local units of homogeneous production (local UHP) . These have been defined in the Regulation on statistical units, which sets out all the units useful for the observation and analysis of the production system in the European Union (see Appendix B).

The revised ESA has given precedence to KAU and local KAU as the most practical operational units for measuring flows occurring in the process of production and the use of goods and services. The UHP and local UHP are still the best analytical units for processes such as input-output analysis. Since KAU and local KAU have become the preferred units at national level, they should also be adopted for regional accounts. This corresponds with the move from aggregates by branch to aggregates classified by industry.

KAUs can cover activity in more than one region and so are not totally suitable for regional accounts. Local units, on the other hand, are strictly defined to be geographically identified places, but may cover several activities. Both the region and the industry need to be correct for regional accounts. For these and the reasons given above, the local KAU is the recommended observational unit for regional accounts.

The possibility of using the local KAU as primary unit for estimating GVA and GFCF depends on the statistical sources and varies from country to country. Full information at local KAU level is not always available. This problem is more frequent for non-manufacturing industries and when multi-regional units are involved. In these cases we must approach the local KAU via another observational unit. In national accounts this may be done using the KAU or enterprise. In regional accounts we also need the local unit to establish the correct region.

Two features of the definition of local KAU and local unit have to be borne in mind:

a) They are fixed units. Mobile equipment such as ships, trains, planes cannot be local units. Mobile equipment has to be attached to local units in an appropriate and consistent way.

b) The local KAU and local unit definitions require at least a minimum of labour activity ( According to ESA 1322 this minimum, has to be considered as the yearly equivalent of one person working half-day). Sites with no labour activity (eg a railway crossing or automated signal box) cannot be local units.

By extension of ESA (211) all units in their capacity as owners of land and existing buildings are deemed - in respect solely of transactions relating to such ownerships - to be resident units, or notional resident units, of the region in which the land and building in question are located.

### 3.2 The treatment of multi-regional and heterogeneous units

Local KAUs have been chosen in section 3.1 as the preferred statistical observation units for regional GVA and GFCF. This is straightforward for producer units with only one site. But many producer units have sites in more than one region and are active in more than one industry. We must classify their activity correctly to local KAUs to obtain reliable regional aggregates by region and industry.

There are five possible situations:

1) The producer unit can provide full data for local KAU units. No problems arise; the compilation of aggregates by industry and their correct regional allocation is straightforward. However, this is not usually the case.

2) Full information exists for local units, and for KAUs. The producer unit can be regionalized correctly, but the industrial classification of the local KAUs must be estimated when the unit has more than one activity.

3) Full information exists for local units, but not for KAUs. The producer unit can be regionalized correctly, but the industrial classification of the KAUs and local KAUs must be estimated when the unit has more than one activity.

4) Full information exists for KAUs, but not for local units. The industry can be determined correctly, but the regionalization of the information to local units and local KAUs must be estimated for multi-regional KAUs.

5) Full information exists only at enterprise level. Either or both the regional and the industrial data have to be

estimated for all producer units with more than one local KAU.

Methods involving least estimation are obviously preferable. So the recommended method of obtaining data for the local KAUs of a producer unit are (in order of preference):

a) collect direct accounting information about each local KAU;

b) estimate each local KAU using accounting data for local unit and KAU.

c) estimate each local KAU using accounting data for local unit or KAU.

d) estimate each local KAU from enterprise data.

Methods b, c and d produce increasingly less reliable estimates of the regional aggregates by industry.

### 3.3 The treatment of ancillary activities

Ancillary activities are difficult to allocate to an industry and region and their contribution to GVA is particularly difficult to measure; headquarters of enterprises(HQ) are a particular problem. Ancillary activities are discussed and defined in Council Regulation (EEC) No 696/93 on statistical units.

*a) Industry allocation.*

Ancillary activities (including HQs) must be allocated to the same industry in regional and national accounts. According to the Regulation:

If ancillary activities are carried out for the benefit of a single entity, these activities and the resources they use will constitute an integral part of the activities and resources of that unit. If ancillary activities are carried out basically for the benefit of two or more KAUs, the cost of these ancillary activities must be spread over all the KAUs which they support.

*b) Regional allocation*

The regional allocation is straightforward if the ancillary activities are carried out on the same site as the main activities or if all units are located in the same region. However ancillary activities on one site may also serve sites in other regions eg accounts and personnel functions. Ancillary activity may also be carried out from a separate site eg a central office (HQ) or a transport depot. The ancillary activities may then be separate local units and, according to the principle of residence, they have to be allocated to the region where the units are situated. (See ESA 1323).

## 4. Bottom-up and top-down methods

Having outlined the general principles for compiling regional accounts in sections 1-3, we now turn our attention to the methods used to estimate GVA and GFCF. Different member states use different methods and, as discussed in the introduction, there are often very good reasons for this and it does not necessarily affect the quality or comparability of the figures. However, some general conclusions can be drawn about the choice of methods and their accuracy.

### 4.1 Definitions

*a) Bottom-up methods*

The bottom-up or ascending method of estimating a regional aggregate involves collecting data at local KAU, and ascending by addition until the regional value of the aggregate is established. The method is named bottom-up because the elements for calculating the aggregate are directly collected at this local KAU level.

A pseudo-bottom-up approach can be followed where data for local KAU are not available. Data for local KAU can be estimated from enterprise, KAU or local unit data using one of the methods in section 3.2. The estimates can then be aggregated to obtain regional totals just as in a purely bottom-up approach. Many enterprises have only one local KAU and this method only requires estimation for multi-regional and heterogeneous enterprises.

*b) Top-down methods*

regions, without attempting to single out the local KAU or local unit. The national figure is distributed using an indicator which is as close as possible to the variable to be estimated. For example wages and salaries might be allocated to regions using total employment multiplied by average earnings from a different statistical source.

The method is named top-down because the aggregate is allocated to a region and not to a local KAU or local unit. However, the notion of local KAU or local unit is, in most cases, still needed to produce the correct regional allocation. In the example above, the employment figures must be based on local KAU or local unit data.

The notion of a local KAU or local unit does not always underpin the estimates. Sometimes an indicator is used to allocate an aggregate to regions. For example rail transport GVA may be allocated to regions according to the number of rail passengers and freight tonnage transported. This type of method is described as a pseudo-top-down method and is less reliable than a pure top-down approach.

*c) Mixed methods*

The bottom-up method is rarely encountered in its pure form. There are always gaps in the data, which have to be filled using a top-down approach. Similarly many top-down methods often include data from comprehensive sources in the same way as bottom-up estimates. Thus mixed methods are the norm.

### 4.2 Comparison of bottom-up and top-down methods

The choice between bottom-up and top-down methods is dependent mainly on the statistical sources available, but also reflects the aims of the regional accounts.

In principle the advantage of the bottom-up method is that it measures the desired variable directly and allo-

cates it correctly to region and industry. Bottom-up methods can produce estimates for any geographical area by aggregating the data appropriately (while maintaining data confidentiality). They can also produce an alternative estimate at national level if they are based on other sources. This alternative estimate could be used to validate the national accounts estimate. In practice it is usually necessary to adjust the regional estimates to agree with the national total.

Bottom-up methods depend on what the enterprises state in their returns and in the case of under-reporting, regional data will not tally with national figures, assuming that the latter were "comprehensive". In this instance, making the figures tally would not involve a straightforward distribution of a small residual amount, i.e. a simple "statistical discrepancy", but would mean assigning to the regions national figures for the "underground economy", i.e. figures, sometimes not inconsiderable, which were not the result of statistical problems but of major economic factors.

An advantage of top-down methods is the numerical coherency between national and regional accounts. These methods may also be cheaper to develop in so far as they exploit existing data or can be based on nation-wide sample surveys rather than requiring comprehensive new registers and annual census-type collections. The main disadvantage is that the estimates are not produced with direct data but with indicators.

Reliability can be estimated for bottom-up methods. Sampling error can be measured, something may be known about non-sampling error and the results can be compared with the national total. Where indicators have been used in top-down and mixed methods, it is hard to assess accuracy.

In conclusion, pure bottom-up methods have advantages over top-down and pseudo-bottom-up methods and should be the first choice. When data are not available for local KAUs, pseudo-bottom-up methods are recommended. Only in cases where no reliable information at enterprise level exists, should top-down methods be used. It is difficult to choose between a pseudo-bottom-up method and a pure top-down approach; where local KAU data can be estimated reliably, pseudo-bottom-up methods are preferable

### 4.3 Improving top-down and mixed methods

Top-down and mixed methods can generally be improved by adhering to the following principles where data permit:

a) Indicators should be as appropriate as possible and new regional data should be sought to validate or replace them - independent of the national values if necessary. Inappropriate indicators should only be a stopgap solution for major items in the accounts.

b) Where there are no regional data, the same indicator should generally be used across the European Union to improve consistency between member states.

c) If an indicator is not appropriate, the estimates should not be published separately. The results can be included in a total for completeness.

d) Top-down methods should be generally applied to components, rather than the total. For example gross operating surplus should be estimated in two parts: income of the self-employed or independent workers and gross operating surplus of companies. Similarly heterogeneous industries should be split into sub-industries (see chapter II for examples).

e) Different indicators should be used for components with a different regional distribution.

f) Some "ad hoc" disaggregation may also be considered if that improves the quality of the estimates. For example gross value added might be split into that resulting from the labour and capital components.

g) Different indicators can be used at NUTS I, II and III, if that will produce more accurate estimates. Sometimes better data are available at NUTS I than for NUTS II and III.

h) In judging an indicator it is useful to think of the "reversal test". For example if wages and salaries are used to estimate GFCF, we can ask "would employment or wages and salaries be estimated from data on GFCF?"

i) Indicators can be tested on existing data. To choose between different indicators, one can compare the actual figure collected with the estimate obtained by using the indicator to break down the national aggregate for the industry. The higher the correlation, the more suitable the indicator.

### 4.4 Adjustment of regional to national values

The sum of the regional values is rarely exactly equal to the national total and the regional figures must usually be adjusted. These differences may arise from random and other errors in the regional data itself, or from specific differences in coverage or definition of the national total.

Differences are usually allocated to the regions in proportion to the regional values, so the same percentage adjustment is applied to all regions. For example if the national total is 5% higher than the sum of the regional values, all the regional values are raised by 5%. This pragmatic approach is not always appropriate for dealing with coverage differences or non-random errors. Other solutions should always be considered.

One possibility is to make greater adjustments to the less reliable estimates - often the smaller regions. This is rarely if ever done because adjustments will have a more significant effect on estimates for smaller regions and move them further from their unbiased estimates. The opposite approach is to include adjustments in large regions where they have little effect. This is sometimes done.

### 4.5 Accuracy of regional accounts

The accuracy of regional estimates of GVA and GFCF has already been discussed in the introduction and in section 4.2. This section makes some additional points. Regional data are usually less accurate than national

data because they are based on smaller samples and inferior quality databases. Similarly, estimates for less-populated regions are less reliable than those for well-populated regions. The choice of methods also affects the accuracy of the figures see para 4.2. and 4.3.

The national economy has a strong identity: the national boundary is fixed and cross-border flows (of people, goods, services and financial assets) are usually measured, if not regulated. The regional economy is much more open: regional boundaries change from time to time and flows between regions are so commonplace that they are rarely regulated or measured.

Thus regional accounts seem to make sense only within the framework of existing national accounts. National accounts can make use of more complete data and are not confronted with as many difficulties in assigning data to areas. The national system provides an independent standard to measure the relative accuracy of regional values; from the point of view of regional accounts, national values must be accepted as given. Where the regional values are determined directly, any difference between their sum and the national values provides an indication of possible errors - usually in the regional accounts. But sometimes the regionally differentiated calculations can help to reveal implausible results in the national accounts, which should then be taken into account when revisions are made at national level.

### 4.6 Comparability of regional aggregates

In regional accounts we require comparability between aggregates, between industries, between regions and over time. Regional accounts aggregates will be comparable if:

- The national accounts series on which they are based are exhaustive, reliable and comparable with those of other member states.
- Member states have a common understanding of the regional aggregates they are trying to measure and use the same principles and definitions.
- Member states have a common approach to dealing with any missing data ie using the same indicators for specific industries.
- Methods are consistent over time.

It is helpful, but not essential for the same statistical sources to be used for each region or industry. For example labour market estimates from the Labour Force Survey are likely to be more comparable across the European Union than those based on national data sets. However there is no particular advantage in using similar sources if principles, coverage and definitions vary.

## 5. Principles and methods for GVA

### 5.1 Principles

Regional GVA is a measure of the economic activity of producer units resident in a region. It does not measure the income of resident households.

As a general principle GVA should be allocated to the region where the producer unit carrying out the activity is resident.

The statistical definition of the local KAU or local unit requires it to be at a fixed and geographically identified place. Mobile equipment is explicitly excluded and its activity has to be attached to a local unit. The residence of the local unit is an essential criterion for the allocation to a particular region of the GVA generated in local units.

### 5.2 Income and output approaches

GVA by industry can be estimated in two ways: the output and the income approaches. The two are mathematically equivalent and both are normally calculated at national level. The output and income measures of GVA by industry can be used together in national accounts to validate each other.

Both approaches can also be used for regional accounts. Ideally two estimates would be calculated independently and the results used together. In practice member states only have enough independent regional data for one set of estimates. Most member states use an output approach supplemented with income data for the service sector where there is little regional output data.

The income and output approaches can be used in combination with the various bottom-up and top-down methods discussed in section 4. There is no reason why member states should all adopt the same approach. The choice depends mainly on the statistical sources and the method should be designed to make the best possible use of whatever detailed regional data exist.

For the income approach, the following components and sub-components should be estimated separately wherever possible:

- compensation of employees
- gross operating surplus (GOS)
- GOS of the self-employed
- GOS of other producer units
- rent
- capital consumption
- other taxes less subsidies on production

### 5.3 Choice of indicators for top-down and pseudo-bottom-up based methods

Decisions on which indicators to use are tightly constrained by the data available, and by their quality. There seems to have been little empirical research into the relative validity of the various indicators. Much depends on the circumstances of individual countries and, for top-down estimates, the magnitude of the amounts to be estimated.

We gave some general recommendations on the choice of indicators in section 4.3. There are some additional points relating solely to GVA:

a) Using a gross output or sales indicator to allocate GVA between producer units or regions assumes that

intermediate consumption is the same proportion of output in all units or regions.

b) For industries where there is little output data, the income approach has the advantage that wages and salaries are a substantial proportion of GVA. When this information is available at local KAU or local unit level, only the gross operating surplus need be estimated.

c) The gross operating surplus is usually allocated using wages and salaries, labour costs, employment or turnover. Amongst these a tentative preference may be given to turnover, followed by labour costs, wages and salaries and then the number of employees. Wages and salaries are preferred to employment because those earning higher wages usually contribute more to GVA than the lower paid.

d) Using an indicator for gross operating surplus almost always results in regional values with identical signs. The surplus will be distributed across all the units to a greater or lesser extent. Thus if the enterprise or industry is profitable nationally, no region makes a loss. Without some data at local unit level, it is not possible to identify profitable and unprofitable units and improve the regional allocation.

e) In capital intensive industries, an adhoc disaggregation of GVA into labour and capital related portions may be preferable to a disaggregation into compensation of employees and gross operating surplus.

The disaggregation has two stages:

1. Split GVA into labour and capital related portions. The ratio of wages and salaries to depreciation could be used to estimate the ratio of the two portions.

2. The two portions should be allocated separately to regions or local units. The labour related part of GVA can be allocated using labour costs, wages and salaries or employment in order of preference. The capital related part requires an indicator such as depreciation, capital stock, or fixed capital formation, in that order. The average of GFCF over several years would be better than one single year.

In a pseudo-bottom-up method, this procedure would be carried out for each enterprise. In a top-down method the national total itself would be broken down in this way.

### 5.4 Ancillary activities

In national accounts ancillary activities are treated as an intermediate output within the enterprise. Ancillary units are not treated as separate local units. They are allocated to the main activity and location of the enterprise. In regional accounts we depart slightly from this ESA principle because it is important to locate the unit in the correct region. In regional accounts ancillary activity should contribute to GVA in the region where it occurs and be deducted as a cost from the value added of other units. The industry classification should be determined by national accounts conventions.

The problem of valuing the ancillary activity still remains. If we regard ancillary activities as a cost borne by other units as implied in the Regulation, we will record a very low total GVA in the regions where ancillary activities are concentrated. It seems more reasonable to assume they make a positive contribution to GVA.

If no local KAU or local unit data exist, an appropriate indicator should be used to distribute GVA and GFCF among the different local KAUs or local units and units engaged in ancillary activities. Wages and salaries and employment are the most appropriate indicators.

When using a pseudo-bottom-up method to break down GVA between local units using an indicator, the allocation of GVA to the units engaged in ancillary activities (HQ included) tends to be done implicitly.

### 5.5 The passage from regional GVA at basic prices to GDP per region (GDPR) at market prices

*5.5.1 Introduction*

Output is to be valued at basic prices. Products used for intermediate consumption are to be valued at purchasers prices at the time they enter the process of production. As a consequence, GVA per industry is valued at basic prices (see ESA 1328).

The basic price of a product is equivalent to the sum of the cost of the goods and services used, and the remuneration of the factors of production needed to produce that product. It does not include taxes paid, neither subsidies on the products, but it includes the other taxes and subsidies linked to production which it pays.

The regional equivalent of GDP is GDPR (gross domestic product per region). GDPR is valued at market prices by adding the regionalized taxes less subsidies on products and imports, and the value added tax (VAT) to values added per region at basic prices (see ESA 1329)

Other taxes and subsidies linked to production, form part of GVA at basic prices, and should be allocated to the local KAU or local unit where the production takes place, when the income approach is used (see 5.2) for estimating GVA at basic prices. They should be distinguished from taxes and subsidies on products and imports and VAT. The two are different in impact and should be allocated separately for the estimation of GDPR.

*5.5.2 Principles for the regional allocation of VAT and taxes and subsidies on products and imports*

The application of the ESA rules for the national economy at regional level for the allocation of taxes and subsidies on products and imports and VAT, is not straightforward. Different interpretations may arise due to the fact that the regional economy is open and without a tax system equivalent to that existing at national level.

In the Joint Working Party "Regional Accounts and Statistical Indicators" and "National Accounts" of January 1994 the principles to allocate other taxes and subsidies on products and imports and the value added tax (VAT) at regional level were discussed. Two different approaches were proposed:

- These taxes and subsidies should be allocated to the region where the value added is generated. This was

argued, because the products cross the regional borders with these taxes already accounted.

- These taxes and subsidies should be allocated to the region where the taxed and subsidized products are used either as final use or intermediate consumption. This was based on the hypothesis that national economic territory rules also apply to the regional territories and these taxes and subsidies are linked to products and not to production

After deep discussion in several Working Parties meetings, no agreement could be reached on which of these approaches were the right interpretation of the ESA rules applied at regional level. The position of the country delegates can be summarized as follows:

a) In favour of regionalizing these taxes and subsidies with regard to where goods are produced:

   Germany, United kingdom, Netherlands, Ireland, Denmark and Belgium

b) In favour of regionalizing this tax with regard to where goods are used:

   Greece, Spain, Portugal, France, Sweden, Finland and Austria

c) In favour of regionalizing VAT with regard to where goods are used and other taxes and subsidies on products and imports with regard to where goods are produced:

   Italy and Norway

*5.5.3 The need for a convention*

The position maintained by the country delegates showed a balance where a compromise solution was needed to guarantee the harmonization of the estimation procedures. This is based on the following arguments:

1. Gross domestic product at regional level is an aggregate that plays a key role for EU regional policies and should be calculated in order to lead to comparable regional figures.
2. No definite theoretical arguments to allocate VAT and other taxes and subsidies on products and imports to the region of production or to the region of use were showed during the different working party meetings.
3. The indicators which could be used to allocate VAT and other taxes and subsidies on products and imports to the region of use of goods are not always available. Possible indicators, derived from regional household accounts, are though in the ESA for being evaluated at NUTS II level while GDP is currently estimated at level NUTS III. However, indicators to allocate these taxes and subsidies to the place of production are easily available even at level NUTS III
4. In the past, Eurostat has been allocating these taxes and subsidies proportional to the regional value added at factor cost. Using the place of production criterion, will favour the coherency in regional GDP time series

Based on the arguments above, the following convention is settled:

National VAT and taxes and subsidies on products and imports will be regionalized according to the value added of all industries as valued at basic prices.

This convention would only apply when regionalising GDP and would not be binding when drawing up regional accounts for general government in the future.

## 6. Principales for allocating GFCF

According to the ESA, (392) "GFCF consists of resident producer units acquisitions, less disposals, of fixed assets during a given period plus certain additions to the value of non-produced assets realised by the productive activity of producer institutional units. Fixed assets are tangible or intangible assets produced as output from processes of production that are themselves used repeatedly, or continuously, in processes of production for more than one year"

### 6.1 Allocation principle

The word "acquisitions" in the definition above can be interpreted in different ways and the choice is a crucial one for GFCF. Producer units can "acquire" assets to use in the production process without actually owning them. The assets might be legally owned by another part of the same enterprise, or by another enterprise. For example a subsidiary property company might own all the buildings for an enterprise group; a builder might hire construction equipment from a specialist leasing company on a long term contract; and many enterprises acquire assets in a tax-efficient way on a financial lease from a bank or credit institution. Users and owners of assets can clearly have different industrial classifications and also different regional locations.

According to ESA 1320, "the general principle of allocating gross fixed capital formation by region is ownership just as in the accounts of the total economy(see par 205, foot note 1) Fixed assets owned by a multi-regional unit are allocated to the local KAUs where they are used. As in national accounts fixed assets obtained through operating leasing are recorded in the region of the owner and those obtained though financial leasing, in the region of the user".

### 6.2 Sales of second-hand or existing assets

Producer units sell existing assets to each other eg second hand machinery. When assets move between industries and regions, the total price paid should be included in the GFCF in one industry or region and the price received should be deducted from GFCF in the other. Transaction costs such as legal fees on sales of land and existing buildings are counted as additional GFCF at national level.

### 6.3 Choice of methods

A top-down approach is generally unsuitable for GFCF as it is particularly difficult to find appropriate indicators. GFCF is by nature "lumpy" and smooth indicators such

as wages and salaries are not particularly appropriate. It can be argued that wages and salaries reflects the existing location of activity and is a suitable indicator for GFCF to improve the assets at these locations. GFCF in new locations and large scale improvements do not fit this picture. For any single year, wages and salaries will be a poor indicator of GFCF, though it is more defensible in the longer term.

In conclusion indicators should be used only to fill in gaps and should not be the major source of GFCF estimates for any industry.

# CHAPTER II: APPLYING THE PRINCIPLES TO PARTICULAR INDUSTRIES

## 1. Introduction

This chapter discusses regional GVA and GFCF estimates for the industries where statisticians have encountered particular difficulties with principles, methods and data. It illustrates the practical application of the concepts of ESA, ESA/Reg and the general principles in chapter I. All the principles in chapter I apply to these industries and are referred to rather than re-iterated in this chapter.

The chapter also gives practical guide-lines on methods and data for the industries concerned. These recommendations should be applied across the European Union to improve the cohesion of the estimates.

### 1.1 Industries covered

Regional tables of the ESA annex are based on Sections of the NACE Rev1. Therefore GVA and GFCF by industry should be evaluated according this standard classification

The following industries, which correspond to sections of the NACE Rev 1, need further details

C Mining and quarrying

E Electricity, gas and water supply

F Construction

I Transport Storage and Communication

J Financial intermediation

Pure bottom-up methods are not usually possible for these industries because full information about local KAU or local units is not available in most member states. However enterprise or KAU data are often complete and pseudo-bottom-up methods may be used instead. Where such data are not reliable or not available a top-down approach may be necessary. A pure top-down estimate is usually preferred to a pseudo-top-down estimate. But in a few cases in these industries, a pseudo-top-down approach is recommended for practical reasons. The accuracy of these estimates should be checked as recommended in chapter I section 4.5.

In addition to data problems, some of these industries are heterogeneous. In such cases we recommend that estimates be compiled at a more disaggregated level. Sub-industries or components should be estimated using different methods and indicators reflecting the special characteristics of the sub-industry. The results can then be aggregated. A disaggregated approach is particularly recommended for transport and communication services where there are conceptual difficulties as well as data problems.

### 1.2 Other industries

Methods for agricultural accounts are covered in: "Manual on Economic accounts for Agriculture and Forestry" SOEC 1992 and in the Eurostat internal document "Regional Agricultural Accounts Manual" 1994.

In other industries there are fewer difficulties in understanding how the general principles should be applied, although there may be data and other practical problems. The approaches described for the five industries considered here can also be applied to other industries as outlined below.

Dealing with multi-regional enterprises is a particular problem in manufacturing, distribution etc and non-market services, but the principles are clear from chapter I (section 3.2). The treatment of embassies is a minor problem in the non-market services industry, but the treatment is also clear from chapter I (section 1). Lack of comprehensive regional data is the main problem for market services which is very heterogeneous and has a large number of small units. However, the principles can be applied in a disaggregated approach as described here.

## 2. Mining and quarrying (C) and electricity gas and water supply (E)

### 2.1 Introduction

These industries have the following breakdown:

C: Mining and quarrying

CA: Mining and quarrying of energy producing materials

10 Mining of coal and lignite; extraction of peat

11 Extraction of crude petroleum and natural gas

service activities incidental to oil and gas extraction excluding surveying

12 Mining of uranium and thorium ores

CB: Mining and quarrying except energy producing materials

E: Electricity, gas and water supply

40 Electricity, gas, steam and hot water supply

41 Collection, purification and distribution of water

Industries classified in CA (10 and 12) AND CB present no special problems and discussion here will focus on industries in 11, 40 and 41 which often have very different kinds of local unit. They have a few large capital intensive units such as power stations, but they also have a large number of labour intensive administrative local units. They also have distribution networks of pipelines and cables which may cross regional boundaries. In general these industries consist of a small number of large enterprises. The leading enterprises in these industries are active throughout the entire national territory or at least in several regions. They are also often in the public sector.

The methods used to allocate GVA and GFCF should take these factors into account in order to produce the most accurate estimates possible.

### 2.2 Producer units

Cross-regional activity is a particular feature of these industries eg energy supply from one region to another and national networks of pipelines and cables. GVA and GFCF from all these activities must be allocated to the region where the producer units doing the work is resident. This is discussed in chapter I (section 2.1).

### 2.3 Allocation of GVA

Complete information is usually only available at enterprise level. Thus a bottom-up approach is not feasible and a pseudo-bottom-up method is recommended. A purely top-down approach is less desirable.

Any method should try to take into account the different kinds of local unit: capital intensive and labour intensive. This requires an adhoc disaggregation of GVA as proposed in chapter I section 5.3e. Even when the indicators recommended in chapter I are not available, a pseudo-bottom-up method is still preferable.

Loss-making units may be particularly difficult to identify and measure correctly in this industry because they form part of multi-regional enterprises or vertically integrated companies. Most methods using indicators for GVA or the gross operating surplus implicitly assume that the gross operating surplus has the same sign in all producer units within the enterprise (chapter I section 5.3d).

### 2.4 Allocation of GFCF

Again there is usually little data for local units and a pseudo-bottom-up method is commonly used, failing that a top-down method may be necessary.

For pseudo-bottom-up and top-down methods, we recommend that GFCF on the distribution network eg pipelines and cables should be distinguished from other GFCF. This requires an adhoc disaggregation in two stages:

1. GFCF on the distribution network should be separated from other GFCF. If this data does not exist for all enterprises, it should be estimated using data for similar companies.
2. Other GFCF may be allocated at the local unit level using indicators such as capacity. For investment in the distribution network, a physical indicator such as the length of the network may be used.

### 2.5 Extra-regio allocation

Permanently-installed mineral oil and gas extraction facilities in international waters or on the continental shelves under the country's sovereignty should be allocated to extra-regio.

## 3. Construction (F)

### 3.1 Introduction

This division of the NACE rev 1 is divided in the following five groups:

45.1 Site preparation

45.2 Building of complete constructions or parts thereof

Civil engineering

45.3 Building installation

45.4 Building completion

45.5 Renting of construction or demolition equipment with operator

### 3.2 Producer units

Local KAU or local units classified to this industry are eligible statistical units if they have their own on-site office or pay-roll department with separate accounting.

Building sites should be treated as independent local units when they exceed a certain minimum size (see ESA 1325). It is clear that only when they meet this

requirement, are building sites likely to have the statistical information required. Consortia in building, construction and civil engineering are a typical feature of this industry. These are formed by several enterprises for a particular purpose for a limited period of time. Consortia must also be counted as local units.

### 3.3 Allocation of GVA

Top-down methods are generally recommended because there is little information at local unit level in most countries. We recommend an adhoc disaggregation of GVA into labour and capital portions, if data are available. Otherwise an income approach is recommended as described in chapter I sections 5.2 and 5.3. Indicators such as wages and salaries or employment seem to be appropriate for this industry because wages and salaries are a higher proportion of GVA than in other industries. However the gross operating surplus of the self-employed should be separated from that of companies if possible (section 4.3d of chapter I).

### 3.4 Allocation of GFCF

A significant amount of equipment is leased in this industry. Equipment may also be owned centrally by the enterprise, but used by several local units. The principle adopted in chapter I requires us to allocate GFCF owned by the enterprise to the region where the producer unit using it is resident, and that leased (operational leasing), to the region where the producer unit owning it is resident (section 6.1).

If there is no information for local units, the GFCF should be allocated to the HQ of the enterprise. Many building enterprises are small businesses and allocating GFCF to HQ's should not lead to significant distortion. This recommendation differs from that for rail and air transport (section 4.2.3) where there are a small number of large enterprises and significant distortion would arise.

### 3.5 Extra-regio allocation

GVA and GFCF from building sites (meeting out size requirements) in the extra-regio territory should be allocated to extra-regio.

## 4. Transport, storage and communication (I)

This industry comprises:

60 Land transport; transport via pipelines
- 60.1 Transport via railways
- 60.2 Other land transport
- 60.3 Transport via pipelines

61 Water transport
- 61.1 Sea and coastal water transport
- 61.2 Inland water transport

62 Air transport

63 Supporting and auxiliary transport activities
- activities of travel agencies

64 Post and telecommunication
- 64.1 Post and courier activities
- 64.2 Telecommunications

There are a large number of conceptual and practical problems for transport, storage and communication industries which require careful treatment. Comprehensive local data does not exist in any member state for this heterogeneous industry. Some transport enterprises are usually in the public sector and more or different data may be available for these. Also there are some transport sub-groups where the analysis based on local KAU or local units may present problems that can be avoided by using a pseudo-top-down approach. We therefore recommend dividing the transport, storage and communication industry into homogeneous parts and using different methods for the different sub-groups.

Three groups are distinguished below:

- Transport (excluding rail and air transport)
- Rail and air transport
- Communications

Inland waterway and maritime transport might be included with rail and air transport instead of the other transport. The data and conceptual problems are similar. This is not recommended because it could lead to an inappropriate treatment of the head-quarters of the enterprises operating these services. Air and rail transport headquarters are often located at major airports or railway stations, but inland waterway and maritime transport headquarters are often located in major cities well away from the transport activity.

### 4.1 Transport (excluding rail and air transport)

#### *4.1.1 Introduction*

This group consists of local and long-distance freight and passenger, pipeline, inland waterway and maritime transport. They are grouped together because an approach based on local KAU or local units is appropriate here.

#### *4.1.2 Producer units*

The producer units are local KAU or local units. Mobile equipment and pipeline networks should be attached to these producer units.

Mobile equipment cannot be producer units (see chapter I section 3.1). They must be attached to the local unit where they are based or to which they are deemed to be attached. For example lorries and buses should be allocated to the depot at which they are based. Ships and barges should be allocated to their home base local unit. This could be the place the ship or barge docks if there is a local unit there. Alternatively it could be the office paying wages or arranging cargo and supplies.

This can be difficult in practice and may result in some apparent anomalies. Mobile equipment may be allocated to a region different from that in which it was mainly

operated, even when the equipment was there for long periods. For example ships sailing in international waters may be allocated to an inland unit.

In a very few cases there may not be any home base local unit - for example inland waterway shippers who sail on their own account and do not have any land-based address. In these exceptional circumstances the mobile unit may be allocated to the extra-regio.

Pipeline networks have to be attached to a local unit according to the residence principle in chapter I (section 2.1). The associated GVA and GFCF should be allocated to the local units responsible for the activity. (See ESA 1326 1° parag).

*4.1.3 Allocation of GVA*

Enterprise information is usually complete and a pseudo-bottom-up method may be used to allocate GVA to the local units according to chapter I.

When a reasonable attachment of the mobile equipment has been carried out, GVA at enterprise level can be allocated to the local KAU. We recommend an adhoc disaggregation of GVA into labour and capital related parts when a highly intensive production activity is performed. This was described in section 5.3 e of chapter I.

*4.1.4 Allocation of GFCF*

GFCF should be allocated to the producer units that use it. The difficulties of attaching mobile and leased equipment to user industries have already been discussed.

*4.1.5 Extra-regio allocation*

GVA and GFCF from mobile equipment without land-based addresses may be allocated to the extra-regio (see 4.1.2).

## 4.2 Rail and air transport

*4.2.1 Introduction*

Rail and air transport activities are best dealt with using a pseudo-top-down approach. There is unlikely to be enough data for a bottom-up-approach as most of these enterprises are large and multi-regional. A pseudo-bottom-up approach introduces unnecessary complexities for both GVA and GFCF. We only need to allocate activity to the correct region and we can do this without going to all the trouble of identifying local units and allocating mobile equipment to them.

A pseudo-bottom-up approach would be particularly difficult for rail and air transport, mainly because of the operational organization of the enterprises in these sectors. These enterprises have many different local units: ticket offices, head offices, service depots, stations, manned signal boxes etc. But the service is mainly provided by mobile equipment: aircraft and trains. Since mobile equipment generates most of the GVA, it is both important to treat it correctly, and undesirable to allocate it arbitrarily to a single local unit in the way required for a pseudo-bottom-up approach. However, we can use a pseudo top-down approach to compile regional aggregates without identifying indicators based on local units

*4.2.2 Allocation of GVA*

A pseudo-top-down income approach is recommended for rail and air transport. This makes the best possible use of the data available in most member states. The income approach requires separate estimates of compensation of employees and gross operating surplus. Self-employment is not significant in this industry and need not be considered separately.

Compensation of employees should be allocated to the region where the people are employed (for air crews to the region where they are paid).

The gross operating surplus should be allocated to regions according to indicators relating to the activity of the train or air routes. (see ESA 1326 2° parag). Indicators such as income from passenger fares and freight charges are preferable to physical indicators about the volume of traffic. Passenger and freight transport should be estimated separately if possible.

The following activity indicators are proposed:

a) Rail transport: passengers and freight (loaded plus unloaded) in the stations of the region carried by enterprises contributing to national GVA.

b) Air transport: passengers and freight (loaded plus unloaded) in the airports of the region carried by enterprises contributing to national GVA.

If inland waterway and maritime transport were included in this group, the recommended indicators would also be passengers and freight at the region's ports. But these are likely to be less appropriate. The introduction to section 4 points out that these activity estimates will understate the contribution of head offices, which are often located elsewhere. They would also ignore the contribution of cross-trading (carrying goods and passengers between third countries).

*4.2.3 Allocation of GFCF*

Data for local units should be used if it is available and a pseudo-bottom-up approach is recommended according to the residence principle (chapter I section 2.1).

However for the following assets it is proposed:

a) Rolling-stock and aircraft can be allocated using the activity indicator mentioned above.

b) Infrastructure like rail track and signal boxes should be allocated to the local units that supports it. If there are no data on local units, the strict territorial criterion can be applied to allocate infrastructure to regions. In any case the differences between one method and the other are likely to be negligible.

*4.2.4 Extra-regio allocation*

No extra-regio allocation is envisaged.

## 4.3 Communications

*4.3.1 Introduction*

Communications activities cover:

(a) postal activities national and other than national

(b) telecommunication activities (telephone, telex, telegram etc).

*4.3.2 Producer units*

The producer units are local KAU or local units as defined previously. Mobile equipment, for example, post vans, trains etc., must be attributed to the administrative local unit on which they depend.

Infrastructure such as telephone boxes and telecommunication lines must be allocated to the local unit responsible for managing it (see chapter I section 2.1 and ESA 1326 3° parag).

*4.3.3 Allocation of GVA*

Once the local units have been identified, their GVA can be collected or estimated. Direct data are often not available for local units and a pseudo-bottom-up approach is necessary. Purely top-down methods are often required here.

The member states use very varied indicators: they may use "physical" indicators (number of stamps, number of lines) or conventional indicators such as the regional compensation of employees. Some member states estimate compensation of employees separately from gross operating surplus, but others do not. An adhoc split into the labour and capital related parts is also possible.

*4.3.4 Allocation of GFCF*

The user and residence principles must be respected. This means GFCF in the entire telecommunications infrastructure, in particular the telephone network must be allocated to the local units that manage it. If there are no data for local units, it should be estimated in a pseudo-bottom-up approach. In a purely top-down approach it is only necessary to allocate GFCF to regions not to local units.

*4.3.5 Extra-regio allocation*

No extra-regio allocation is envisaged.

## 5. Financial intermediation (J)

This industry includes:

65 Financial intermediation except insurance and pension funding

66 Insurance and pension funding except compulsory social security

67 Activities auxiliary to financial intermediation

We recommend that financial intermediation and insurance activities be treated separately. The financial intermediation services indirectly measured (FISIM) must be estimated separately to derive the correct regional distribution of total GVA.

### 5.1 Financial intermediation except insurance and pension funding

*5.1.1 Introduction*

Financial intermediation except insurance and pension funding in the NACE Rev.1. includes the following groups:

65.1 Monetary intermediation (Central banking and other monetary intermediation)

65.2 Other financial intermediation (Financial leasing, other credit granting and other financial intermediation n.e.c.)

Output from this industry is basically measured a) by the amount by which income earned exceeds the interest owing to creditors, and b) by the provision of various services invoiced to customers (see ESA 3.5.3 for details).

*5.1.2 The producer units*

There are no particular difficulties for this industry.

*5.1.3 Allocation of GVA*

An income approach is recommended for financial intermediation activities. A pseudo-bottom-up method should be used if enterprise data exist. Otherwise a top-down income method is necessary.

Compensation of employees should be allocated to the local units where the people are employed. For central banking authorities gross operating surplus should be allocated to local units in proportion to compensation of employees. For other institutions it should be allocated to local units in proportion to the sum of loans and deposits. (See ESA 1327).

*5.1.4 Allocation of GFCF*

No particular problems in applying general principles. New buildings account for most of GFCF and these can be allocated directly to the region where they are situated.

*5.1.5 Extra-regio allocation*

No extra-regio allocation in this industry.

### 5.2 Insurance and pension funding except compulsory social security

*5.2.1 Introduction*

These activities are basically performed by the enterprises in the sub-sector entitled "insurance corporations and pension funds" S.125. This sub-sector covers those institutional units which carry out insurance as their main activity, i.e. they transform individual risks into collective risks by constituting technical insurance reserves.

It is worth noting that insurance brokers are not classified to the insurance services industry. They are classified to "Business services provided to enterprises, services of insurance auxiliaries", because their main activity is to negotiate some contracts and not to insure and because they also work for a number of enterprises.

*5.2.2 The producer units*

As explained above the local units are the offices carrying out insurance activities and exclude insurance brokers. These offices may serve a large area or even the whole country.

*5.2.3 Allocation of GVA*

The absence of regional data (inherent in the way these enterprises operate) means that bottom-up methods cannot be used to evaluate value added. One must therefore use a pseudo-bottom-up method or, failing that, a top-down method.

In view of the data usually available, the income approach is appropriate for both pseudo-bottom-up and top-down methods. Compensation of employees should be allocated to the region where the local units are situated and the gross operating surplus in proportion to insurance premiums (See ESA 1327) .

*5.2.4 Allocation of GFCF*

No particular problems in applying general principles. New buildings account for most of GFCF and these can be allocated directly to the region where they are situated.

*5.2.5 Extra-regio allocation*

No extra-regio allocation in this industry.

### 5.3 Financial intermediation services indirectly measured (FISIM)

Part of the output of bank services is the net interest payments of producer units to the banks. It has been included as output of banks, but has not been deducted as intermediate consumption from the output of all the industries. Thus it is double counted. In regional accounts the borrowers and the lenders may be in different regions as well as different industries.

The principle would be to deduct the amounts included in the GVA of industries and regions which use bank services. However there is almost no industrial or regional information on interest flows and these must be estimated consistently in member states.

However, for the time being (See ESA Parag 14 Chap VIII) FISIM are not allocated to user sectors. " The whole of the value of the output of FISIM is treated as the intermediate consumption of a nominal sector with zero output and negative value added, equal in size but opposite in sign to intermediate consumption. In this way the value added of all sectors and industries together is reduced in total by this amount".

This value added from the nominal sector should be allocated to the regions in proportion to the total value added of all the industries.

Total GVA by region is then calculated by deducting the regional estimation of GVA from the nominal sector from the sum of the regional GVA in all the industries.

## APPENDIX A: Definitions of national economic territory

1. The following definition of economic territory is taken from para 205 of ESA.

The term economic territory means:

a) the geographic territory administered by a government within which persons, goods services and capital circulate freely;

b) any free zones, including bonded warehouses and factories under customs control;

c) the national air-space, territorial waters and the continental shelf lying in international waters, over which the country enjoys exclusive rights;

d) territorial enclaves (i.e. geographic territories situated in the rest of the world and used, under international treaties or agreements between States, by general government agencies of the country (embassies, consulates, military bases, scientific bases, etc.))

e) deposits of oil, natural gas etc. in international waters outside the continental shelf of the country, worked by units resident in the territory as defined in the preceding sub-paragraphs.

2. The economic territory of each member state for regional accounts is that defined for gross national product at market prices in the Commission Decision of 26 July 1991. This decision implements Article 1 of Council Directive 89/130/EEC, Euratom on the harmonization of the compilation of gross national product at market prices.

## APPENDIX B: Official definitions of Statistical units

Council,Regulation (EEC) N° 696/93 of 15 March 1993 on statistical units contains the official definitions of the following units:

The enterprise is the smallest combination of legal units that is an organizational unit producing goods and services, which benefits from a certain degree of autonomy in decision making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit.

The local unit(LU) is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place economic activity is carried out for which - save for certain exceptions - one or more persons work (even if only part-time) for one and the same enterprise.

The kind of activity unit (KAU) groups all the parts of an enterprise contributing to the performance of an activity at class level (four digits) of NACE Rev.1 and corresponds to one or more operational subdivisions of the enterprise. The enterprise's information system must be capable of indicating or calculating for each KAU at least the value of production, intermediate consumption, manpower costs, the operating surplus and employment and gross fixed capital formation.

The local kind of activity unit(local KAU) is the part of a KAU which corresponds to a local unit.

The unit of homogeneous production(UHP) is characterized by a single activity which is identified by its homogeneous inputs, production process and outputs. The products which constitute the inputs and outputs are themselves distinguished by their physical characteristics and the extent to which they are processed as well as by the production technique used, by reference to a product classification. The unit of homogeneous production may correspond to an institutional unit or a part thereof; on the other hand, it can never belong to two different institutional units.

The local unit of homogeneous production(local UHP) is the part of a unit of homogeneous production which corresponds to a local unit.

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